

# A Bibliometric Analysis of Research on the Behavior Therapy in China and Its Trend

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**Summary:** To get formed of the status of research and application of the domestic behavior therapy and its development trend, the time distribution and the subject distribution were bibliometrically analyzed of the literature on behavior therapy from 1981 to 2000 in the CBMdisc. Our results showed that the number of literature of behavior therapy has been increasing in exponential manner over the past 20 years; the behavior modification, the biofeedback and the cognitive therapy are extensively used in China. In clinical practice, the behavior modification and the biofeedback have been applied in all departments of medical institutions, especially for treating the cardiovascular and the neurological conditions. The cognitive therapy has been employed mainly for the treatment of mental disorders (or dysphrenia), the aversive therapy mainly for material withdrawal, and the systematic desensitization for phobia. There was no report found on the clinical use of meditation. It is concluded that the study and application in behavior therapy in China is currently developing very fast.

**Key words:** behavior therapy; biofeedback; cognitive therapy; bibliometrics; CBMdisc

The literature is a carrier of records of scientific activities and the change in the amount and content of literature can directly reflect the changes in scientific activities<sup>[1]</sup>. In previous study, the author had analyzed the pattern of change in the total amount of literature on the psychotherapy and the behavior therapy, the results showed that: the psychotherapy in other countries had been growing linearly over the past 20 years, lying in the third stage of discipline development; that the behavior therapy had entered the fourth stage of the discipline development in some countries; the total amount of domestic literature on both psychotherapy and the behavior therapy was in the second stage of the discipline development during which the amount of literature increases exponentially<sup>[2]</sup>. This paper further analyzed the time distribution and the subject distribution of the literature on the various behavior therapies in China, in a hope to offer relevant information for professionals in psychotherapy on status and general trend of the discipline.

## 1 METHODS

### 1.1 Literature Source and Data Searching

The CBMdisc is a database of medical literature which covers the longest time frame and possesses the largest amount of annual coverage. Its relatively standardized subject indexing practice makes it convenient for literature analysis<sup>[3,4]</sup>. CBMdisc, as a literature source, could mirror the status and level of the medical research in China.

The subject headings "behavior therapy (Be-

haT)" and its subheadings such as "aversive therapy (Ave T)", "biofeedback (Biof B)", "cognitive therapy (ConT)", "desensitization, psychological (Desen)", "modification therapy (BeModi)", "implosive therapy (ImpT)", "relaxation techniques (RelaT)" and "meditation (Medit)" were used for literature retrieval to obtain all relevant literature from 1981 to 2000 on the behavior therapy.

### 1.2 Data Analysis

Curve fitting was performed on the annual cumulative amount of literature on the more widely used behavior modification, biofeedback and cognitive therapy in the behavior therapy from 1981 to 2000 by using regression analysis to get the information on the development and trend of the various behavior therapies in China. The mathematical formulas used in this paper are exponential equations.

The application of the various behavior therapies for different diseases by employing subject analysis in order to get information on the application of behavior therapy.

## 2 RESULTS

### 2.1 The Annual Distribution of the Literature on Behavior Therapy in CBMdisc

With CBMdisc, the search with the heading "behavior therapy" and its subheadings yielded 402 citations from 1981 to 2000. The annual amount of literature is given in table 1.

Table 1 shows that the literature on the behavior therapy in China increased rapidly over the past 20 years, with most of them being about the behavior modification, the biofeedback and the cognitive therapy. There were also a few reports on the aversive therapy, the systematic desensitiza-

tion and the relaxation techniques. Only 3 citations about meditation was available. In this paper, only

behavior modification, biofeedback and cognitive therapy were subjected to regression analysis.

**Table 1 The Annual Amount of Literature on Behavior Therapy from 1981 to 2000 in the CBMdisc**

Year	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	Total
Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
BehaT*	2	3	2	3	3	8	13	10	4	9	6	11	6	28	36	38	47	55	53	65	402
BeModi	0	2	0	2	1	3	2	4	3	6	0	4	3	7	18	12	23	29	26	12	152
AveT	0	0	0	0	0	0	1	0	0	1	0	0	0	1	3	1	2	3	1	4	17
BiofB	1	1	1	0	1	4	9	5	4	4	5	7	4	9	13	13	9	7	12	23	132
ConT	0	0	0	0	0	0	0	1	1	1	0	0	1	15	7	11	14	18	28	24	112
Desen	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	2	3	5	1	6	21
ImpT	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	1	0	1	2	17
RelaT	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	2	7
Madit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3

\* Behavior therapy refers to the total amount of literature on the behavior therapy, including the citations on various behavior therapies under its subheadings.

**2.2 The Regression Analysis of Literature on Behavior Modification, Biofeedback and Cognitive Therapy in the CBMdisc**

The study of the pattern of changes in the scientific literature is mainly based on the cumulative data<sup>[5]</sup>. On the basis of the statistical results in table 1, the cumulative amount of literature on “Behavior Modification”, “Biofeedback” and “Cognitive

Therapy” were calculated respectively. X stands for the year number and Y for the annual cumulative amount of literature. The scatter graphs were plotted of the relationship between the annual cumulative amount of literature on the above-mentioned three therapies and the year number. As a result, the scatter graphs(fig. 1) mimicked the

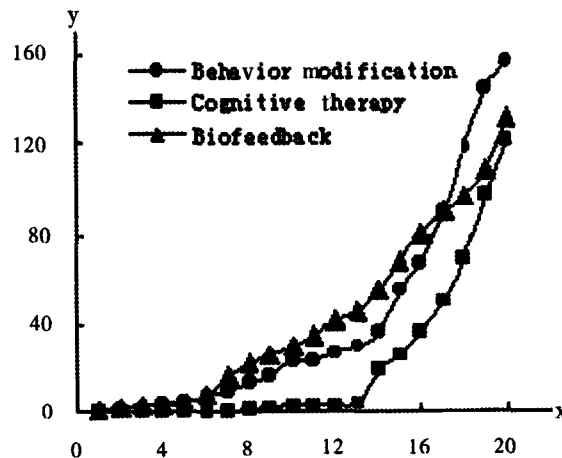


Fig. 1 Scatter graph

exponential curve distribution, and can be shown in the form of exponential equation, that is,  $Y = b_0 e^{b_1 x}$ . Make a curve fit of the annual cumulative amount of literature on the above various behavior therapies with the statistical software SPSS V10. The results are as follows : Curve fit of behavior modification

Independent: X

Dependent Mth Rsq d. f. F Sigf  $b_0$   $b_1$   
 Y EXP .980 17 829.90 .0001 .5533 .2391

From the above results, the exponential equation could be obtained;  $Y = 1.55e^{0.24x}$ ,  $R^2 = 0.98$ ,  $P < 0.001$ . The relationship between the amount of literature and the year number is conspicuous. The annual cumulative amount of literature on the behavior modification in China yielded an exponen-

tial curve with fair goodness of fit.

Curve fit of the biofeedback

Independent: X

Dependent Mth Rsq d. f. F Sigf  $b_0$   $b_1$   
 Y EXP .929 19 247.03 .0001 .7604 .2362

From the above output, the exponential equation:  $Y = 1.76e^{0.246x}$ ,  $R^2 = 0.93$ ,  $P < 0.001$ . The relationship between the amount of literature and the year number is very remarkable. The annual cumulative amount of literature on the domestic biofeedback reveals an exponential curve with fair goodness of fit.

Curve fit of the cognitive therapy

Independent: X

Dependent Mth Rsq d. f. F Sigf  $b_0$   $b_1$   
 Y EXP .957 11 242.45 .000 .0355 .4182

From the above results, the exponential equation can be obtained:  $Y = 0.0355e^{0.418x}$ ,  $R^2 = 0.957$ ,  $P < 0.001$ . The relationship between the amount of literature and the year number is very noticeable. The annual cumulative amount of literature on the cognitive therapy shows an exponential curve with fair goodness of fit.

### 2.3 The Subject Analysis of the Behavior Therapy in the CBMdisc

The 402 citations are about various domestic

behavior therapies. Exclusive of the articles of reviews, theoretic exploration, research on basic sciences and instrument development, 355 citations from 1981 to 2000 deal with the clinical study. The subject distribution is as follows (table 2):

Table 2 shows that among the various behavior therapies, the behavior modification, the cognitive therapy and the biofeedback have been more widely employed, and that the aversive therapy, the systematic desensitization and the relaxation

**Table 2 The Distribution of clinical application of the domestic behavior therapy from 1981 to 2000**

	BeModi	ConT	Biofb	AveT	Desen	RelaT	Madit	BehaT*
Schizophrenia	22	8	2					32
Neurotic disorders	1	2	10					13
Phobia	9	8	1		14			32
Compulsion	8	5		1	1			15
Depression	2	11	1					14
Anxiety neurosis	4	10	4		2			20
Hysteria	1		1		1			3
Neurasthenia	2	6	1					9
Melancholia	3	15						18
Mania	1	1						2
Disorders in sexuality & Sexual behaviors	4	3		5				12
Substance-related disorders	6			14				20
Dysomnia	4		3			2		9
Eating disorders	3	3						6
Adiposis	9			1				10
Juvenile behavioral disorders*	1	1						2
Childhood autism	1							1
Stuttering	1	1						2
Encopresis & enuresis	3		4					7
Cardiopathy/Hypert/ Type A Personality	6		23			7		36
Diseases of nervous system	5	4	12	1			4	26
Diabetes mellitus	2		5					7
Gastrointestinal diseases	3	5	3					11
Tumor	2	9	3					14
Prostatitis	1			2				3
Gynecological diseases	1	2		1		1		5
Skin Diseases	1		2					3
Ophthalmic diseases			5		1			6
Chronic pains	6	4	3					13
Muscle spasm & Muscle training	1		3					4
Total	113	98	86	25	19	14		355

techniques were also reported. The literature of the behavior modification ranks first in terms of amount and it has been most widely used. The cognitive therapy is still mainly used for mental disorders (dysphrenia). The biofeedback is extensively used for the treatment of cardiovascular diseases, nervous diseases, gastrointestinal diseases, diabetes mellitus and chronic pains. The aversive therapy is mainly used for material withdrawal, and the

systematic desensitization mainly for phobias. So far, there is no reports on the meditation in the domestic literature.

### 3 CONCLUSION

The change in the amount of literature can directly reflect the change in scientific activities. Derek de Solla Price, a prominent American scienolo-

gist and one of the founders of Bibliometrics, upon an extensive statistical analysis of the scientific indicators, proposes the law that the amount of literature increases exponentially and a pattern of logistic curve, and put forward the theory that the increase in the scientific literature experiences 4 stages<sup>[5]</sup>.

In this study, the domestic literature on behavior therapy from 1981 to 2000 was bibliometrically analyzed and the cumulative amount of literature displayed an exponential curve with perfect goodness of fit. According to the four-stage theory of discipline development, the behavior therapy in China has entered the rapid development stage during which the amount of literature increases exponentially.

On the basis of the subject analysis of literature on behavior therapy, we can have overview of the status of the application of behavior therapy in China. As shown by table 2, the behavior therapy is most widely (over 50 %) employed for the treatment of mental disorders. However, it also found more applications in clinical departments of general hospitals, especially in departments of cardiovascular diseases and neurology. Its use is extending to other clinical departments. In addition, few citations on the behavior modification for treating urti-

caria and hyperplasia of mammary glands, the cognitive therapy for reforming criminals, the biofeedback for relieving the stress of training, relaxation for strengthening memory, and biofeedback for treating graphospasm are not included in the tables. In short, the behavior therapy has been widely used in a good many clinical departments and for the modification of a variety of unhealthy behaviors.

In the basis of the above analysis, the behavior therapy has reached the stage of great development in our country, but it is still on the initial stage of the discipline development and hasn't set foot in many fields.

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The recently introduced multislice technology, LightSpeed plus CT, which was used in the present case, offers a higher spatial resolution. By combining source imaging, MIP and VR, and rotation of the CTA images in 3D mode, the neck of the aneurysms, parent arteries, surrounding vessels, and measurement in the respective plane could be easily done. In the present case, CTA clearly demonstrated the fenestrated basilar artery and associated aneurysms. Because of the characteristics of this particular aneurysm (short segment fenestration and small size of the aneurysm) and limited image planes of DSA<sup>[6]</sup>, the pathology was demonstrated better by CTA in this patient. DSA was unable to document the exact location of the lesion and evaluation by DSA has its limitations. CTA was done showing the fenestrated basilar artery and associated aneurysms to better advantage. This case presented CTA as a problem solver in the characterization of aneurysms that conventional angiographic techniques showed to be poorly defined or inconclusive.

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