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Normative data on cognitive measures of depression.

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Abstract

The assessment of cognition and cognitive change is important for case conceptualization, monitoring the efficacy of specific interventions, and evaluating treatment outcome in cognitive-behavioral therapy. Unfortunately, a paucity of normative data exists on cognitive measures used for psychotherapy outcome research in depression, and little information is available to guide a practitioner's understanding of the magnitude and clinical significance of a patient's cognitive change. This article presents normative data on six self-report instruments: the Automatic Thoughts Questionnaire - Negative, the Automatic Thoughts Questionnaire - Positive, the Beck Hopelessness Scale, the Cognitive Bias Questionnaire, the Cognitive Error Questionnaire, and the Dysfunctional Attitudes Scale. Normative data were derived from studies published from the date of inception of a given cognitive index to the year 2000. Recommendations for the use of this normative data are provided.

Normative Data on Cognitive Measures of Depression

Increased emphasis has been placed in the research literature on the utility of assessment for treatment planning and outcome evaluation (Groth-Marnat, 1999; Maruish, 1999). Along with a growing trend toward empirically supported therapies (DeRubeis & Crits-Christoph, 1998; Dobson & Craig, 1998) has been a parallel movement toward empirically-supported assessment strategies (Antony & Barlow, 2001; Meyer et al., 1998). As Docherty and Streeter (1996) noted, society now demands that mental health services are informed by the empirical literature and also administered with a precision of science.

Comprehensive assessment that includes, among other aspects of functioning, the evaluation of diagnostic criteria, symptom severity, and theory-specific mechanisms of change, serves a number of important functions (Dozois & Dobson, 2001a). The use of multiple assessment strategies a) typically provides more accurate descriptions of a patient's current level of functioning than is otherwise possible; b) helps practitioners to avoid clinical hermeneutics errors (e.g., working with highly disturbed patients and becoming accustomed to the severity of symptomatology such that one loses track of the actual degree of pathology present); c) assists with case formulations, allowing clinicians to target interventions based on both a nomothetic and idiographic understanding of the patient; d) increases one's ability to demonstrate clinical efficacy; e) allows clinicians to confirm or refute hypotheses and impressions about their patients; f) aids in differential diagnosis; g) affords clinicians and researchers the opportunity to monitor the efficacy of treatment over time; h) enables one to respond to external pressures (e.g., managed care and third party payers); and, i) improves the prediction and prevention of relapse (Maruish, 1999; Meyer et al., 1998; Meyer et al., 2001). In many ways, the line between assessment and therapy is artificial, as there is a dynamic interplay between the two --

assessment continually informs treatment and there is a constant need to reassess as treatment progresses (Persons & Davidson, 2001).

Although an understanding of diagnosis and symptom severity is important in formulating a treatment plan and evaluating outcome, it is often insufficient (Beutler, Goodrich, Fisher, & Williams, 1999) and the use of collateral measures of outcome is recommended (Nezu, Ronan, Meadows, & McClure, 2000). Various researchers have advocated for the use of theoretically appropriate measures in the appraisal of treatment outcome (e.g., Dozois & Dobson, 2001a; Lambert & Lambert, 1999). Given that cognitive-behavioral therapy (CBT) emphasizes the modification of negative automatic thoughts and dysfunctional attitudes, the measurement of cognition is an important component of outcome assessment for depression in this modality of treatment (Swallow & Segal, 1995).

A number of studies have supported the idea that cognitive change is associated with changes in depressive symptomatology (DeRubeis et al., 1990; DeRubeis, Tang & Beck, 2001; Hollon, DeRubeis, & Evans, 1996; Oei & Free, 1995; Rush, Beck, Kovacs, Weissenburger, & Hollon, 1982; Tang & DeRubeis, 1999; Whisman, 1999). Although its specificity to CBT has been disputed (Simons, Garfield, & Murphy, 1984; Imber et al., 1990), cognitive change appears to be an important variable to assess in therapeutic change for depression.

Another possible use of cognitive measures relates to the prevention of relapse. Jarrett et al. (1999) have found that relapse rates improve when the length of therapy is extended until patients score consistently (i.e., for 6 weeks) in a minimal range on depressive severity (also see Jarrett et al., 2001). At present, there are no comparable data using cognitive measures. However, because depression is a recurrent disorder (Coyne, Pepper, & Flynn, 1999; Solomon et al., 2000), and cognitive therapy seems to yield a prophylaxis against relapse (see Hollon et al.,

1996; Segal, Gemar, & Williams, 1999), the assessment of self-reported cognitive variables makes intuitive sense, and may also be pertinent to prevention. A number of studies have found, for instance, that individuals with remitted depression have more elevated dysfunctional attitudes than controls after they are induced into a dysphoric mood state (see Ingram, Miranda, & Segal, 1998).

Kendall and Sheldrick (2000) recently published norms on several symptom-based inventories, and discussed the use of these data for making normative comparisons and assessing the clinical significance of treatment change (also see Kendall, 1999; Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999; Sheldrick, Kendall, & Heimberg, 2001). Normative comparisons provide an important strategy for determining whether the change(s) made in therapy are clinically significant (i.e., has a patient's average functioning on a given measure shifted from being within the dysfunctional population to being within a nomothetically average range). As Kendall et al. cogently argued, advances in our nosological system have improved our ability to determine whether a patient continues to meet criteria for a given psychological disorder following treatment. However, many patients continue to exhibit significant residual psychopathology even though they no longer meet diagnostic criteria. Normative comparisons permit researchers and clinicians to examine whether the symptomatology (or, in the case of the present article, cognitive indices) in a sample or individual patient is within the average range, relative to a nondisordered sample (Kendall & Grove, 1988; Kendall et al., 1999).

Although myriad self-report instruments are available for assessing cognitive change in depression (see Nezu et al., 2000), few norms have been published on these measures, making it difficult to use self-report cognitive instruments to assess the clinical significance of treatment change. In this article, we report the normative data on six self-report cognitive measures and

discuss how researchers and clinicians may use these data to monitor treatment change and evaluate outcome.

Method

Measures

Nezu et al. (2000) rated various depression-relevant self-report cognitive measures as either "high" or "limited" in terms of their clinical and research utility. Ratings of "high" were given to instruments that were used frequently in clinical practice and/or used in research and found to yield meaningful results. Self-report instruments were considered to be of "limited" value if they were either uncommon or difficult to use (e.g., the cost or time required was prohibitive) in clinical settings. For measures that Nezu et al. argued accrued an insufficient database, a rating of "limited" was designated for that instrument's research utility. The six cognitive measures chosen for this present review were based on Nezu et al's (2000) recommendations of measures that possess both high research and clinical utility. The literature review included all articles that could be found between the time of the measure's inception up to and including the year 2000.

Automatic Thoughts Questionnaire- Negative (ATQ-N).

The ATQ-N was developed by Hollon and Kendall (1980) to measure the frequency with which an individual experiences negative automatic thoughts over a one-week period. This scale consists of 30 items rated on a 5- point scale, with higher scores indicative of a greater frequency of negative thinking. The ATQ-N has been reported to have excellent reliability (split-half and coefficient alpha were .97 and .96, respectively; Hollon & Kendall, 1980). In terms of convergent validity, the ATQ-N correlates significantly with other related measures (e.g., the Beck Depression Inventory [BDI] and the Minnesota Multiphasic Personality Inventory -

Depression scale) (Hollon & Kendall, 1980).

Automatic Thoughts Questionnaire - Positive (ATQ-P).

The ATQ-P is similar in format to the ATQ-N, and was developed by Ingram and Wisnicki (1988) to measure the frequency of positive self-statements. Respondents rate 30 items on a 5- point scale, ranging from 1 ("not at all") to 5 ("all the time"). The ATQ-P has good psychometric properties (Ingram, Kendall, Siegle, Guarino, & McLaughlin, 1995). Internal reliability appears to be excellent, with coefficient alphas reported as high as .95 (Burgess & Haaga, 1994). Ingram et al. (1995) have also concluded that the ATQ-P exhibits adequate convergent and discriminant validity based on associations with other cognitive measures.

Beck Hopelessness Scale (BHS).

The BHS (Beck & Steer, 1988; Beck, Weissman, Lester, & Trexler, 1974) is a 20-item questionnaire presented in a true/false format. This scale was designed to assess the degree to which a person has negative expectancies toward the future. This scale is believed to measure state-dependent cognitions that can be distinguished between automatic thoughts and stable, underlying self-schemata (Beck, Epstein, & Harrison. 1983). Studies that have assessed the reliability of the BHS have documented high internal consistency (e.g., Kuder-Richardson estimate = .93) and adequate test-retest reliability (Beck & Steer, 1988; Katz, Katz, & Shaw, 1999). The validity of this measure, especially its relationship to suicidal intent, has received considerable support (Beck et al., 1983; Dozois & Covin, in press).

Cognitive Bias Questionnaire (CBQ).

This instrument was developed by Krantz and Hammen (1979) in an effort to measure a person's cognitive distortions, as described by Beck's (1967) cognitive theory of depression (e.g., selective abstraction, overgeneralization, and arbitrary inference). The CBQ consists of six

stories describing potentially problematic scenarios, followed by four response options for respondents to rate. Respondents are required to choose the option that would best reflect their own response to the given situation. Each response option was constructed along two dimensions: affect (depressed/nondepressed) and logical inference (distorted/nondistorted thinking). Thus, responses considered most dysfunctional are those that are both depressive and distorted.

Internal consistency for the depressed-distorted scores appears to be moderate (r = .62 to .69), while the reliability of the whole scale is slightly worse (r = .12 to .50). Test-retest reliability was found to be adequate over a period of 8 weeks (r = .60). Support for the scale's validity stems from findings that depressed-distorted responding relates significantly to increased depression scores. In addition, as depressed persons recover from depressed mood, depressed-distorted scores exhibit a subsequent decrease.

Cognitive Error Questionnaire (CEQ).

This instrument was developed by Lefebvre (1980, 1981) to measure four types of cognitive errors described by Beck (1967): a) catastrophizing, b) overgeneralization, c) personalization, and d) selective abstraction. There are two forms, one dealing with low back pain and one pertaining to more generalized cognitive errors. The entire scale consists of 48 vignettes followed by the presentation of a cognitive distortion. Respondents are asked to rate, on a 5-point scale, how similar the thought is to one they would have had in a similar situation.

Relibility for the entire scale is quite good, with internal consistency coefficients ranging from .76 to .92 (Lefebvre, 1980). Lefebvre (1980) reported moderate concurrent and discriminant validity for both forms, citing significant correlations with similar measures such as the CBQ (r = .60 and .53) and the BDI (r = .29 and .37).

Dysfunctional Attitude Scale (DAS).

The DAS (Weissman & Beck, 1978) was produced to test Beck's (1967) cognitive model of depression, which postulates that those individuals vulnerable to depression should exhibit maladaptive thinking. The original scale consisted of 100 items but, through factor analysis, was partitioned into two 40-item, parallel forms (Form A and Form B). Items are rated on a 7-point (1 = "totally agree"; 7 = "totally disagree"), which yield a total score ranging from 40 to 280. Forms A and B both appear to exhibit good reliability (coefficient alphas of .86 and .87, respectively), and correlate quite well with one another (r = .79) (Beck et al., 1983). The DAS appears to distinguish reliably between depressed and nondepressed groups (e.g., Dobson & Shaw, 1986), and a stable 2-factor structure (relating to affiliative and achievement needs) has generally been found (e.g., Cane, Olinger, Gotlib, & Kuiper, 1986).

Procedure for Inclusion of Articles

An extensive literature review was performed to find articles that contained one or more of the measures in question. The review consisted of examining abstracts from PsychInfo using the measure's name as the keyword in the search. Additional searches were performed using alternate spellings of the measure because certain measures were spelled variantly (e.g., the Cognitive Error Questionnaire was occasionally spelled the Cognitive Errors Questionnaire). To ensure the comprehensiveness of our search strategies, the reference sections of each obtained article were also examined to determine if they contained references omitted in the initial search.

The main criteria for inclusion into this study on normative comparisons were that: 1) studies had to contain samples that were not based on cutoff scores, and 2) the means reported in these studies had to come from a "normal" population, which excluded those persons with serious physical or mental health problems (cf. Kendall & Sheldrick, 2000). To meet criteria for

inclusion, the studies reporting normative data were also required to be published articles, written in English, and administered in the original standardized format (e.g., translated versions of a measure were excluded). Occasionally, there were studies that met our criteria, yet due to other problems, were unable to be included into the final list of articles. For example, there were a large number of studies that used the ATQ-N and the DAS, but did not report the appropriate means for the normative sample. In other instances, only the means from the subscales of a measure were reported or the data were presented in a figure without providing the exact means.

Results

Automatic Thoughts Questionnaire - Negative

A literature search revealed 66 articles that used this measure. There were a total of 21 studies (n = 2916) using the ATQ-N that met inclusion criteria for the present study (see Table 1). The scores ranged from 37.05 to 64.72, with a mean ATQ- N score of 52.91 (SD = 18.18)[1]. Although the samples tended to be comprised mainly of undergraduate students and community volunteers, there were several studies that included adolescents, and two articles focused on elderly persons. Adolescent scores (M = 63.83, SD = 21.27) were significantly higher than were scores for the adult (M = 52.91, SD = 18.19, t [2836] = -6.16, p < .001) or elderly (M = 41.62, SD = 13.68; t [187] = -8.10, p < .001) samples. A statistically significant age difference was also found between the general adult and elderly samples, t (2806) = 5.43, p < .001. Based on the studies that reported separate means for both sexes, women (M = 53.49; SD = 18.60) exhibited significantly higher ATQ- N scores than men (M = 48.40; SD = 15.97), t (773) = -3.28, p < .05.

Automatic Thoughts Questionnaire - Positive

Using the database from PsychInfo, ten studies were found that reported using the ATQ-P. Seven studies (n = 1153) that used the ATQ-P, and met the criteria outlined previously, were

included in the present normative database (see Table 2). ATQ-P scores ranged from 86.63 to 103.31, with a mean of 98.61 (SD = 13.02). The majority of these samples consisted of undergraduate students.

Beck Hopelessness Scale

The BHS is a well-known instrument, with 123 published articles that have included this instrument. There were a total of 25 BHS articles (n = 5503) that met our inclusionary criteria (see Table 3). Scores for this measure ranged from 1.70 to 4.45, with a mean of 3.06 (SD = 3.11). While the majority of samples consisted of undergraduates, there were also samples that included high school students, elderly persons, and volunteer participants from the community. There were no statistically significant effects for age or gender on the BHS.

Cognitive Bias Questionnaire

The CBQ is not used as extensively as some of the other measures we report in this article. Only 11 published studies have used this measure to the year 2000. Of these manuscripts, only 2 CBQ articles met our criteria (see Table 4). However, the total sample size was ample (n = 702). Scores for the depressed-distorted items ranged from 1.58 to 1.95, with an average score of 1.83 (SD = 2.11). All samples with usable normative information were undergraduates and separate means for gender were not reported in the articles reviewed.

Cognitive Error Questionnaire

There are 27 published articles that report findings using the CEQ, and only 4 articles (n = 273) met our inclusion criteria for appropriate nonclinical norms (see Table 5). Scores on this measure ranged from 12.80 to 18.50. The average CEQ score was 17.05 (SD = 11.65). All but one sample consisted of undergraduates, with the remaining sample comprised of elderly participants. The difference between these samples was small in magnitude and not statistically

significant, t (272) = 1.68, p = ns.

Dysfunctional Attitude Scale

The DAS is the most frequently cited cognitive measure related to depression, and has been used extensively in the evaluation of treatment outcome. A PsychInfo search on this measure generated 166 published articles (from 1979 to 2000) that used the DAS. From this empirical database, 35 normative samples (n = 4669) were identified that met our criteria for inclusion (see Table 6). DAS scores ranged from 82.90 to 136.72, with a mean of 119.01 (SD = 26.89). Form A of the DAS is clearly the more commonly used form, as only 2 of the 35 samples reported in this article used Form B. Excluding the mean from these samples did not alter the overall mean (M = 119.35; SD = 26.91). The samples represented in Table 6 were primarily undergraduates, although there were high school student, senior citizen, and non-student volunteer participants as well. The general adult (M = 115.00; SD = 26.70) and elderly (M = 116.73; SD = 23.96) samples did not differ statistically from one another, t (3721) = -.73, p = ns, but adolescents (M = 134.58; SD = 32.13) scored significantly higher than both groups on the DAS (adult vs. adolescent: t [4539] = -19.20, p < .001; elderly vs. adolescent: t [1075] = -6.01, p < .001). When the studies that reported separate means for males and females were analyzed, no significant gender differences were found, t (1176) = -.40, p = ns.

Discussion

This article provides normative data on six self-report indices of depression-related cognition. The measures chosen for inclusion in this review were those deemed to be high on both research and clinical utility (Nezu et al., 2000). As such, we believe that the norms presented herein are applicable to both researchers and practitioners. These norms may be used in many ways. One possibility is to select an individual sample from one of the published

studies reported in this article to make normative comparisons. Another option is to use the pooled means and standard deviations from combined samples. As Kendall and Sheldrick (2000) noted, however, the "decision to combine samples should be made carefully, because despite precautions, the samples to be combined may still differ on some unknown variable, thus reducing the validity of the combined group" (p. 771). In some instances, we found significant age and gender effects. Consequently, we recommend that researchers and clinicians who use the ATQ-N as an outcome measure either select an individual sample that optimally matches their comparison group, or use age- and gender-specific aggregate norms. Similarly, researchers and clinicians working with adolescent populations should use individual or combined adolescent norms when using the DAS.

Consistent with the recommendations of Kendall and his colleagues (Kendall et al., 1999; Kendall & Sheldrick, 2000), the normative data presented in this article are appropriate for making normative comparisons to evaluate clinically significant cognitive change in treatment outcome. Such data are important to demonstrate clinical efficacy and cost-effectiveness (see Meyer et al., 1998).

Using cognitive data, and placing these findings in the context of normative information, may also assist with case conceptualization and treatment planning. For example, normative comparisons may be used to assess the extent to which a patient's scores on cognitively-based measures fall outside of the normal range in severity and frequency. The ongoing collection of cognitive data may also help patients to better grasp the link between cognition and existing symptomatology, and therapists to monitor treatment progress (see Dozois & Dobson, 2001a).

The use of theory-specific measures may also enhance the efficacy of treatment itself, as it can provide directions for intervention. For instance, patients sometimes make significant

changes in negative thinking, but continue to show deficits in positive cognition (Dozois & Dobson, 2001b). If a patient's scores on the ATQ-P are significantly below the normative range, clinicians may decide to increase behavioral activation and develop strategies for improving positive reinforcement.

Normative data may also be used to gauge when treatment might be terminated safely and/or relapse prevention techniques employed (Dozois & Dobson, 2001a). To illustrate, Figure 1 presents ATQ-N and ATQ-P scores for a depressed patient across 18 sessions of cognitive-behavioral therapy. Around the ninth session, this patient's scores fell within the normative range (e.g., □ 1 SD; see Kendall et al., 1999) on both measures. Examining cognitive change, in conjunction with symptom amelioration, the therapist and patient mutually decided to increase the time between sessions, work on maintaining gains, and focus on relapse prevention. The use of these cognitive norms with individual patients is appropriate (see Follette & Callagan, 2001), provided that clinicians determine what the "range of closeness" to the nonclinical population should be. Clinicians should note, however, that it is not possible to actually test for clinical equivalency with individual patients in the manner outlined by Kendall et al. (1999).

The norms presented in this article can also be used to evaluate clinical significance in psychotherapy outcome trials. Kendall et al. (1999) suggested that one strategy for quantifying clinical significance involves the calculation of clinical equivalence between the treatment group and the normative group. Although the typical view is that "normative" is equivalent to "average" and implies that an individual's scores fall above or below one standard deviation, clinicians and researchers may opt to use different delta values depending on how conservative they wish to make the criteria for attaining clinical significance. For example, given that high BHS scores are associated with suicidality (Beck & Steer, 1988), one might decide to use a

stringent delta value for the determination of clinical equivalence. The choice of delta values may also be made based on the reliability of the measure(s) used in the evaluation of outcome. Using a t-test that incorporates the criteria for closeness to the normative population and the standard error of measurement[2], researchers are able to document both the statistical and clinical significance of their findings. It is important to note, however, that this formula may result in a biased estimate when the normative sample is large; this is particularly true if the normative group has low variance in its scores relative to a clinical comparison group (see Kendall et al., 1999).

Finally, cognitive norms may also assist with vulnerability research. A dilemma often faced by researchers who investigate cognitive vulnerability to depression, for example, involves choosing an appropriate cutoff score for a cognitive measure. Several strategies are typically used to determine whether a participant is to be considered cognitively vulnerable. For example, raw scores are frequently converted into z-scores to make this determination, and top and bottom tertiles or median splits are often utilized. Having access to a large normative sample should assist researchers in classifying participants in terms of vulnerability. For instance, a score of 173 or higher on the DAS (i.e., 2 standard deviations above the normative mean) could be used as cutoff score for future studies.

In many ways, this article represents an important extension of, and complement to, the normative database provided by Kendall and Sheldrick (2000), which encompassed norms for self-report measures of symptomatology. It is worth pointing out, however, that this review was necessarily selective, and that there are numerous other measures that may be used in research and applied settings in addition to those presented in this article (see Nezu et al., 2000). There are also a number of other unresolved issues regarding the meaning and measurement of clinical

significance (see Kazdin, 1999, 2001). However, we encourage cognitive-behaviorally oriented researchers and clinicians to evaluate self-reported cognition using these or other normative data.

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Footnotes

1. In each instance, a weighted mean was calculated to determine the overall normative mean for a given measure. A weighted average was used because the variances based on larger sample sizes are better estimates of the population variance than variances derived from smaller samples.

2. The formula provided by Kendall et al. (1999) to determine clinical significance involves the following computations:

$$\text{Clinical Equivalence} = \frac{M_n - M_c - \delta_1}{SE_{N-C}}$$

$$\text{where } SE_{N-C} = 9 \square \frac{(n_N - 1)\, SD^2_N + (n_C - 1)\, SD^2_C}{n_N + n_C - 2} \square \square \frac{1}{n_N} + \frac{1}{n_C} \square^{\frac{1}{2}} A$$

In this formula, M_n = the mean DAS of the normative sample; M_c = the mean DAS for the clinical group; SE_{N-C} = the standard error of the difference between the normative and clinical group means; n_N = the sample size of the normative group; n_C = the sample size of the clinical group; SD_N = the standard deviation of the normative group; and, SD_C = the standard deviation of the clinical group.

Table 1

Normative ATQ-N Means and Standard Deviations

Citation	Sample size and Description	% Female	Mean age	Mean score (SD)
Lightsey Jr. (1997)	69 undergraduates	84	---	51.04 (23.86)
Burgess & Haaga (1994)	199 undergraduates	79	19.60	55.20 (20.50)
Lightsey Jr. (1994a)	71 undergraduates	56	21.20	58.96 (20.47)
Lightsey Jr. (1994b)	168 undergraduates	49	19.65	58.88 (19.25)
McDermit & Haaga (1994)	155 undergraduates	74	20.00	55.30 (21.80)
Kwon & Oei (1992) Study 1	355 undergraduates	71	21.70	52.60 (18.50)
Kwon & Oei (1992) Study 2	200 undergraduates	56	21.30	50.60 (17.10)
Maag et. al. (1992)	65 adolescents from public schools	40	15.10	63.22 (19.76)
Siegert et. al. (1992)	306 undergraduates	53	range = 17-55	54.29 (18.61)

Barnes-Nacoste & Wise (1991)	58 undergraduates	53	19.19	46.83 (15.81)
	57 parents	63	45.11	40.97 (10.33)
	56 grandparents	61	69.00	43.50 (15.13)
Smari (1991)	157 undergraduates	100	range = 20-36	53.86 (18.78)
Kauth & Zettle (1990)	44 middle and high school students	---	---	64.72 (23.50)
Dohr et. al. (1989)	19 volunteers from bulletin board ads	58	42.60	38.40 (8.50)
Hill et al. (1989)	159 undergraduates	57	23	56.30 (17.70)
Kendall et. al. (1989)	19 undergraduates	53	18.53	55.63 (9.10)
Olioff et. al. (1989)	49 undergraduates	49	20.37	48.81 (12.30)
Lam et. al. (1987)	23 elderly volunteers	48	73.00	37.05 (10.35)
Hollon et.al. (1986)	32 undergraduates	69	30.03	45.12 (11.02)

Deardorff et.al. (1985)	82 undergraduates	48	20.25	55.01 (18.45)
Deardorff et.al. (1984)	117 employees of a plastics factory	---	---	48.84 (16.16)
Dobson & Breiter (1983)	456 undergraduates	49	---	50.88 (17.96)

Table 2

Normative ATQ-P Means and Standard Deviations

Citation	Sample size and Description	% Female	Mean age	Mean score (SD)
Lightsey Jr. (1997)	69 undergraduates	84	---	91.50 (31.93)
Burgess & Haaga (1994)	199 undergraduates	79	19.60	100.60 (20.50)
Lightsey Jr. (1994a)	71 undergraduates	57	21.20	86.63 (25.15)
Lightsey Jr (1994b)	168 undergraduates	49	19.65	89.91 (19.32)
McDermut & Haaga (1994)	155 undergraduates	74	20.00	99.30 (22.00)
Ingram et. al. (1990)	11 nondepressed, nonpsychiatric	---	32.35	103.01 (26.05)
Ingram & Wisnicki (1988)	480 undergraduates	59	---	103.31

Table 3

Normative BHS Means and Standard Deviations

Citation	Sample size and Description	% Female	Mean age	Mean score (SD)
Velting (1999)	191 undergraduates	68	18.91	3.04 (3.38)
Clark et. al. (1998)	25 university clerical & support staff	68	40.70	2.68 (3.15)
Johns & Holden (1997)	N = 262 188 undergraduates 12 sexual assault center volunteers 41 social work students 21 continuing education students	79	23.00	4.29 (4.00)
Weber et. al. (1997)	185 undergraduates	51	range = 18-25	3.81 (3.92)
Hickman et. al. (1996)	324 undergraduates	64	range = 17-53	2.67 (2.99)
Alford et. al. (1995)	156 undergraduates	53	--	3.43 (3.31)
Joiner & Rudd (1995)	203 undergraduates	56	19.30	2.21 (3.02)
Moilanen (1995)	84 highschool students	52	15.46	4.11 (4.32)

(table continues)

Chang et. al. (1994)	377 undergraduates	56	19.50	4.12 (3.90)
Dixon et. al. (1993)	154 undergraduates	62	range = 18-19	2.73 (3.47)
Lennings (1992)	86 undergraduates	70	21.40	2.67 (2.39)
Brakney & Westman (1992)	108 undergraduates	73	28.50	2.80 (3.50)
Watley & Clopton (1992)	305 undergraduates	70	range = 18-24	2.55 (3.01)
Page (1992)	1297 high school students	49	15.30	2.99
Simonds et. al. (1991)	61 undergraduates and community	---	---	2.00 (2.49)
Rudd (1990)	737 undergraduates	61	18.00	2.25 (2.60)

(table continues)

Dohr et. al. (1989)	19 volunteers from bulletin board ads	58	42.60	1.70 (1.70)
Rotheram-Borus & Trautman (1988)	23 high school students	100	14.70	2.30 (2.80)
Holden & Fekken (1988)	149 undergraduates	68	20.66	2.67 (2.58)
Lam et. al. (1987)	23 elderly volunteers	48	73.00	4.35 (3.40)
Durham (1982)	197 undergraduates	52	20.71	2.32 (2.25)
Wilkinson & Blackburn (1981)	15 volunteers recruited through newspaper ads	73	54.00	4.10 (3.10)
Greene, S.M. (1981)	396 sampled from electoral wards in Dublin	58	range = 18-65	4.45 (3.09)
Malloy & Fyfe (1980)	91 undergraduates and graduates	62	24.29	2.06 (2.05)
Winefield (1979)	35 undergraduates	100	28.10	4.40 (3.00)

Table 4

Normative CBQ Means and Standard Deviations

Citation	Sample size and description	% Female	Mean age	Mean score (SD)
Krantz & Hammen (1979)	Group 1 -- 212 undergraduates	50	18.00	1.85
	Group 2 -- 315 undergraduates	63		1.95
Carver et al. (1985)	175 undergraduates	52	--	1.58 (2.10)

Table 5

Normative CEQ Means and Standard Deviations

Citation	Sample size and description	% Female	Mean age	Mean score (SD)
Muran & Motta (1993)	40 undergraduates	--	--	16.60 (11.80)
Poulakis & Wertheim (1993)	160 undergraduates	100	20.30	18.50 (11.30)
Robinson & Fleming (1992)	20 undergraduates	80	---	12.80 (9.40)
Scogin, et al. (1986)	53 seniors recruited from community agencies	62	72.10	14.62 (13.43)

Table 6

Normative DAS Means and Standard Deviations

Citation	Sample Size and Description	% Female	Mean age	Mean score (SD)
Scott et al. (2000)	20 healthy controls using patients, spouses and friends	55	42.00	104.40 (16.20)
Klocek et al. (1997)	196 undergraduates	64	18.80	126.38 (25.81)
Bentall & Kaney (1996)	20 nonpsychiatric controls	25	36.65	130.80 (20.16)
Huprich et. al. (1996)	89 undergraduates	64	19.09	125.09 (28.22)
Marton & Kutcher (1995)	819 high school students	48	17.10	135.50 (32.70)
Moilanen (1995)	84 high school students	51	15.46	124.47 (29.53)
Poulakis & Wertheim (1993) Wertheim & Poulakis (1992)[a]	160 undergraduates	100	20.30	119.90 (24.60)
Wong & Whitaker (1993)[b]	171 undergraduate and graduate students	67	20.90	82.90 (29.30)

(table continues)

Kwon & Oei (1992)	355 undergraduates	71	21.70	130.30 (24.90)
Whisman & Kwon (1992)	150 undergraduates	75	19.70	122.49 (32.65)
Barnes-Nacoste & Wise (1991)	58 undergraduates	53	19.19	115.05 (19.99)
	57 parents	63	45.11	107.10 (26.82)
	56 grandparents	61	69.00	114.60 (26.20)
Barnett & Gotlib (1990)	268 undergraduates	74	---	126.00 (23.00)
Dance et. al. (1990)	62 undergraduates	69	21.50	125.66 (27.60)
Kauth & Zettle (1990)	44 middle and high school students	---	range = 12-17	136.72 (26.55)
Peselow et al. (1990)	22 nonpsychiatric controls	---	---	Form B: 99.46 (22.70)
Steiger et al. (1990)	24 nonpsychiatric controls	100	28.04	106.21 (22.65)

(table continues)

Dohr et. al. (1989)	19 community controls	58	42.60	106.80 (34.80)
Hill et. al. (1989)	159 undergraduates	57	23.00	119.70 (29.30)
Kuiper et. al. (1988)	61 undergraduates	--	28.00	117.98 (23.27)
Lam et. al. (1987)	23 elderly volunteers	48	73.00	127.25 (24.00)
Kuiper et. al. (1987)	Study 1 -- 76 undergraduates	--	20.00	116.56 (23.64)
	Study 2 -- 187 undergraduates		19.00	123.78 (28.38)
Olinger, Kuiper et. al. (1987)	132 undergraduates	--	19.00	122.41 (27.92)
Olinger, Shaw et. al. (1987)	89 undergraduates	--	20.00	115.56 (23.64)
Swallow & Kuiper (1987)	172 undergraduates	--	--	124.94 (28.82)
Hollon et. al. (1986)	32 undergraduates	69	--	108.25 (19.68)

(table continues)

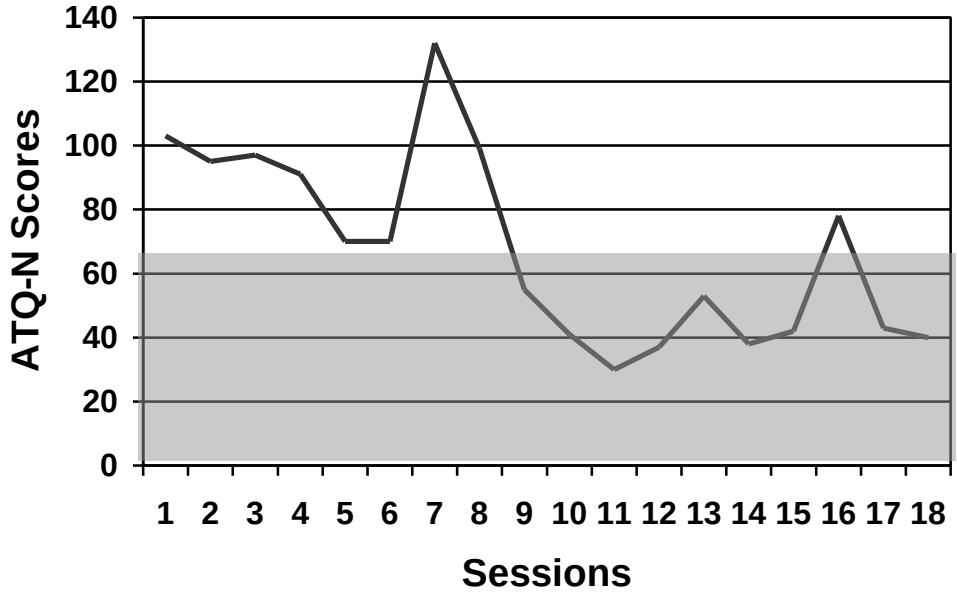
Zimmerman et al. (1986)	53 community controls	--	--	106.50 (22.40)
Parker et. al. (1984)	Study 1 -- 117 patients visiting GP	Form A	36.20	110.00 (24.20)
	Study 2 -- 126 patients visiting GP	Form B	42.30	112.20 (23.60)
Vezina & Bourque (1984)	50 elderly people randomly selected	72	71.00	114.27 (21.42)
Dobson & Breiter (1983)	456 undergraduates	49	--	88.95 (27.96)
Hamilton & Abramson (1983)	20 community controls	65	40.20	105.10 (20.30)
Lohr & Bonge (1981)	242 undergraduates	52	--	118.90 (24.47)

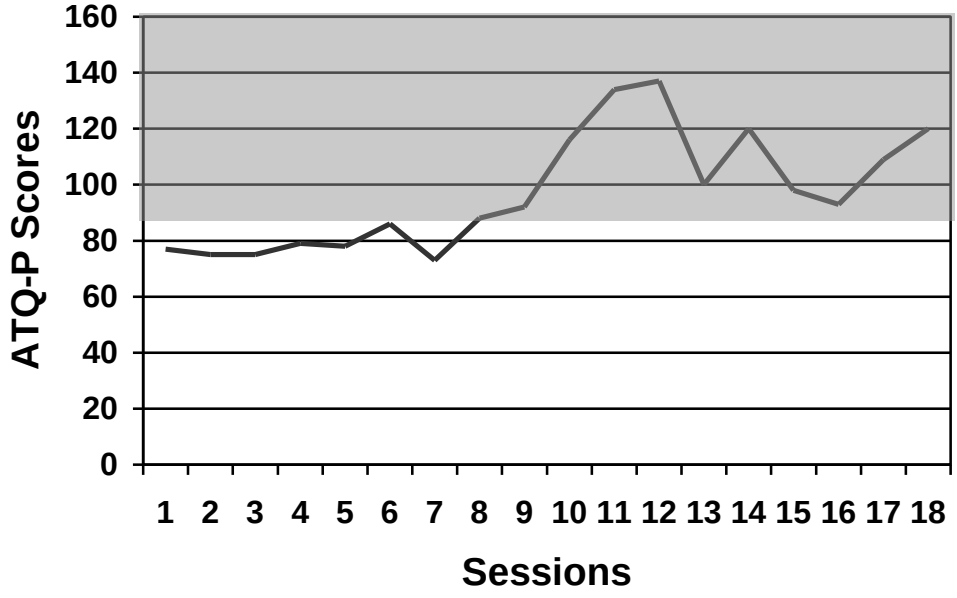
[a] the same sample size and means were reported, implying that these data were derived from the sample participants.

[b] the authors reverse-scored the DAS so that higher scores reflected healthier cognitions (J. L. Wong, personal communication, July 2001). Thus, the grand mean presented in their article was subtracted from 280 to derive number reported above.

Figure Caption:

Figure 1. Mean scores on the Automatic Thoughts Questionnaire - Negative and Positive over the course of therapy. The normative range is presented in gray shading.


ATQ-N Scores
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Sessions


ATQ-P Scores
160
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Sessions