

Assessment of Positive Automatic Cognition

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Although measures of negative thinking in depression such as the Automatic Thoughts Questionnaire have been widely used, comparable measures of positive thinking have not been developed. The lack of such measures has made it difficult to examine both negative and positive change processes as a function of therapeutic interventions. The present article reports two studies designed to develop and evaluate a measure of positive automatic thinking that is complementary to the Automatic Thoughts Questionnaire. The first study examined 30 items that discriminated between groups of subjects with and without elevated depressive affect. The second study examined the relation of these items to several kinds of negative affect. The results of these studies suggest that this scale is a reliable and valid measure of positive thinking that may prove useful in testing theory-based predictions about the role of positive and negative thoughts in dysfunction and in the alleviation of dysfunction.

A variety of assessment methods have been developed to evaluate the extent and quality of negative cognition in psychopathology. One of the most widely used of these measures is the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980). The ATQ is predicated on Beck's (1967, 1976) model of depression, which suggests that recurrent negative thinking is a central component of depression. The ATQ contains 30 negative self-statements and asks respondents to rate the frequency with which these or similar self-statements occur over the period of a week.

Empirical findings from studies using the ATQ have supported its adequacy as a measure of negative thinking in depression. Research has indicated, for example, that both subclinical (Hollon & Kendall, 1980) and nosologically classified (Dobson & Breiter, 1983; Harrell & Ryon, 1983; Hollon, Kendall, & Lumry, 1986) depressives report significantly more negative thoughts on the ATQ than do nondepressed control subjects. Data further suggest that the ATQ assesses cognitions relatively specific to depression (Hollon et al., 1986; Ingram, Kendall, Smith, Donnell, & Ronan, 1987). The ATQ has also proven valuable as a sensitive measure of the cognitive change associated with clinical interventions (e.g., Bisno, Thompson, Breckenridge, & Gallagher, 1985; Simons, Garfield, & Murphy, 1984). Development of the ATQ has therefore clearly advanced an understanding of the cognitive change mechanisms and of the negative cognitive processes in psychopathology.

Although there is little question about the importance of the data on negative thoughts provided by the ATQ, there is controversy over whether negative thinking should receive the sole emphasis in cognitive assessment. Some studies, for example, have suggested that sometimes the degree of positive rather than of negative thinking is the most important determinant of adaptive and maladaptive functioning (e.g., Heimberg, Acerra, & Holstein, 1985; Ingram, Smith, & Brehm, 1983). Alternatively, Kendall (1984) and Kendall and Hollon (1981) have proposed

that the presence of positive thought may be less important in adaptive behavior than the absence of negative thought. Still others have argued that it is the ratio of positive to negative thinking that is critical in determining psychological dysfunction (e.g., Schwartz, 1986; Schwartz & Michelson, 1987).

The assessment of positive thinking also has important treatment implications. In principle, there are different ways in which thought patterns can be therapeutically affected (Ingram & Hollon, 1986). For example, the therapist can work to decrease negative thinking without necessarily focusing on an increase in positive thinking. This might be achieved by emphasizing a less emotional and more rational approach to all thought (e.g., Ellis & Grieger, 1977). The therapist can alternately focus on the accuracy of thinking and thus facilitate positive thought in addition to negative thought. Such approaches suggest a return to a normal balance of positive and negative cognition (see Evans & Hollon, 1988). In addition, some treatments may work by replacing negative thoughts with more positive thoughts (see Meichenbaum, 1977; Steinbrueck, Maxwell, & Howard, 1983). Without a measure of positive thinking that is comparable and complementary to negative thought measures, however, it is difficult to assess which (if any) of these effects might occur. This is particularly true if positive and negative thinking are largely independent processes and, thus, if changes in one cannot be inferred from changes in the other. In addition, dissimilar effects on positive and negative thinking may vary as a function of several treatment variables. For example, comparisons of psychotherapeutic versus pharmacological treatments may yield differential influences on positive and negative cognition. Alternatively, within the realm of psychotherapeutic interventions, different effects may be found for different kinds of therapies.

The present article reports the development and evaluation of an inventory similar in format to the ATQ that was designed to assess the occurrence of positive automatic cognition. Two sets of studies address the development of a positive automatic thoughts measure and its relation to negative affective functioning. In providing an assessment of positive cognition in conjunction with negative cognition, such a measure should allow for the evaluation of theoretically derived hypotheses concern-

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Table 1
Comparison of ATQ-P Items for Depressed and Nondepressed Subjects

Item	Depressed		Nondepressed		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
I am respected by my peers.	3.21	1.15	3.55	.95	1.99
I have a good sense of humor.	3.42	.96	3.72	1.01	2.18
My future looks bright.	3.15	1.25	3.81	.96	4.67
I will be successful.	3.52	1.01	3.96	.99	3.19
I'm fun to be with.	3.46	.94	3.79	.93	2.48
I am in a great mood.	3.18	1.07	3.72	.86	4.29
There are many people who care about me.	3.29	1.15	4.01	.98	5.11
I'm proud of my accomplishments.	3.00	1.27	3.82	1.02	5.47
I will finish what I start.	3.35	1.04	3.68	1.10	2.10
I have many good qualities.	3.43	1.09	3.85	.95	3.06
I am comfortable with life.	2.85	1.09	3.73	1.06	5.93
I have a good way with others.	3.35	1.07	3.64	1.00	2.01
I am a lucky person.	2.86	1.27	3.44	1.14	3.59
I have friends who support me.	3.26	1.28	4.00	.98	4.78
Life is exciting.	2.86	1.05	3.80	1.04	6.55
I enjoy a challenge.	3.12	1.09	3.66	1.09	3.55
My social life is terrific.	2.61	1.15	3.32	1.16	4.47
There's nothing to worry about.	2.15	1.10	2.90	1.08	4.95
I'm so relaxed.	2.41	1.18	3.08	1.04	4.57
My life is running smoothly.	2.48	1.01	3.27	1.09	5.24
I'm happy with the way I look.	2.73	1.10	3.38	1.03	4.25
I take good care of myself.	3.19	1.23	3.56	1.03	2.50
I deserve the best in life.	3.51	1.18	3.94	1.15	2.26
Bad days are rare.	2.31	1.02	2.88	1.14	3.66
I have many useful qualities.	3.33	1.13	3.85	.98	3.71
There is no problem that is hopeless.	2.91	1.11	3.55	1.20	3.92
I won't give up.	3.29	1.23	3.89	1.14	3.71
I state my opinions with confidence.	2.88	1.15	3.53	1.09	4.27
My life keeps getting better.	2.78	.98	3.63	.99	6.19
Today I've accomplished a lot.	3.02	1.23	3.63	1.04	4.07

Note. ATQ-P = Automatic Thoughts Questionnaire-Positive. *df* = 347.

ing the frequency of positive thought in psychopathology and the treatment of psychopathology.

Study One: Scale Development and Characteristics

Initial Item Selection

During pilot work, a group of 47 randomly selected undergraduate students was used to develop initial items. These subjects were drawn from the same pool that provided subsequent experimental samples, which were demographically quite similar. Pilot subjects were asked to recall a situation in which they experienced something positive or were in a good mood and to then attempt to cognitively re-experience that situation as vividly as possible. Next, they were asked to write down at least five thoughts that occurred to them in this situation. Subject responses were then screened by the experimenters to eliminate redundancies and to cull the most appropriate items. Only items that both experimenters independently agreed were unambiguously positive were selected. From this initial list, 30 self-statements were chosen for further use (the ATQ-Positive; ATQ-P). These items are provided in Table 1.

Subjects and Procedure

Subjects were 197 male and 283 female psychology students at San Diego State University who completed both the ATQ-P,

the regular ATQ (ATQ-Negative; ATQ-N) and the Beck Depression Inventory (BDI; Beck, 1967). The items for all scales were randomly combined. Subjects were asked to read and rate each item on a 5-point Likert scale according to how frequently each thought or a similar thought had occurred to them during the past week (1 = *never*, 3 = *sometimes*, 5 = *all the time*).

Depressive Affect Discrimination

As a first step in validating the ATQ-P items and exploring item characteristics, subjects were divided into subsamples consisting of those individuals who reported depression (BDI scores ≥ 10) and those individuals who did not report depression (BDI scores < 10). Prior to univariate analyses, a multivariate analysis was performed to insure that there was an overall difference between depressed and nondepressed subjects on the combined ATQ-P items. This overall difference was confirmed, (Hotellings T^2), $F(30, 445) = 3.66, p < .001$. Independent t tests between depressed and nondepressed subject responses were then computed for each item. ATQ-P items, means, standard deviations, and t values are presented in Table 1. As can be seen from this table, each ATQ-P item discriminated between depressed and nondepressed subjects.

Factor Analysis

Subject responses for each of the 30 ATQ-P items were next submitted to a principal-components analysis with a varimax

Table 2
ATQ-P Item Factors and Loadings

Factor and items	Loading	Factor and items	Loading
Positive Daily Functioning		Positive Self-Evaluation (continued)	
I'm in a great mood.	.52	I take good care of myself.	.60
There are many people who care about me.	.51	I deserve the best in life.	.42
I am comfortable with life.	.56	I state my opinions with confidence	.41
I am a lucky person.	.51	I have many useful qualities.	.40
I have friends who support me.	.55	Others Evaluations of Self	
Life is exciting.	.61	I am respected by my peers.	.46
My social life is terrific.	.50	I have a good sense of humor.	.61
I'm so relaxed.	.44	I'm fun to be with.	.61
My life is running smoothly.	.53	I have a good way with others.	.52
My life keeps getting better.	.51	Positive Future Expectations	
Positive Self-Evaluation		My future looks bright.	.67
I have many good qualities.	.41	I will be successful.	.62
I am happy with the way I look.	.55		

Note. ATQ-P = Automatic Thoughts Questionnaire-Positive.

rotation. This analysis resulted in a four-factor solution. Table 2 presents items on these factors with a varimax loading of greater than .40. These factors together accounted for 92.6% of the variance, with the first factor accounting for 75.2% of the variance, the second factor accounting for 6.8% of the variance, the third factor accounting for 5.7% of the variance, and the fourth factor accounting for 4.8% of the variance.

Because varimax factors are orthogonal, the four factors can be considered largely independent dimensions of responding. The first factor, made up of items revolving around life generally going well, was labeled *Positive Daily Functioning*. The second factor was labeled *Positive Self-Evaluation* and the third factor was labeled *Others' Evaluations of the Self*. Finally, the fourth factor was labeled *Positive Future Expectations*. These factors appear to reflect the opposite of Beck's (1967) negative cognitive triad, which proposed that dysfunctional individuals' cognitions are predominated by negative thoughts about the self, the world, and the future. In contrast, these factors reflect positive cognitions about the self, the world, the future, and how others evaluate oneself.

Internal Consistency

Pearson correlation coefficients were calculated between each individual item and the total scale score. The Bonferroni adjustment was used to control for the experimentwise error rate. All correlations were significant beyond the .001 level. The magnitude of these correlations ranged from .75 ("I have many good qualities") to .42 ("My life is running smoothly"). Thus, each individual item was reasonably related to the total scale score. In addition, the coefficient alpha was found to be .94 ($p < .001$). Split-half reliability for odd and even items was .95 ($p < .001$). The internal consistency of the scale therefore appeared quite adequate.

Normative Data and the Relation of the ATQ-P to the ATQ-N

The overall scale mean for the 480 subjects was 103.31. Means for the factor-analytic subscales follow: Daily Function-

ing = 33.54, Self-Evaluation = 21.20, Other's Evaluations = 14.26, and Future Expectations = 7.65. The *t*-test analyses indicated no significant differences between men and women on any subscale.

To examine the relation between the ATQ-P and the ATQ-N, a Pearson correlation coefficient was calculated. The resulting coefficient was .29, suggesting that the scales shared only about 8% common variance. The scales, therefore, appear relatively independent and do not suggest a bipolar relation between positive and negative thinking.

Study Two: Relation to Negative Affect

A second study using a different sample of subjects was conducted to assess the relation between the ATQ-P and several indices of negative affect. Two questions were addressed. The first examined associations between the ATQ-P and measures of depression and anxiety. The second evaluated ATQ-P scores in a subsample of depressed individuals undergoing treatment.

Associations With Negative Affect

Subjects were 469 undergraduates who completed both the ATQ-N and the ATQ-P in addition to measures of depression, generalized anxiety, and social anxiety. Depression was assessed by the Beck Depression Inventory (BDI; Beck, 1967), generalized anxiety was assessed using the Trait form of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, 1970), and social anxiety was assessed by the Social Avoidance and Distress Scale (SADS; Watson & Friend, 1969). Subjects were also asked whether they had ever sought psychological or psychiatric treatment or were currently in treatment for a problem involving depression. If they responded that they were currently in treatment, subjects were asked for how many months they had been receiving this treatment. Subjects were also asked if any member of their family had ever received psychiatric treatment.

To examine the relation between the ATQ-P and negative affect, correlations were computed with the BDI, the STAI, and the SADS. For the BDI, the resulting correlation coefficients

were .60 with the ATQ-N and $-.33$ with the ATQ-P. For the STAI, the coefficients were .66 with the ATQ-N and $-.37$ with the ATQ-P. Finally, correlations with the SADS were .34 for the ATQ-N and $-.32$ for the ATQ-P. Again using the Bonferroni adjustment, all of these correlations were significant ($p < .001$).

Relation to More Severe Affective Distress

Although the ATQ-P was a somewhat weaker predictor of depression and trait anxiety than the ATQ-N in this sample, this may not be a flaw in the scale but rather may reflect the actual relative weights of positive and negative thinking in this population. That is, as Kendall (1984) and Kendall and Hollon (1981) have suggested, it may be that negative thinking is more strongly characteristic of dysfunction than is the absence of positive thinking. It is also possible that, for the level of depression and anxiety generally experienced in this population, positive thinking had not yet been impaired to the same extent that negative thinking had been facilitated. Positive cognition, for example, might show similar levels of impairment only at more severe levels of distress. To provide initial data on this issue, a subsample of more impaired subjects was chosen to compare with a sample of subjects reporting increased depression but whose distress was presumably less severe, more transient, and less problematic.

Three subsamples were chosen for comparison. First, a depressed subsample was selected of subjects who (a) had BDI scores above 20, (b) reported that they were currently being treated for depression, and (c) had a positive family history for psychiatric treatment. This resulted in a sample of 16 subjects. Second, a mildly depressed subsample was randomly designated of 24 subjects with BDI scores greater than 12 but with no current or past personal or family treatment history. Finally, a nondepressed control group was formed of 24 randomly selected subjects who scored below 9 on the BDI and had no personal or family treatment history. The independent variable, severity of depressive affective functioning, was thus operationally defined by scores on the BDI and by the presence or absence of treatment history for psychological problems. Descriptive statistics for these three groups are presented in Table 3.

A one-way analysis of variance (ANOVA) on ATQ-P scores indicated a significant effect, $F(2, 62) = 21.75, p < .001$. Means are presented in Table 3. Pairwise comparisons using the mean square error term (protected t test) revealed that depressed subjects evidenced significantly fewer positive thoughts than did mildly depressed subjects, $t(62) = 2.27, p < .05$. In turn, there was a strong trend for mildly distressed subjects to report fewer positive thoughts than nondepressed control subjects, $t(62) = 1.97, p < .06$. A one-way ANOVA also indicated significant effects for negative thoughts, $F(2, 62) = 51.90, p < .001$. As can be seen in Table 3, no differences were apparent between depressed and mildly depressed subjects. Both of these groups reported significantly more negative thoughts than did the control group, $ts(62) = 3.69$ and $3.68, ps < .01$, respectively.

Correlations were also calculated within the depressed group to examine relations between treatment length and both ATQ measures. For ATQ-N scores, $r(14) = -.54, p < .05$, was found, whereas for ATQ-P scores, $r(14) = .35, p < .15$, was obtained. Hence, both negative and positive automatic thoughts were impacted depending on how long an individual had received treat-

Table 3
Mean Scores and Months in Treatment for Depressed, Mildly Depressed, and Nondepressed Control Subjects

Measure	Depressed		Mildly depressed		Nondepressed	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ATQ-P	83.08	15.78	95.96	18.63	107.15	18.55
ATQ-N	71.08	16.24	71.13	18.71	53.01	15.00
BDI	23.87	6.32	16.01	7.24	4.39	2.83
STAI	45.10	6.21	42.74	6.82	35.92	6.64
SADS	12.83	5.83	9.57	7.29	5.69	5.50
Months ^a	11.75	12.17	—	—	—	—

Note. ATQ-P = Automatic Thoughts Questionnaire-Positive; ATQ-N = Automatic Thoughts Questionnaire-Negative; BDI = Beck Depression Inventory; STAI = State-Trait Anxiety Inventory; SADS = Social Avoidance and Distress Scale.

^a Number of months in treatment.

ment (range = 1–36 months). Calculation of a correlation between positive and negative thoughts within this group revealed a nonsignificant correlation coefficient of $-.17$, again suggesting a relative independence of positive and negative thinking.

These results suggest that both mildly depressed and depressed subjects evidenced more negative automatic thoughts than did the nondepressed control group. These data strengthen findings from previous analyses of the relation between negative thoughts and distress. The ATQ-P findings also show that the degree of positive cognition apparently deteriorated more in subjects who were not only more depressed but whose negative feelings were severe enough to warrant treatment. These data therefore tentatively suggest that decreases in positive cognition may be associated not only with depression but also with the severity of depression.

It is interesting to note that when we examined different severity levels, negative thoughts did not show the same relation as positive thoughts: No differences were found between the depressed group and the mildly depressed group, and these types of thinking were not correlated. Although these findings may be interpreted a number of ways, they most immediately suggest that positive and negative thoughts may function quite differently within the context of different distress parameters.

General Discussion

The results of these studies suggest that the ATQ-P demonstrates promise as a measure of positive cognition. Specifically, the ATQ-P appears to possess good construct validity as well as the ability to discriminate reliably between subjects experiencing depression and those not experiencing depression. The ATQ-P also differentiates within varying categories of dysfunctional affect to distinguish individuals with more serious affective problems from those experiencing what may be more transient and nondisabling negative affect. Additionally, there is little evidence of a reliable relation between negative and positive cognition. The results reveal that negative and positive self-referent thought may represent fundamentally different processes with different implications for adaptive and maladaptive functioning.

An obvious possible limitation of the present studies is the sample population from which these data were gathered. Subjects for both sets of studies were younger and better educated than many populations for which the ATQ-P might be used. In addition, the level of negative affective functioning was typically less severe than that in a clinical sample (although a subset of these subjects may very well have experienced clinically significant levels of distress). Hence, continued testing with different subsets of clinically significant problem populations is warranted.

The current results serve to illustrate the numerous yet largely unexplored questions regarding the function of positive cognition in psychopathology. In this regard, the data from Study 2 suggest a number of possibilities. For example, the kind of positive thinking assessed by the ATQ-P may serve a coping function in that individuals who generate such thoughts in response to negative events may be able to prevent depression from reaching significant levels. Thus, it is possible that positive cognition acts as a buffer against significant distress; when this cognition diminishes, the affective condition deteriorates. Alternatively, it is possible that, as depression naturally worsens, the level of positive cognition simply decreases concomitantly. This possibility suggests that, whereas negative thinking may asymptote relatively early in distress, positive cognition continues to deteriorate as the affective condition worsens. Appropriate longitudinal assessment with an adequate measure of positive cognition that complements measures of negative cognition should facilitate answers to such questions.

The ATQ-P and the ATQ-N may also be used to answer a number of questions concerning the modification of positive and negative cognition in a clinical context. For example, positive and negative cognitive change may be examined as a function of varying psychotherapeutic interventions, as a function of specific methods within an overall therapeutic intervention, in relation to other indices of therapeutic improvement, or at varying times in the treatment sequence. Inclusion of a positive cognition scale in addition to a negative cognition scale will allow for a more comprehensive evaluation of these and similar questions. For instance, the generation of positive thoughts at some point earlier in treatment may signal the development of coping mechanisms that precede later decreases in negative thinking. Alternatively, negative thoughts may decrease before a return to normal positive cognition is observed. The current studies support the use of the ATQ-P as a measure of positive cognition that may help to answer such questions.

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