

Effectiveness of Cognitive-Behavioral Treatment for Major Depressive Disorder in a University Psychology Clinic

Francisco José Estupiñá Puig and Francisco Javier Labrador Encinas

Universidad Complutense (Spain)

Major Depressive Disorder (MDD) is the most prevalent mental disorder in our environment, and one of the main causes of disability. While several empirically supported treatments (ESTs) for MDD exist, some doubts have been cast on the applicability—in time, components, and effectiveness—of these ESTs in routine clinical practice. A few attempts have been made to contrast the effectiveness of ESTs, but usually the precise components of the treatment developed are not considered in detail. The purpose of this study is to analyze the components of an EST-based treatment on a sample of 69 MDD cases from a University Psychology Clinic, and to benchmark them against the results of published efficacy studies on ESTs (behavioral activation, cognitive therapy, interpersonal therapy). Results show that treatments delivered at this clinical facility are similar in components, length, and effectiveness (in effect size, completers and improved ratio) to the benchmarked studies. Cognitive restructuring is the most frequent component of the delivered treatments. Therapy results show a 3.12 effect size, and a 55.1% improved ratio over initial sample, an 80% of completers. Results and limitations of the current study, especially those related to sample and center characteristics, are discussed.

Keywords: depression, effectiveness, cognitive behavioral treatment, clinical context.

El Trastorno Depresivo Mayor (TDM) es el trastorno mental más prevalente en nuestro entorno y uno de las principales causas de incapacidad. Aunque se dispone de Tratamientos Empíricamente Apoyados (TEAs) para el mismo, existen dudas sobre la aplicabilidad, en tiempos y componentes, y la efectividad de estas intervenciones en la práctica profesional cotidiana. Son escasos los estudios que intentan contrastar la efectividad de los TEAs para el TDM, y no suele considerar en detalle los contenidos del tratamiento desarrollado. El objetivo de este trabajo es analizar las características del tratamiento basado en TEAs, en una muestra de 69 casos de TDM, en una Clínica Universitaria de Psicología (CUP), y compararlo con las referencias bibliográficas y resultados de los estudios de eficacia de TEAs (Activación Conductual, Terapia Cognitiva, Terapia Interpersonal). Los resultados señalan que las intervenciones de la CUP son similares en componentes, duración y efectividad (en tasa de abandonos, porcentaje de mejorados y tamaño del efecto) a los datos de referencia. La reestructuración cognitiva es el elemento más presente en los tratamientos. Los resultados terapéuticos señalan un Tamaño del Efecto de 3,12 y un porcentaje de mejorados del 55,1% sobre la muestra inicial, un 80% sobre los que completan el tratamiento. Se discuten los resultados y las limitaciones del estudio, en especial referidas a las características de la muestra y del centro.

Palabras clave: depresión, efectividad, tratamiento cognitivo conductual, contexto clínico.

This work was carried out within the framework of the Project PSI2009-13100 from the Spanish Ministerio de Educación & Ciencia [Ministry of Education and Science].

Correspondence concerning this article should be addressed to Francisco José Estupiñá Puig. Clínica Universitaria de Psicología, Edificio Caracolas, Campus de Somosaguas S/N, 28223 Pozuelo de Alarcón – Madrid (Spain). Phone: +34-913942614. Fax: +34-913943010. E-mail: fjepuig@pas.ucm.es

Major Depressive Disorder (MDD) (American Psychiatric Association, 2000) is the most prevalent psychological disorder, both in Spain (3.9% prevalence/year, 10.5% life-prevalence; Haro et al., 2006) and in Europe, although it varies in the diverse countries (The ESEMeD/MHEDEA 2000 Investigators, 2004). Currently, MDD is the fourth cause of impairment and it is predicted to be the second in 2020 (World Health Organization, 2010). Moreover, it involves high economic costs (Üstün, Ayuso-Mateos, Chatterji, Mathers, & Murray, 2004), and according to the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM-IV-TR; American Psychiatric Association, 2000, p. 347), “15% of the people with major depressive disorder die by suicide.” Consequently, within the framework of its National Strategy of Mental Health, the National Health System targets the reduction of the depression and suicide rates in Spain as a specific goal (Ministerio de Sanidad, Política Social e Igualdad [Ministry of Health, Social Policy, and Equality, hereafter, MSPS], 2007, p. 77).

Given the relevance of MDD, there are many psychological intervention proposals and, in recent years, the importance of treatments that meet criteria of efficacy and empirical validation has been underlined, for ethical, economic, and practical reasons (Labrador, Echeburúa, & Becoña, 2000). In accordance with the main classifications of the topic (Chambless & Ollendick 2001; Nathan & Gorman, 2007; National Collaborating Centre for Mental Health, 2010), three empirically supported treatments (ESTs) for MDD are currently acknowledged.

- Behavior therapy (Jacobson et al., 1996; Lewinsohn, Steinmetz, Antonuccio, & Teri, 1985), based on increasing the rate of patients’ reinforcements, by means of behavioral activation, planning of pleasant activities, and problem solving;
- Cognitive or cognitive-behavioral therapy (Beck, Rush, Shaw, & Emery, 1979), based on restructuring depressogenic thoughts, with the support of behavioral activation and personal and social problem-solving strategies;
- Interpersonal therapy (Klerman, Weissman, Rounsaville, & Chevron, 1984), based on managing interpersonal deficits and reappraising contents related to loss, bereavement, and changing roles.

But the empirical validation criteria of treatment efficacy proposed by the 12th Division of the APA (Chambless et al., 1998) have received much criticism due to the difficulty of generalizing the results of the randomized clinical trials (RCTs) on which they are based (Rodríguez, 2004; Seligman, 1995; Shadish et al., 1997). It has been pointed out that the “laboratory” conditions of RCTs differ from those of assistential clinical practice in aspects such as: recruitment of homogeneous patients, treated by investigators using protocolized handbooks and with a limited work load, with supervision and specific preparation for short and highly structured interventions, carried out in an academic setting (Weisz, Weiss, Han, Granger, &

Morton, 1995). Although some data question the magnitude of the differences between these contexts (Chambless & Ollendick, 2001; Nathan, Stuart, & Dolan, 2000; Shadish, Matt, Navarro, & Phillips, 2000; Stirman, DeRubeis, Crits-Christoph, & Rothman, 2005), it is currently considered essential to analyze the clinical utility or effectiveness of ESTs in order to establish the feasibility of applying them in daily clinical practice from the viewpoint of Evidence-Based Clinical Practice: that is, integrating the best evidence available with clinical experience, while taking into account the patients’ differential characteristics (American Psychological Association, 2002; APA Presidential Task Force on Evidence-Based Practice, 2006; Kazdin, 2008). In this sense, it has been noted that the contribution of clinical work—regardless of the fact that the degree of experimental control applied can be considered quasi-experimental—may be an important addition to the scientific knowledge-base on psychological treatments (Kazdin, 2008). University psychology services, developed in the past 25 years in our country (Saúl, López-González, & Bermejo, 2009), are a privileged setting for the study of effectiveness, due to their mixed nature—assistential and investigative (Borkovec, 2004). The University Psychology Clinic of the Universidad Complutense de Madrid, due to its commitment with evidence-based clinical practice and its careful data collection with investigative purposes (Labrador, Estupiñá, & García-Vera, 2010), meets the appropriate conditions to study the effectiveness of ESTs.

Three strategies have been proposed to study effectiveness: clinical representativeness studies (essentially meta-analytical), direct comparison studies (RCTs in natural setting), and comparative studies with reference points obtained from RCTs; these reference points are called *benchmarks* (Minami, Wampold, Serlin, Hamilton, & Brown, 2008). The *benchmarking* strategy compares the results of an intervention in a natural setting, without modifying its characteristics, with the results obtained in rigorous clinical trial conditions. This strategy has some advantages over the other two, as it allows maximizing the clinical representativeness of the intervention studied without altering its natural functioning. This type of studies of MDD (Gibbons et al., 2010; Merrill, Tolbert, & Wade, 2003; Minami, Wampold, Serlin, Kircher, & Brown, 2007; Minami et al., 2008; Persons, Bostrom, & Bertagnolli, 1999; Westbrook & Kirk, 2005) generally indicates equivalent results to those of CCTs. Nevertheless, some limitations have been reported, such as the low reliability of the diagnosis of MDD in natural settings, comparison problems with the RCTs chosen as benchmarks, the generalizability of the results (Gibbons et al., 2010), or the exact nature of the treatment implemented and the assessment tools used. In addition, carrying out studies in applied clinical contexts also presents difficulties, such as missing data (Borkovec & Castonguay, 1998; Gibbons et al., 2010; Westbrook & Kirk, 2005).

Thus, the goal of this study is to compare the characteristics and results of psychological treatments for MDD carried out in an assistential context with the treatments of clinical trials of ESTs for MDD by means of a benchmarking strategy, and to attempt to correct the defects of former studies.

Method

Design

We performed a quasi-experimental, prospective study, with a single group made up of an incidental sample, with repeated measures at assessment and at posttreatment. We compared the results with those obtained in RCTs that are representative of ESTs (benchmarks).

Participants

The final sample comprised 69 patients, whose sociodemographic characteristics, access data to the center, and clinical data are presented in Table 1. The patients were adults who requested treatment for various reasons, between 1999 and 2010, and who received a primary diagnosis of MDD. The University Psychology Clinic of the UCM is a Health Center belonging to the UCM, authorized by the Comunidad Autónoma de Madrid [Autonomous Community of Madrid] (Registry Number CS 1334) since 1998, which

accepts, at their own request, all kinds of patients who do not require hospitalization (Labrador et al., 2010). Information about the patients is gathered for clinical and investigative purposes, a fact about which the patients are informed when starting therapy.

Inclusion and exclusion criteria of this study

Of the initial sample of 118 subjects, we excluded those who: (a) were still in treatment (28 cases) or assessment (17 cases); (b) were diagnosed with a depressive syndrome coded as "in remission" (4 cases).

Procedure

The patients were diagnosed with MDD according to DSM (APA, 2000) criteria by the therapist after an individualized assessment in which diverse instruments were used (semi-structured interviews, validated questionnaires such as the BDI-II, Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996) the Beck Anxiety Inventory (BAI; Beck & Steer, 1993) or the Symptom Checklist 90 - R (SCL-90-R; Derogatis, 1994) and others, according to the particular criterion of the clinician; and self-reports). The median of sessions for assessment was 4, ending with the diagnosis, clinical formulation, and treatment plan. The same therapist subsequently carried out the treatment.

Therapists. The cases were assessed and attended to by 29 therapists from the center, to whom the cases were assigned depending on their availability and the order of

Table 1
Sociodemographic Characteristics of the Patients included in the Study (N = 69)

	Total patients (N = 69)	Completed therapy (n = 44)	Dropouts (n = 25)	$F/\chi^2(p)$
Sex	73.9% women	70.5%	80.0%	$\chi^2(1,69 = 0.753. p < .385)$
Age	$M = 35.41$ $SD = 12.48$ Range = 18-73 years	$M = 36.43$, $SD = 12.908$	$M = 33.60$, $SD = 11.730$	$F(1, 67) = 0.818. (p < .369)$
Civil status	59.4% single	59.1%	60.0%	$\chi^2(3,69 = 0.679. p < 1.000)$
Work situation	33.8% students 57.4% active workers 8.8% unemployed, retirees, homemakers	37.2% 60.5% 2.3%	28.0% 56.0% 16.0%	$\chi^2(10,68 = 15.649. p < .045)$
Educational level	52.9% university graduate 36.8% secondary studies	53.5% 34.9%	52.0% 40.0%	$\chi^2(4,68 = 2.668. p < .652)$
Belongs to the UCM	55.0% students or personnel	54.7%	56.0%	$\chi^2(3,69 = 0.637. p < .881)$
Reason for consultation	50.7% mood 37.8% various reasons for consultation 11.5% reasons other than mood	54.5% 31.8% 4.7%	44.0% 48.0% 8.0%	$\chi^2(4,69 = 2.350. p < .790)$

Table 2
Clinical Characteristics of the Patients included in the Study (N = 69)

	Total patients (N = 69)	Completed therapy (n = 44)	Dropouts (n = 25)	F/ χ^2 (p)
Main diagnoses	66.7% MDD single episode (n = 46) 33.3% recurring MDD (n = 23)	63.6% (n = 28) 36.4% (n = 16)	72.0% (n = 18) 28.0% (n = 7)	$\chi^2(1,69) = 0.502, p < .479$
Pretreatment BDI-II score	M = 29.16 (severe depressive symptomatology); SD = 11.30	M = 27.22 SD = 10.60	M = 32.77 SD = 11.908	F(1, 61) = 3.600, p < .063
Comorbidity	20.3% at least one comorbid diagnosis (n = 14)	15.9% (n = 7)	28.0% (n = 7)	$\chi^2(2,69) = 3.491, p < .186$
Secondary diagnoses	7.1% Anxiety problems (n = 5) 5.8% Couple relation problems (n = 4) 7.2% Other problems (n = 5)	4.5% (n = 2) 9.1% (n = 4) 2.3% (n = 1)	12.0% (n = 3) 0.0% 16.0% (n = 4)	$\chi^2(3,69) = 7.216, p < .042$
Duration of problem	21.7% doesn't know exactly (n = 15) Remaining 78.3%: M = 21.88 months SD = 26.18 months	M = 16.25 SD = 23.024	M = 23.56 SD = 35.857	F(1, 67) = 1.064, p < .306
History of prior treatments	55.1% no prior treatments (n = 38) 29.0% pharmacological treatment (n = 20) 10.1% medication and psychotherapy (n = 7) 5.8% psychological treatment (n = 4)	61.4% (n = 27) 22.7% (n = 10) 9.1% (n = 4) 6.9% (n = 3)	44.0% (n = 11) 40.0% (n = 10) 12.0% (n = 3) 4.0% (n = 1)	$\chi^2(5,69) = 5.656, p < .293$
Family antecedents of depression	63.8% no family antecedents (n = 44) 18.8% maternal antecedents (n = 13) 17.4% other antecedents (n = 12)	61.4% (n = 27) 25.0% (n = 11) 13.6% (n = 6)	68.0% (n = 17) 8.0% (n = 2) 24.0% (n = 6)	$\chi^2(7,69) = 10.456, p < .071$
Current prescription of medication	69.6% receive no medication (n = 48) 11.6% antidepressive medication (n = 8) 5.8% anxiolytics (n = 4) 13.0% several medications (n = 9)	72.7% (n = 32) 9.1% (n = 4) 6.8% (n = 3) 11.4% (n = 5)	64.0% (n = 16) 16.0% (n = 4) 4.0% (n = 1) 16.0% (n = 4)	$\chi^2(3,69) = 1.491, p < .721$

arrival of the patients. The therapists were Graduates in Psychology with cognitive-behavioral training, and holding, at least, a postgraduate Masters Degree in Clinical and Health Psychology, and between 1 and 3 years of supervised clinical practice at the time of joining the center. Their interventions were supervised by professionals of recognized prestige in clinical psychology or psychiatry. The characteristics of the therapists can be seen in Table 3.

Treatments. Each therapist elaborated an individualized treatment program based on the clinical formulation of the case and the recommendations about ESTs for MDD. The treatments, carried out in weekly 1-hour sessions, had a variable duration, and ended either with therapeutic discharge or due to the patient's dropping out. The therapists had access to supervision when they considered it appropriate. They also were free to modify the treatment plan throughout its development, either on their own initiative or at the supervisor's suggestion.

Variables and Instruments

The information was obtained from the patients' clinical records.

Characteristics of the patients. Sex, age, civil status, work situation, educational level, reason for consultation, source of referral to the center, status of student or personnel of the UCM, comorbidity and secondary diagnoses (number and type), duration of the problem, prior treatments (number and type), and family antecedents of depression were included.

Characteristics of the therapies. The number of assessment sessions and treatment sessions before dropout or discharge, the number of follow-up sessions and the number and type of techniques employed in the treatment, as well as patients' adherence to the sessions and tasks assigned in the treatment were included.

Treatment outcomes. The diagnosis of MDD carried out by the clinician and the scores on the Beck Depression

Table 3

Characteristics of the Therapists in Charge of the Application of the Treatment (N = 29)

Sex	58.6% women ($n = 17$), attend to 59.4% of the cases ($n = 41$)
Workload in the present study	$Md = 2$ cases of depression, Range = 1-7 cases.
Age at admittance in the center	$M = 25.45$ years, $SD = 1.0$ years
Type of intervention	Cognitive-behavioral based on ESTs, individualized and self-corrective.
Clinical Training	$M = 7.03$ years, $SD = 0.19$ years
Supervision, control, and work dedication	Access to supervision of cases at assessment. treatment. and discharge. Full-time work dedication.
Referrals ^a	9 cases referred to other therapists.

^a The therapists of the Clinic have a 2-year internship, and at the end of their stay they must refer their cases to other therapists.

Inventory (BDI or BDI-II; respectively, Beck & Steer, 1993, and Beck et al., 1996, Sanz, García-Vera, Espinosa, Fortún, & Vázquez, 2005) were taken into account at the beginning of treatment and at posttreatment. The effect size (ES) of these scores was calculated using Cohen's δ statistic (Cohen, 1988). Jacobson and Truax's (1991) considerations about the reliability of clinically significant therapeutic change and improvement were taken into account, and the Reliable Change Index (RCI) was calculated as an estimation of the reliability of the change occurred due to the treatment. We established the clinically significant improvement criterion at a score equal to or lower than 7 on the BDI-II, according to the criterion "a" of these authors ($a = M_{\text{clinical population}} - 2SD_{\text{clinical population}}$). This criterion is more demanding than the score of 9 points proposed by Sanz et al. (2005), and less ambiguous than the 17-point "c" criterion used in other studies (Gibbons et al., 2010).

We also considered the result of the treatment, conceptualized as discharge or dropout, in the cases in which the posttreatment BDI was not available. Dropout was defined as the termination of treatment after it had started and prior to the time considered suitable by the therapist (Westbrook & Kirk, 2005), and was, in any case, considered a therapeutic failure.

Reference points (benchmarks). As comparison group, we selected the series of studies used by the Task Force to designate "well-established" treatments for Depression (Chambless et al., 1998). From these studies, we selected an application of each one of the therapies with the following characteristics:

- It contained applications of the program of Behavioral Activation, Cognitive Therapy for Depression, or Interpersonal Therapy for Depression, which faithfully followed the corresponding manuals in format and components.

- It used a methodology of RCT that would maximize the internal validity of the study as much as possible.

- It had an explicit recovery criterion, preferably scores on the BDI or BDI-II. When the BDI was used the scores were transformed into BDI-II scores following the proposal of Sanz, Perdigón, and Vázquez (2003).

- It included clear data about participants, number of dropouts and recoveries, ES of the interventions or numerical data that allowed its calculation.

If we found more than one study of each therapy, we chose the one that offered greater methodological guarantees, more robust results, and was that easier to compare with the treatment carried out in the University Psychology Clinic.

Using these criteria, we selected the study of behavioral activation of Jacobson et al. (1996), and the CCTs of cognitive therapy and the interpersonal therapy of Elkin et al. (1989).

Data Analysis

The demographic, clinical, and treatment data and their results were coded on an SPSS 15.0 database for analysis with the pertinent descriptive statistics. The data of the patients who completed the treatment were differentiated from the data of those who dropped out of treatment. We calculated the ratios of treatment success based on the percentage of discharges and dropouts and the clinical significance of change, defined as absence of depression at the end of treatment and a BDI-II score lower than 7 points. We used Cohen's δ to quantify the ES of the treatment at posttreatment, as well as the RCI. In the values where this was possible, the treatment results were compared with the results obtained in the selected comparison groups. This was done by means of *t*-tests or

Kolmogorov–Smirnov (depending on whether or not the parametric assumptions were met), Chi-square tests, Fisher's exact test (depending on whether the expected frequencies were adequately distributed), and ES. We also carried out comparisons between the group of patients who dropped out of treatment and those who completed it (demographic and pretreatment clinical characteristics, treatment characteristics) and between the patients who took antidepressive medication throughout the treatment (demographic and pre- and posttreatment clinical characteristics), by means of a one-factor ANOVA, chi-square tests, or Fisher's exact test.

Results

Intervention format

The patients who completed treatment with therapeutic discharge received a median of 16.5 sessions of treatment, and an average of 9 cognitive-behavioral techniques, including psychoeducation and the offer of verbal or written information about the depressive disorder. The remaining techniques were applied in a varying percentage of the cases, ranging from 100% for the cognitive restructuring techniques to 4.3% for biofeedback. Nevertheless, at least 66% of the patients who finished treatment received a treatment consisting of psychoeducation, techniques to control arousal, behavioral activation/planning of pleasant activities, techniques to control internal dialogue, cognitive restructuring, and social skills and problem-solving training. In 85.4% of the cases, the therapist estimated that more than 75% of the treatment prescriptions were being followed by the patients. Attendance and punctuality in the sessions were appraised as adequate in 95.3% of the cases. Follow-up of treatment outcomes was prolonged for a median of 2 sessions.

The patients who dropped out of treatment received a mean of 5 sessions of treatment, with a median of 6 intervention techniques. The psychoeducational approach was present in 100% of the cases, with the remaining techniques ranging between 80% for the techniques of behavioral activation/planning pleasant activities and 4% for biofeedback techniques. In all, at least 66% of these patients received psychoeducation about their problem, deactivation techniques, behavioral activation/planning pleasant activities, and cognitive restructuring. In 66.7% of the cases, the therapist estimated that more than 75% of the treatment prescriptions were being followed by the patients. Attendance and punctuality in the sessions were appraised as adequate in 66.7% of the cases. Due to dropout, there were no follow-up sessions or information about the final status of the intervention. The details of the characteristics of the interventions applied to patients who completed treatment and those who dropped out can be seen in Table 4.

Treatment Outcomes

Of the patients, 63.8% completed treatment as discharges.

And 36.2% dropped out of treatment. Of these, 29.2% ($n = 7$) justified their decision due to economic criteria, time schedule, or travelling difficulties. In addition, 16.7% ($n = 4$) dropped out because they considered they had improved sufficiently.

BDI-II scores. At posttreatment, we only had the scores of 30 patients, with a mean value of 5.37 points ($SD = 5.58$). The mean reduction of the scores with regard to pretreatment was 24.64 points ($SD = 11.12$), and this difference was statistically significant ($t(29) = 11.264, p < .001$). The RCI was significant for 83.3% of the patients, indicating that their improvement was not due to fluctuations in the measurement instruments. The ES was $d = 3.12$.

Table 4
Characteristics of the Application of Treatment for MDD at the Clinic (N = 69)

	Total patients (N = 69)	Completed therapy (n = 44)	Dropouts (n = 25)	$F/\chi^2(p)$
Number of treatment sessions	$M = 14.64$ $SD = 12.05$	$M = 18.16$ $SD = 11.45$	$M = 8.44$ $SD = 10.65$	$F(1, 67) = 12.140, p < .001$
Number of techniques applied	$M = 8.03$ $SD = 3.23$	$M = 8.80$ $SD = 2.55$	$M = 6.68$ $SD = 3.86$	$F(1, 67) = 7.509, p < .008$
Adherence to treatment prescriptions	80.6% completed at least 75% of the tasks	85.4% completed at least 75% of the tasks	66.6% completed at least 75% of the tasks	$F(1, 65) = 3.653, p < .060$
Regularity and punctuality of attendance	83.6% adequate	95.3% adequate	66.7% adequate	$F(1, 65) = 15.311, p < .001$

Clinical significance. Out of the patients with pre- and posttreatment scores in the BDI-II, only 5 exceeded the cut-off point (7 points) at posttreatment; therefore, 80% of these patients achieved a clinically significant improvement.

Therapeutic discharge indicated the absence of the DSM-IV-TR diagnosis of depression according to the therapist. Considering these two criteria (BDI-II and clinical diagnosis), and considering the dropouts as therapeutic failures, 55.1% of the patients studied achieved a clinically significant improvement.

No significant differences were found between the patients who completed treatment and those who dropped out in demographic variables (sex, age, civil status, educational level, links with the UCM, occupation) or in clinical variables (pretreatment BDI-II, number and type of comorbid diagnoses, duration of the problem, use of medication, adherence to tasks), except in occupation (there was a higher percentage of unemployed among the dropouts, $\chi^2(10, 68 = 15.649, p < .045)$ and type of comorbid diagnosis (there were fewer couple problems, more anxiety and eating problems, and other problems among the dropouts, $\chi^2(3, 69 = 7.216, p < .042)$). Significant differences were also found, $F(1, 65) = 15.311, p < .001$, in compliance

to therapy sessions, as well as in the number of sessions, $F(1, 67) = 12.140, p < .001$, and the number of techniques received, $F(1, 67) = 7.509, p < .01$.

No significant differences were observed between patients with and without antidepressive medication in demographic variables (sex, age, educational level, occupation, and civil status). Nor were differences found in the clinical variables (pre- and posttreatment BDI-II, reduction of BDI-II scores, number of comorbid diagnoses, duration of the problem, use of medication, adherence to tasks, compliance with sessions, completing the treatment) except for the number of prior treatments, $F(1, 67) = 16.511, p < .001$, (taking antidepressive medication counted as prior treatment in all cases).

Comparison of the interventions

Table 5 presents the main characteristics of the therapies to be compared: Behavioral Activation, Cognitive Therapy, Interpersonal Therapy, and the group from the University Psychology Clinic. They are fairly similar in various aspects: individual therapy, duration (12 to 20 sessions), frequency (weekly), and the most important differences emerged in the context (only the University Psychology Clinic was a

Table 5
Characteristics of the interventions

	BA	CT	IT	CLINIC
Format	Individual, manualized, supervised therapy	Individual, manualized, supervised therapy	Individual, manualized, supervised therapy	Individual, self-corrective, supervised therapy
Context	Research	Research	Research	Clinical
Duration	20 one-hour sessions	12 one-hour sessions. extensible.	16 one-hour sessions	Md = 16 one-hour sessions
Frequency	Weekly	Weekly	1 or 2 per week	Weekly
	Behavioral Activation	Behavioral Activation		Behavioral Activation (68.2% of the discharges)
		Cognitive restructuring	Coping with bereavement, loss, and role transitions	Cognitive restructuring (97.7% of the discharges)
	Social Skills	Social Skills	Coping with interpersonal deficits	Social Skills Training (75.0% of the discharges)
Treatment components	Training in Problem Solving	Training in Problem Solving	Coping with interpersonal difficulties	Training in Problem Solving (72.7% of the discharges)
		Exposure		Exposure (32.8% of the discharges)
				Other components (4.5 to 84.1% of the discharges, depending on the techniques)

BA = Behavioral Activation (Jacobson et al., 1996), CT = Cognitive Therapy, IT = Interpersonal Therapy (Elkin et al., 1989), CLINIC = University Psychology Clinic.

Table 6
Comparison of Treatment Outcomes

	BA	CT	IT	CLINIC
% dropouts	10.7% *	37.3%	23.0%	36.2%
Measures of BDI-II (pre- and posttreatment) of patients who completed the treatment	Pre = 29.2, SD = 7.1 Post = 8.4, SD = 7.8, (n = 50)	Pre = 26.8, SD = 8.4 Post = 10.2, SD = 8.7, (n = 37)	Pre = 25.5, SD = 7.7 Post = 7.7, SD = 8.6, (n = 47)	Pre = 30.4, SD = 9.1 Post = 5.6, SD = 5.6 (n = 30)†
Difference of means of pre- and posttreatment BDI-II	20.4	16.6	17.8	24.8
Effect size pre – post (BDI-II)	d = 2.78	d = 1.94	d = 2.17	d = 3.12
% improved at the end of the treatment on BDI-II score	62.5% (n = 50)	64.9% (n = 37)	70.2% (n = 47)	80.0% (n = 30)
% improved at the end of the treatment from total N	55.4%	40.7%	54.1%	55.1% ‡

* presence of significant differences with CLINIC. $\chi^2 (1, 125 = 10.793, p < .001)$.

† for CLINIC. the pre- and posttreatment scores of the 30 subjects of whom we have all the measures. Another 14 subjects finished the treatment but the posttreatment BDI was not applied, so they are not considered here.

‡ BDI-II (n = 30) and other clinical criteria [Interviews and questionnaires: BAI, SCL-90-R, Penn State Worries Questionnaire (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990), Rosenberg's Self-esteem Scale (Rosenberg, 1989), State Trait Anxiety Inventory (STAI; Spilberger, Gorsuch & Lushene, 1970). (n = 14)]

BA = Behavioral Activation (Jacobson et al., 1996), CT = Cognitive Therapy, IT = Interpersonal Therapy (Elkin et al., 1989), CLINIC = University Psychology Clinic.

“clinical context”) and in the treatment components, especially in the Interpersonal Therapy Group.

Comparison of treatment outcomes

Table 6 shows the results of the four comparison groups. Important differences can be seen in the percentage of dropouts between Behavioral Activation and the University Psychology Clinic, and some differences in the pre-post ES. The higher percentage of improvement in the group from the University Psychology Clinic is also noteworthy, although it did not reach statistical significance. The RCI could not be calculated for the selected benchmarks, so it was omitted.

Discussion

Sociodemographic Characteristics

More than two thirds of the patients were women, most of them single, with university studies, and relatively young. The data are similar to that of the other samples, except perhaps for the high educational level (MSPS, 2007). The higher percentage of unemployed among the dropouts may explain why they dropped out (due to economic reasons).

Clinical characteristics of the Patients

The sample used reflects severe depression problems; all of them meet the clinical criteria for MDD, with a high score in the BDI-II ($M = 29.16$), which corresponds to severe depressive symptomatology. Other data such as mean duration of the problem of 22 months, and that almost one half had received prior treatment for this problem, supports the rating of severity. Comorbidity is limited to 20.3% of the cases, although the comorbidity profile between the patients who dropped out and those who did not is different.

Characteristics of the Therapists

Their youth (around 27 years) is noteworthy, as is their academic training of about 8 years in clinical psychology and, particularly, that their interventions are evidence – based on the application of ESTs, depending on the clinical formulation of each problem, not on the assignment of the patient to a diagnosis. The high percentage of referrals (13.7%) has to do with the fact that the mean stay of the therapists is two years, after which, they should refer their cases to other therapists from the same center. These obligatory referrals could cause an increase in the number of sessions of treatment and in the number of dropouts.

Characteristics of the Treatment

The high percentage of discharges (63.76%) is noteworthy. There were also important differences between the groups of discharged patients and dropouts. In these treatment variables, the mean numbers of sessions and techniques are lower in the group of dropouts, which is logical, although it is also noted that their adherence to treatment (attendance) is significantly lower.

Treatment components. At least 15 different types of techniques were used, although some of them, in turn, included various techniques (operant techniques, social skills...), which shows that the psychologist made use of many and varied techniques, which, moreover, achieved considerable clinical efficacy, in view of the results presented. Psychoeducation was used in all cases because, in order for people to change, it is important for them to understand what their problem is and how to behave to overcome it. Knowing about the problem does not solve it, but it guides the patient about how to act. Moreover, according to the formulations and developments of the research that underlines the importance of irrational ideas (Beck et al., 1979), cognitive restructuring techniques and techniques to control internal dialogue are used the most frequently. The other notable factor in depression (Jacobson et al., 1996), the reduction of behaviors and levels of reinforcement, is also reflected in the extensive use of behavioral activation techniques, problem solving, and social skills. The high use of the techniques to control physiological arousal probably reflects the importance of anxious symptomatology in these patients, although it was not expressly diagnosed. The rest of the techniques used seem to respond more to specific aspects of each patient, which is why they are used less frequently.

Comparison of the techniques used in the ESTs

Out of the four alternatives, Interpersonal Therapy is the one that has fewer common components with the other three. The treatment applied in the University Psychology Clinic, in contrast, includes the main components of Behavioral Activation and Cognitive Therapy. The main components of the ESTs, except for Interpersonal Therapy, are applied to a great extent in all cases and within certain time limits, which are similar to those indicated in the RCTs. Both Behavioral Activation and Cognitive Therapy propose programming activities, training in social skills, and problem solving as adjuvant components. Cognitive Therapy includes an essential component of cognitive restructuring as the core of the treatment. In the University Psychology Clinic, at least two thirds of the cases treated until discharge received practically all the components of Behavioral Activation and Cognitive Therapy.

As revealed by the main psychopathological models, in the treatment for MDD, it is important to act on certain specific processes, such as increasing rates of behaviors

and levels of reinforcement, reappraising situations, emotions, and cognitions that feed back to the disorder, improving social functioning and the patient's environment, or training in specific coping skills (Follete & Greenberg, 2006). This is the central nucleus of the treatments in the University Psychology Clinic, to which other techniques are added more sporadically.

Some techniques not considered among the ESTs for MDD (e.g., techniques of control of arousal, control of internal dialogue) are part of the treatment for many patients. It is important to analyze the contribution of these techniques to the treatment to determine whether they really contribute to improving the results or, as their inclusion in the treatment plan is not empirically supported, whether their effect is only to increase the number of techniques and the number of treatment sessions.

With regard to the number of sessions, there are not many differences. Cognitive Therapy is the therapy that proposes a lower number (12), which are considered extensible, so that the number of sessions of reference for MDD is around the median of those used in the University Psychology Clinic (16). It seems that, despite not following a fixed protocol and the frequent effect in clinical practice of adding some goal to those indicated at the beginning, the number of sessions is just as moderate.

With regard to the results, the low rate of dropouts in Behavioral Activation is noteworthy, less than half of the rate for Interpersonal Therapy and less than one third for Cognitive Therapy and for the University Psychology Clinic. However, this datum is misleading, because in the study of Behavioral Activation, even if the patient only attended 12 out of the 20 sessions, it was not considered a dropout. If we exclude Behavioral Activation, there are no significant differences in the dropout rates of the three groups. No doubt, the causes of dropout—with very high rates—and their predictors, are a topic of great interest, both theoretical and applied, and deserve an in-depth analysis, which exceeds the limits of this work.

When considering the BDI-II scores as indicator of clinical improvement, the results of the University Psychology Clinic are the most positive, although the difference does not reach statistical significance. The Clinic also shows the best therapeutic outcomes with regard to the percentage of improved BDI-II scores at the end of the treatment, showing differences of at least 10 points with the other treatments; the fact that 80% improved at posttreatment implies very positive results, which, moreover, were achieved with a reduced number of sessions (16). Taking the ES as the criterion, the ES achieved with the treatment of the University Psychology Clinic ($d = 3.12$) is the largest of all those considered. In many cases, however, there were no posttreatment BDI-II data, and in these cases, the discharge was based on other criteria, which can imply some bias in the total number of recoveries and thereby reduce the sample with which the ES was

calculated. There is some bias, as the diverse studies have employed different cut-off points in order to consider a patient recovered. Nevertheless, the cut-off point employed with the patients from the Clinic was more demanding, so that, in any case, any bias would not overestimate the results in this sample of patients.

Summing up, the individualized treatment carried out in the University Psychology Clinic, a case of evidence-based clinical practice—in the sense that it integrates the principles of change present in the ESTs for MDD adapted to the characteristics of each patient, from the perspective and clinical experience of each therapist—obtains therapeutic results that are at least similar to those obtained in the RCTs of reference for MDD. In fact, these results were achieved despite the scarce experience of the therapists, and despite not having a standardized protocol, or being specifically trained for it, and employing a similar number of sessions as those of the trials. The data obtained support the effectiveness of intervention protocols based on ESTs for MDD, although the manuals are not strictly followed, obtaining rates of change comparable to those reported in the literature concerning efficacy and effectiveness (Gibbons et al., 2010; Merrill et al., 2003; Minami et al., 2008, 2009; Westbrook & Kirk, 2005). Ultimately, these results justify and support the value of generalizing the development of research on ESTs for MDD to assistential clinical practice, adapted to the individual characteristics of the patients.

This work has various limitations, among them, missing BDI-II measures at the posttreatment assessment, as this constitutes an uncontrolled source of variability. With regard to the sample size, although the larger the better, a clinical sample of 69 patients with the same diagnosis is a relevant contribution to the study of the effectiveness of ESTs for depression. However, there are some unavoidable difficulties to collect data in the assistential sphere, as noted in other studies (Westbrook & Kirk, 2005). One of the most important consequences of this is the lack of long-term follow-up data, which limits the scope of this work, and should be corrected in the future. Another limitation of the study is the lack of experimental controls, the inevitable consequence of prioritizing external validity over internal validity. Although more controls would no doubt be desirable, these cannot be carried out at the cost of substituting the natural conditions of treatment application without reducing the generalization goals of the study.

Nevertheless, the data presented herein are partial evidence in favor of the use of ESTs for the treatment of MDD in an Evidence – Based Practice frame, although more specific data is required, such as the time dedicated to each technique, or their order of application. This would provide more accurate information about the similarity of the interventions among the RCTs and the possibilities to apply them in the assistential sphere, or about the weight of each component of the ESTs in the patients'

improvement, or their optimum doses, thus achieving better generalization of the development of research to the applied sphere, and identifying processes of specific change.

Lastly, as indicated in other works (Labrador et al., 2010), the special characteristics of the University Psychology Clinic limit the generalization of the results, but any clinic will have its own special and differentiating characteristics. The publication of the results from other clinics would allow us to determine the possibilities of generalization of these results more precisely.

References

- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th Ed., revised). Washington, DC: Author.
- American Psychological Association (2002). Criteria for evaluating treatment guidelines. *American Psychologist*, 57, 1052–1059. <http://dx.doi.org/10.1037//0003-066X.57.12.1052>
- APA Presidential Task Force on Evidence-Based Practice (2006). Evidence-based practice in psychology. *American Psychologist*, 61, 271–285. <http://dx.doi.org/10.1037/0003-066X.61.4.271>
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford.
- Beck, A. T., & Steer, R. A. (1993). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., & Steer, R. A. (1993). *Beck Depression Inventory. Manual*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A., & Brown, G.K (1996). *Manual for the Beck Depression Inventory–II*. San Antonio, TX: Psychological Corporation.
- Borkovec, T. D., & Castonguay, L. G. (1998). What is the scientific meaning of empirically supported therapy? *Journal of Consulting and Clinical Psychology*, 66, 136–142. <http://dx.doi.org/10.1037//0022-006X.66.1.136>
- Borkovec, T. D. (2004). Research in training clinics and practice research network: A route to the integration of science and practice. *Clinical Psychology: Science and Practice*, 11, 211–215. <http://dx.doi.org/10.1093/clipsy.bph073>
- Chambless, D. L., Baker, M. J., Baucom, D. H., Beutler, L. E., Calhoun, K. S., Crits-Christoph, P., ... Woody, S. R. (1998). An update on empirically validated therapies II. *The Clinical Psychologist*, 51, 3–16.
- Chambless, D. L., & Ollendick, T. H. (2001). Empirically supported psychological interventions: Controversies and evidence. *Annual Review of Psychology*, 52, 685–716. <http://dx.doi.org/10.1146/annurev.psych.52.1.685>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Hillsdale, NJ: Erlbaum.
- Derogatis, L. (1994) *Symptom Checklist – 90 – R. Administration, Scoring and Procedures Manual*. Minneapolis, MN: National Computer System
- Elkin, I., Shea, M. T., Watkins, J. T., Imber, S. D., Sotsky, S. M., Collins, J. F, Parloff, M. B. (1989). National Institute of

- Mental Health Treatment of Depression Collaborative Research Program. *Archives of General Psychiatry*, 46, 971–982. <http://dx.doi.org/10.1001/archpsyc.1989.01810110013002>
- Follete, W. C., & Greenberg, L. S. (2006). Technique factors in treating dysphoric disorders. In L.G. Castonguay & L.E. Beutler (Eds.), *Principles of therapeutic change that work*. (pp. 83–109) New York, NY: Oxford University Press.
- Gibbons, C. J., Fournier, J. C., Stirman, S. W., DeRubeis, R. J., Crits-Christoph, P., & Beck, A. T. (2010). The clinical effectiveness of cognitive therapy for depression in an outpatient clinic. *Journal of Affective Disorders*, 125, 169–176. <http://dx.doi.org/10.1016/j.jad.2009.12.030>
- Haro, J. M., Palacín, C., Vilagut, G., Martínez, M., Bernal, M., Luque, I., ... the Grupo ESEMeD España (2006). Prevalencia de los trastornos mentales y factores asociados: Resultados del estudio ESEMeD-España [Prevalence of mental disorders and associated factors: Results of the ESEMeD-Spain study]. *Medicina Clínica*, 126, 445–451. <http://dx.doi.org/10.1157/13086324>
- Jacobson, N. S., Dobson, K. S., Truax, P., Addis, M. E., Koerner, K., Gollan, J. K., ... Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, 64, 295–304. <http://dx.doi.org/10.1037/0022-006X.64.2.295>
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59, 12–19. <http://dx.doi.org/10.1037//0022-006X.59.1.12>
- Kazdin, A. E. (2008). Evidence-based treatment and practice. *American Psychologist*, 63, 146–159. <http://dx.doi.org/10.1037/0003-066X.63.3.146>
- Klerman, G. L., Weissman, M. M., Rounsaville, B. J., & Chevron, E. S. (1984). *Interpersonal psychotherapy of depression*. New York, NY: Basic Books.
- Labrador, F. J., Echeburúa, E., & Becona, E. (2000). *Guía para la elección de tratamientos psicológicos efectivos* [Guide to effective psychological treatment]. Madrid, Spain: Dykinson.
- Labrador, F. J., Estupiñá, F. J., & García-Vera, M. P. (2010). Psychological care demand in clinical practice: Treatment and results. *Psicothema*, 22, 619–626.
- Lewinsohn, P. M., Steinmetz, J., Antonuccio, D. O., & Teri, L. (1985). A behavioral group therapy approach to the treatment of depression. In D. Upper & S. M. Ross (Eds.), *Handbook of behavioural group therapy* (pp. 303–329). New York, NY: Plenum.
- Merrill, K. A., Tolbert, V. E., & Wade, W. E. (2003). Effectiveness of cognitive therapy for depression in a community mental health center: A benchmarking study. *Journal of Consulting and Clinical Psychology*, 71, 404–409. <http://dx.doi.org/10.1037/0022-006X.71.2.404>
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and Validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy* 28, 487–495. [http://dx.doi.org/10.1016/0005-7967\(90\)90135-6](http://dx.doi.org/10.1016/0005-7967(90)90135-6)
- Minami, T., Wampold, B. E., Serlin, R. C., Kircher, J. C., & Brown, G. S. (2007). Benchmarks for psychotherapy efficacy in adult major depression. *Journal of Consulting and Clinical Psychology*, 75, 232–243. <http://dx.doi.org/10.1037/0022-006X.75.2.232>
- Minami, T., Wampold, B. E., Serlin, R. C., Hamilton, E. G., & Brown, G. S. (2008). Benchmarking the effectiveness of psychotherapy treatment for adult depression in a managed care environment: A preliminary study. *Journal of Consulting and Clinical Psychology*, 76, 116–124. <http://dx.doi.org/10.1037/0022-006X.76.1.116>
- Minami, T., Davies, D. R., Tierney, S. C., Bettman, J. E., McAward, S. M., Averill, L. A., Wampold, B. E. (2009). Preliminary evidence on the effectiveness of psychological treatments delivered at a university counseling center. *Journal of Counseling Psychology*, 56, 309–320. <http://dx.doi.org/10.1037/a0015398>
- Ministerio de Sanidad, Política Social e Igualdad (2007). *Estrategia en salud mental del Sistema Nacional de Salud*. [Mental health strategy in the National Health System]. Madrid, Spain: Centro de Publicaciones del Ministerio de Sanidad, Política Social e Igualdad.
- Nathan, P. E., & Gorman, J. M. (Eds.) (2007). *A guide to treatments that work*. New York, NY: Oxford University Press.
- Nathan, P. E., Stuart, S. P., & Dolan, S. L. (2000). Research on psychotherapy efficacy and effectiveness: Between Scylla and Charybdis. *Psychological Bulletin*, 126, 964–981. <http://dx.doi.org/10.1037//0033-2909.126.6.964>
- National Collaborating Centre for Mental Health (2010). *Depression: The treatment and management of depression in adults* (Updated Ed.). Leicester, England: BPS & RCP.
- Persons, J. B., Bostrom, A., & Bertagnolli, A. (1999). Results of randomized controlled trials of cognitive therapy for depression generalize to private practice. *Cognitive Therapy and Research*, 23, 535–548. <http://dx.doi.org/10.1023/A:1018724505659>
- Rodríguez, A. (2004). La investigación de resultados y el futuro de la psicoterapia: Alternativas a los tratamientos empíricamente validados [Research of the results and the future of psychotherapy: Alternatives to empirically validated treatments]. *Papeles del Psicólogo*, 25, 45–55.
- Rosenberg, M. (1989). *Society and the adolescent self-image. Revised edition*. Middle-Town, CT: Wesleyan University Press.
- Sanz, J., García-Vera, M. P., Espinosa, R., Fortún, M., & Vázquez, C. (2005). Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 3. Propiedades psicométricas en pacientes con trastornos psicológicos [Spanish adaptation of the Beck Depression Inventory-II: 3. Psychometric properties in patients with psychological disorders]. *Clínica y Salud*, 16, 121–142.
- Sanz, J., Perdigón, A. L., & Vázquez, C. (2003). Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 2. Propiedades psicométricas en población general [Spanish adaptation of the Beck Depression Inventory-II: 3. Psychometric properties in general population]. *Clínica y Salud*, 14, 249–280.

- Saúl, L. A., López-González, M. A., & Bermejo, B. (2009). Revisión de los servicios de atención psicológica y psicopedagógica de las universidades españolas [Review of the services of psychological and psychopedagogical care in Spanish universities]. *Acción Psicológica*, 6, 17–40.
- Seligman, M. E. (1995). The effectiveness of psychotherapy: The Consumer Reports Study. *American Psychologist*, 50, 965–974. <http://dx.doi.org/10.1037//0003-066X.50.12.965>
- Shadish, W. R., Matt, G. E., Navarro, A. M., & Phillips, G. (2000). The effects of psychological therapies under clinically representative conditions: A meta-analysis. *Psychological Bulletin*, 126, 512–529. <http://dx.doi.org/10.1037//0033-2909.126.4.512>
- Shadish, W. R., Matt, G., Novaro, A., Siegle, G., Crits-Christoph, P., Hazelrigg, M., ... Weiss, B. (1997). Evidence that therapy works under clinically representative conditions. *Journal of consulting and clinical psychology*, 65, 355–365. <http://dx.doi.org/10.1037//0022-006X.65.3.355>
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E., (1970) *Manual for the State-Trait Inventory*. Palo Alto, CA: Consulting Psychological Press
- Stirman, S. W., DeRubeis, R. J., Crits-Christoph, P., & Rothman, A. (2005). Can the randomized controlled trial literature generalize to nonrandomized patients? *Journal of Consulting and Clinical Psychology*, 73, 127–135. <http://dx.doi.org/10.1037/0022-006X.73.1.127>
- The ESEMeD/MHEDEA 2000 Investigators (2004). Prevalence of mental disorders in Europe. *Acta Psychiatrica Scandinavica*, 109, 21–27. <http://dx.doi.org/10.1111/j.1600-0047.2004.00327.x>
- Üstün, T. B., Ayuso-Mateos, J. L., Chatterji, S., Mathers, C., & Murray, C. J. L. (2004). Global burden of depressive disorders in the year 2000. *The British Journal of Psychiatry*, 184, 386–392.
- Weisz, J. R., Weiss, B., Han, S. S., Granger, D. A., & Morton, T. (1995). Effects of psychotherapy on children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin*, 117, 450–468. <http://dx.doi.org/10.1037//0033-2909.117.3.450>
- Westbrook, D., & Kirk, J. (2005). The clinical effectiveness of cognitive behaviour therapy: Outcome for a large sample of adults treated in routine practice. *Behaviour Research and Therapy*, 43, 1243–1261. <http://dx.doi.org/10.1016/j.brat.2004.09.006>
- World Health Organization (2010). *Depression*. Retrieved from http://www.who.int/mental_health/management/depression/definition/en/index.html

Received April 15, 2011

Revision received October 3, 2011

Accepted October 24, 2011