

■ *Research Paper*

## Effectiveness of Systematic Desensitization through Eye Movement and Reprocessing on Reducing Severity of Major Depression in Women

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*The present study aims at measuring the effectiveness of systematic desensitization through eye movement and reprocessing (EMDR) on reducing the severity of major depression. EMDR is a kind of hybrid treatment which relates traumas and disorders to the way the brain processes and stores data, uses behavioral techniques such as simultaneous exposure to intentional and rapid movements of pupil and deals with cognitive restructuring. Methodology: experimental design of single subject was administered on four people suffering from major depression over five sessions using multi-step baseline design. Follow-ups happened quarterly and annually. Data collection tools included a self-made demographic inventory, depression and distress inventory and EMDR treatment tool and measurement scales of cognition validity and SUD. Findings: EMDR caused significant changes in both reduction of major depression and SUD and increase of higher level of trust in validity cognition. Conclusion: the results suggested that EMDR was effective in decreasing the rate of depression severity through cognitive and emotional reprocessing of traumatic memories and changing patients' bias via building trust in validity cognition to the point that the intervention effect was maintained after three months and one year follow-ups.*

*Keywords:* Systematic Desensitization through Eye Movement and Reprocessing, Major Depression, Anxiety, Mental Distress, Trusting Validity Cognition.

### INTRODUCTION

Depression is one of the human's common experiences often happening as natural reaction to external events or individuals' internal traumas (Hawton, 2003; Abdolmanafi, 2010)

. In general, the rate of depression prevalence is reportedly 15% within lifetime and twice in as many women as men (Abdolmanafi, 2010; Sadok, 2007). American Psychiatric Association has estimated that depression is the second highest among four most common psychological disorders

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in the world between 2000-2020 (Sadok & James, 2007). Major depression as a mood disorder is an emotional state intensified by higher feelings of sadness and characterized by loss of sexual desire and interest and pleasure in normal activities (Sadok & James, 2007; Perocheska, James & Jansi, 2008). Review of the related literature is so much extensive regarding the cause of the disorder and the recommended treatments based on the developed theories. Different studies relate the beginning and process of the disorder to various variables of biology, disorder record, environment, psychology and society (Sadok & James, 2007).

Among others, Hawton et al (Hawton, 2003) refer to some recent negative events of life, long-term sensation of lack of self-esteem. Beck relates to the individual's thinking and evaluation of the events and happenings which get him involved and the individual's unpleasant experiences caused by ineffective, inflexible and resistant to changes assumptions. Mog and Grath (2008) refer to losing or failure of the feelings. Hanasabzadeh (1999) points to the way an event is evaluated in short-term and long-term memory over the processes of concrete thinking. Kaviyani (2008) refers to the way automatic/ controlled emotional data are processed in the individual. Mog and Grath (2008) refer to the orientation of attention in the individual. Dysfunction of neurotransmitters such as norepinephrine and serotonin are most involved in the pathophysiology of mood disorders (Dowlatabadi, 1999).

Based on the different approaches dealing with the etiology of major depression, there have been various psychological treatments developed which help the patients with not only accelerating the recovery in the current period but also creating continuous recovery and reducing the likelihood of recurrence of the disease (Busch et al., 2013). Cognitive-behavioral models as successful interventions have managed to treat this disorder, among other various treatment approaches (Dowlatabadi, 1999).

EMDR as a novel, fast and effective treatment has gained lots of success in treating major traumas such as post-traumatic stress disorder and anxiety disorders (Johnson, Brennan, Stowe, Leibenluft, & Newport, 2014). Recently the effectiveness of tis

short-term, powerful treatment has been analyzed for a wide range of disorders including depression, chronic pains, phobia, stress, panic attacks, nutritional disorders, poor self-concept and emotional disorders. Moreover, its effectiveness had also been extended to treating chronic pains, shortness of breath, asthma and learning disabilities (Lorzadeh, 2006; Williams et al, 2007). However, this different therapeutic approach drawn on Shapiro's theory in 1987 was first called Accelerated Information Processing (AIP) Lorzadeh, 2006; Williams et al, 2007).

Treatment process includes systematic desensitization through eye movements and reprocessing and recalling early, root and effective experiences proved to have a deep impact on cognitive-emotional processing of negative data resulting from harmful occurrences. The mechanism is to involve the patient in the cognitive filter on the ground that the individual would reprocess the negative concepts and phrases (cognitions) relating to his/her life history and would follow opening cognitive nodes in which accelerating the formation of orientation process towards positive cognition would take place as well as negative orientation (Perocheska, James & Jansi, 2008).

In general, Shapiro believes that any psychological disorder comes from psychological traumas and divides them into two groups of major trauma (T) and minor trauma (t). He states that these traumas are aftermaths of shocking events such as natural phenomena or less harmful events like childhood blames and parents' negative messages, etc. which in turn lead to the formation of feelings of worthlessness, inferiority and lack of self-esteem. They stay in the individual's accelerated information processing, psychological, innate and adaptive system following the blockage or stuck of unprocessed data due to the accumulation of electrical charges on the surface of neurons caused by negative emotional arousal. The reason for continuation of these traumas is to recall the hidden negative feelings and cognitions from the harmful memories of the individual due to daily drivers (Perocheska, James & Jansi, 2008; Lorzadeh, 2006).

Depression with negative emotions such as sadness, hopelessness, thoughts and feelings of

failure, frustration and cynicism locked or stuck rigidly with the occurrence of harmful events becoming continuously active via shockers during life (Uddin et al., 2013). Continuous recalling of traumatic memories, feelings and due to negative emotions would cause a sense of inability, psychological weakness and depression enhancement (Khalbrin, 2010); Williams et al, 2007). In other words, Williams et al (2007) states that lack of appropriate processing and solution would result in the individuals' emotional and behavioral reaction in harmony with the trauma. Treatment means freeing up with the system and providing suitable reprocessing so that the past memories and events would be void of negative, annoying components regarding emotions, cognitions and physiology.

It seems like EMDR has shown fantastic results in helping people with overcoming depression, feeling of guilt, fear, pain, discomfort, negative self-cognitions and interpretations and distress, often coming from harmful experiences (Lorzadeh, 2006; Khalbrin, 2010, Williams et al, 2007).

Since Shapiro has initially applied his method to the treatment of distress disorders caused by trauma, especially post-traumatic stress disorder, it has had controlled studies more than any other methods so far (Lorzadeh, 2006; Khalbrin, 2010; Williams et al, 2007; Uribe et al, 2010). In spite of distinguishing between minor trauma and major trauma regarding their influence on the individual's lighting and physiological systems by Shapiro, there are few studies on the minor traumas, those arise from non-harmful but saddening experiences formed during daily life events and end up in creating some feelings like frustration, psychological stress, lack of crushing control and leave profound destructive effects on the individual (Lorzadeh, 2006; Williams et al, 2007; Siegle, 2001). Maxfield maintains that there are limited studies or no studies at large-scale on the effectiveness of EMDR treatment on depression [16]. Results of Uribe et. al. (2010) study, a case study, on 3 patients suffering from major depression after a 3-stage intervention of EMDR show that the scores of first, second, and third subjects before the treatment were 26, 13, 19

respectively which decreased to 0,0,4 after the treatment (Perocheska, James & Jansi, 2008).

Gradually, the relevant studies focus on the reduction of depression symptoms, as the second measured factor in the studies on post-traumatic stress disorder. Beck's inventory on depression is largely used in these studies to detect the severity of depression. Van der Kolk's study was carried on 88 subjects categorized into three treatment groups of Fluoxetine, Pillplacebo and EMDR (for six sessions 90 min long) and they had diagnostic criteria of post-traumatic stress disorder. Depression severity was measured using Beck's inventory (Kenna et al., 2013). The results suggested that subjects under the treatment of EMDR saw a sharp fall in depression severity comparing to those under fluoxetine and pillplacebo treatment (Mog & Bradley, 2000).

In another study, Taylor et al. put 63 subjects into three different groups of EMDR, relaxation training and live & imaginative context. They all suffered from post-traumatic stress disorder and their depression severity had been measured using Beck's inventory. In the meantime, they had depression symptoms. The results showed significant reductions after the treatment and subsequent follow-ups in depression symptoms for all three treatments (Scherer, 2001)

In Iran, there are few studies on the effectiveness of EMDR and they have been mostly carried out on post-traumatic stress disorder and only in handful cases on phobia. There was no study analyzing the effectiveness of EMDR on depression disorder (Stevens et al., 2013). Depression severity reduction had been dealt with as the second measured factor in the studies on the treatment of distress disorders. Doing a study on 51 combatants suffering from post-traumatic stress disorder of being hospitalized in Ardabil's Isar hospital, Rajabi and Narimani drew this conclusion that EMDR and cognitive-behavioral treatments reduced bothering memories and hospital distress and depression significantly.

Jabar Ghaderi in a study on 14 girls, 12-13 years old, who had been exposed to sexual harassment and treated by either eye movement desensitization and reprocessing or immunization training against stress showed that the group under EMDR treatment recovered significantly

and saw a fall in depression in terms of introvert symptoms, physical symptoms and

Given that results of lots of studies support the effectiveness of EMDR in reprocessing and harmful memories relevant to trauma and subsequently treatment of disorders associated with trauma such as PTSD, all types of phobia, and other harmful disorders (Williams et al, 2007; Khalbrin, 2010) and that there are few studies on the effectiveness of the treatment for disorders like depression which is in connection with harmful memories bound to apparently minor traumas, the major goal of this studies is to examine the functionality and effectiveness of this treatment on the reduction of depression and distress reduction (Starr, Hammen, Connolly, & Brennan, 2014). Of the peripheral objectives, one can refer to the effectiveness rate of EMDR on the reduction of subjective unit disturbances and increase of trust in validity cognition (Seng et al., 2013).

## **METHODOLOGY**

Research design: it was carried out based on a single case experimental design using Beck's baseline design of multiple steps [24]. Independent variable was the implementation of therapeutic intervention of EMDR; dependent variable was the severity rate of depression, distress, SUD and trust in validity cognition. Participants were chosen based convenience sampling.

Participants: chosen based tendency to participate in the study; a diagnostic interview by a trained psychologist according to the criteria of the fourth edition of mental disorder's statistical diagnostic manual; the condition of not receiving psychological interventions prior to entering the research and/or the possibility of fixing the type and amount of drug taken during the study; being min 18 and max 45 years old; holding at least diploma level; patient's written and signed agreement to take part in the study; no history of heart attacks, convulsion and respiration, no pregnancy; not having any kind of problem with pupil's movement; and the ability of bearing high potential rate of annoyance in the current condition of patient's life (Beck, 1979).

The exclusion criteria in research sample included: having a psychotic disorder; drug abuse; having

full criteria of personality disorders on axis II; risks to the patient as having serious thoughts of suicide which makes it possible not to receive medication and fix its doze; the existence of cardiopulmonary disorders or convulsion; having eye problems; not standing high level of annoyance due to being old or having problems with the current living conditions (Biederman et al., 2013). Finally, after initial diagnosis by the psychiatrist, the patients were referred to a therapist and only four participants met the requirements of the study. The rate of depression severity for choosing all sample participants was 24 which means major depression. The participants then completed the inventories. Completing the inventories, the first patient entered the treatment design. In the second session of first patient second patient entered the treatment design. In third session of first patient and second session of second, the third patient entered the treatment design. In the fourth session of first patient, third session of second patient and second session of third patient, fourth patient entered the treatment design. Therapeutic intervention happened based on the standard protocol of the treatment within 8 stages and 3 individual sessions (a 90 min session in each two weeks) for each patient.

First Patient: 31 year-old woman, holding handicrafts diploma, married and having a 4-year-old son. She had experienced a depression course of 6 months in the last one and a half year ago and has taken no drugs or any psychological intervention so far. The current course has started since 2 months ago and accompanied by symptoms of mass and pain feelings. The current course has started following a heavy family argument and her sister has depression record.

Second Patient: a 28 year old woman, holder of B.A. in Human Education, first child, married and having a 2 year old girl. She has experienced 3 depression courses for the last 3 years, received drug once but not taken it due to fears of drug dependence. There is no family history of depression. Her mother is suffering from cleanness obsession.

Third Patient: a 20 year old woman, student of B.A. in Law. First child, married, experienced depression since teen years, committed suicide once and has no family history.

Fourth Patient: a 22 year old woman, student of B.A. in theology, last child, single, experienced fourth depression course since 5 or 6 years ago. Her parents both have depression history. She has so far received drugs twice but taken impartially and decided to commit suicide.

None of the patients had another major disorder in axes 1 and 2. First patient's symptoms were diagnosed as depression and he didn't have enough evidence for dissociative disorder diagnosis independently.

#### 1. Demographic Data Inventory and Required Data to Get EMDR Treatment

a. Data including age, sex, marital status, education, occupation, child born order.

b. A thorough clinical picture of the individual according to clinical manual criteria for EMDR use including a brief history of the individual's life, dysfunctional behaviors, symptoms and events of trauma activation, current's driving factors of trauma, a range of positive behaviors, essential approaches to future, ensuring eye health, examining the history of cardiac or respiratory disorder, age-related disorders in older ages, making sure of the individual's ability and preparedness for coping with a high rate of potential annoyance which might be created during ineffective information processing.

#### 2. Beck Depression Inventory, 2nd edition (BDI-II)

This inventory is the revised version of that of Beck, designed to measure depression severity. This is a self-report form including 21 symptoms and the participants are asked to put these symptoms on a scale of 0 to 3. The results of Beck, Steer and Brown's study showed that this inventory has high internal consistency. Score range is theoretically from 0 to 63. Shear point used in this study includes the range of scores (9-0) as normal range, (10-15) as mild depression, (16-23) as moderate depression and (more than 24) is major depression.

#### Beck Distress Inventory

It is a self-assessment inventory including 21 questions and measuring general severity of distress. The participant uses a 4 degree scale ranging from at all to heavily or I can't stand to rate each of the symptoms. Scoring is done by

summing the scores of 21 questions and the range of scores would be from 0 to 63 [25].

Beck et al. (1998) proved the reliability of the inventory to be 75% using retesting technique on 83 outpatients over a week [25]. Alpha coefficient of 92% was also gained for the inventory on 160 outpatients. In the study carried out at Tehran medical college and Rouzbeh hospital, reliability of this inventory was shown for healthy clinical population who were 56 infertile patients and Cronbach's alpha coefficient was 90% [26].

#### 4. Scale of Subjective Unit Disturbance (SUD) and Psychological Distress (SAD)

The criterion is the severity of distress and SUD currently experienced by the individual. Participants' personal evaluations are put on an 11 unit scale, from 0 to 10 in which zero means no distress and 10 equals the highest SUD. This criterion, the major measuring criterion for the progress and effectiveness of EMDR, has extensive functionality in the field of therapeutic cognitive behavior. It was first used by Joseph Wolpe. It must be noted that the appropriate level for start of EMDR is higher than 5 (Beck, et al. 1979).

#### 5. Value Scale of V.O.C Validity Cognition

Shapiro used "value scale of cognition" differently from SAD SUD scale for measuring the individuals' evaluation of the value he/she gives for the selection of a positive statement about himself/herself.

1. Represents lack of faith to the statement and 7 shows full belief in the positive statement. Generally, the patients start EMDR with value scale of validity cognition of 4 or less and may finally reach to 6 or 7 [27].

#### 2. EMDR Sessions based on Shapiro's Standard Protocol (2004, 2005)

This treatment is composed of 8 standard stages which are at times done in a session or sometimes one or more session is dedicated for doing a stage (Khalbrin, 2010; Williams et al, 2007). Getting the patient familiar with major depression disorder in the first stage of the treatment, safety factors and patient's ability to cope with high rate of potential annoyance, which might be created in the trend of ineffective data processing, are analyzed. Considering personality stability of the individual,

the therapist moved on to gather data on the individual's thorough clinical picture.

The second stage or "preparation" stage started. It consisted of a "therapeutic alliance". At this stage, the patient gets familiar with EMDR process and its influences. In the present study, the therapist has used "peace train" at the beginning of each session. Then SAD value was measured [31]. At the third stage where the memory was identified, the patient was asked to pick up a picture best symbolizes that memory. Then, a negative cognition was administered including self-assessment of the individual's ineffectiveness or inconsistencies which relates to the part the individual considers for him/herself in the bothering event.

Next, the therapist determines a validity cognition that must be later substituted for negative cognition. Here, the therapist measures the individual's validity cognition based on a 7-value scale, then the picture and negative cognition are combined so the emotion and rate of sadness or due raising severity can be measured based on an 11-value scale of SAD. The patient is asked to show a value on the scale representing his emotion when the bothering memory is there in his mind. After that, the therapist reaches to the fourth stage of the treatment: desensitization. At this stage, the clinical specialist repeats a set of eye movements with appropriate essential changes and focuses to the point that individual's sadness level falls to zero or 1 on the SAD scale. Then, we move on to the fifth stage: installation. At this stage, therapist asks the patient to keep the most suitable validity cognition with the memory's goal in his mind. Then, the therapist pursuits the set of eye movements to an extent that the patient's evaluation of the validity cognition reaches to 6 or 7 on VAS scale. Now, it is time for the sixth stage: body scan. At this point, the patient will detect any stress left in his body. These physical stresses are processed through eye movements. Then, the treatment session is finished. At the seventh stage "closure", it is necessary for the therapist to remind the patient of some pictures, thoughts or bothering emotions which might happen during the sessions representing the continuity of the processing and considered to be fine signals. At the eighth stage "reevaluation", at the same time one should consider the thorough protocol and

treatment design applied to the patient, he/she must have done enough reevaluation of the reprocessing and its behavioral influences. Here is the stage ultimate effectiveness of EMDR happens.

In the last session, the final SUD value scale, final validity cognition value and responding to distress and depression inventories were administered. In the meantime, the patient was recommended to identify actively other bothering memories and reprocess the unsolved memories using relaxation exercises.

## RESULTS

The findings are as following:

In Beck's depression scale, scores of first, second, third and fourth participants before the treatment intervention were 35, 33, 27, and 27 respectively which decreased to 13, 15, 7 and 8 after the treatment. Also, in Beck's distress scale, the scores of first, second third and fourth participants were 19, 23, 21, and 15 respectively in the pre-intervention therapeutic stage which decreased to 8, 11, 7, and 7 in the post-treatment stage. In SUD scale, the score of all four participants was 10 in the pre-treatment intervention which decreased to 2, 1, 1, and 2 respectively. Finally, in the value scale of validity cognition, participants' scores were 1, 1, 1, and 1 respectively which increased to 6, 6, 7, and 7 in the post-treatment intervention. Baselines taken from participants are 5, 4, 3 and 2 respectively. Moreover, twice within the sessions and once at the end of the sessions, the test was administered and in a 3 months and one year follow-ups the test was readministered.

All four patients' scores within baseline course, treatment intervention and follow-up courses on the severity rate of depression, distress, SUD and trust in validity cognition have been pictured on a diagram in figure 1 and the mean of their scores in a quadruple scale is available in table 1. All four patients showed significant recovery to the symptoms and severity rate of depression, distress, SUD and trust in validity cognition after treatment intervention. Their scores on the diagram also show the treatment effectiveness after two points of time: three months and one year. Psychological interview after a year showed that none of the patients had used another treatment had any essential criteria of DSM-IV-TR for diagnosing

major depression. The scores obtained from Beck's depression scale after a year showed that first and second patients' depression state (14, 15) was mild and third and fourth patients' depression state (5, 8) was normal.

**TABLE 1 & 2 HERE**

**FIGURE 1 HERE**

Table 2 shows that level of recovery and reduction of depression and distress scores are significant in all four patients in whom the highest percent of recovery belongs to the third and the fourth participants respectively. It was also noticeable the recovery percent of first and second participants: 92.2% and 67.09%. They all showed noticeable recovery in their distress severity and the highest value belonged to the fourth patient.

**DISCUSSION**

The current study aims at analyzing the effectiveness of EMDR on the reduction of depression severity in patients suffering from major depression. The results proved positive the efficiency of therapeutic intervention of EMDR in the process of recovering patients with major depression both immediately after the treatments and subsequent follow-ups. The results also showed that EMDR method caused significant reduction of distress and SUD level and significant increase of building trust in validity cognition among patients with major depression. These findings were in agreement with the researcher's expectations and consistent with the studies carried out in the field of EMDR treatment and its effectiveness in reducing distress, SUD and increasing trust in validity cognition within the scope of distress disorders [Maxfield, 2002; BoDill, 2009; Shapiro, 1997; Parker, 2002; Uribe et al, 2010).

Significant reduction of SUD with EMDR can be partly associated with EMDR therapeutic protocol framework since the participant's statement of reduction level of this variable is a requirement to enter the next stage, that is, validity cognition installation based on the protocol.

Analyzing the results and effectiveness of EMDR on the main variable, major depression, and other variables, there are some points to note. Analyzing theories relevant to EMDR, one can say that this

efficiency which is realized through activating neural system, memory and emotional networks via eye stimulations within a disciplined and systematic process, is a prevailing effectiveness in facilitating data processing of bothering memories. This question of what underlying principles govern this change when information is processed still remains unanswered. Does EMDR work on deconstructing stereotypical answers at a behavioral cognitive change? Is there a kind of attention distraction through eye movements which result in reducing bothering severity of the drivers? Are the neurochemical changes involved? Is it just the focus of attention and stimulation of both hemispheres which connect the holistic performance from the right hemisphere to the step by step performance in the left hemisphere or the emotions or reasoning together? Does the main result come from the focus on and stimulation of both hemispheres? Is it obvious that each eye's optic nerve is connected to both hemispheres and perhaps this compulsory focus on a certain point with the visibility of each eye and its movement would facilitate the processing of different layers of the brain?

It seems that through stimulating visual tracks in a way like rum, amygdala and hippocampus systems become active. In other words, emotional memory (amygdala) and the memory of so called cool declarative blend together through rapid data processing, meaning that non-declarative memory would change into declarative.

In the present study, observing the flow rate of mental images of traumatic memories which was reflected in the patients' statements meant that the speed was beyond the one with which passing image turned into reality one, especially in a disorder such as major depression often characterized by slow fluid movement, one of its most important features. In other words, from the researcher's viewpoint, high-speed mutual stimulation might be one of the most important reasons of creating arousal and so advent of an opposite state to helplessness and passivity. As a result, these due to emotional arousal, image movement, images, and awakening of memories and emotions took a higher speed.

Finally, it is a good idea to point to a new component in EMDR introduced by Shapiro that is,

identifying an alternative validity cognition to negative cognition. The researcher believes that this factor has been influenced in the effectiveness of EMDR in reducing depression, distress, SUD. It was quite observable the replacement speed of positive mood with negative mood of the patients after giving through highly stressful stage of desensitization like the speed of changing images and associations through eye movements and cognition installation stage.

Low volume of the sample was of the limitations of the current study due to selection of only participants coming under treatment for the first time. Thus, it is recommended that similar studies be carried out with bigger population and the possibility of random sampling. Also, there should be follow-up studies to set the reliability of the results and compare this kind of treatment with others such as cognitive-behavioral treatments.

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## APPENDIX

Table 1:

**Mean and Criterion Deviation of Four Patients Before and After Treatment; 3 Months and one Year Follow-up Courses**

Table 1: Mean and Criterion Deviation of Four Patients Before and After Treatment; 3 Months and one Year Follow-up Courses			
Measurements		Mean	Standard Deviation
Depression	3 Month later	30.58	3.66
	1 Year Later	10.75	3.86
	Before Treatment	10	3.8
	After Treatment	10.5	4.7
Distress	3 Month later	19.27	2.9
	1 Year Later	13.22	3.3
	Before Treatment	8.5	2.6
	After Treatment	10	2.94
SUD	3 Month later	9.7	0.2
	1 Year Later	1.5	1
	Before Treatment	1.25	.64
	After Treatment	.05	1
Trust in Validity Cognition	3 Month later	1.26	0.18
	1 Year Later	6.5	1
	Before Treatment	6.25	0.86
	After Treatment	6.75	1.03

Table 2:

Indexes of Process Variations, Slope and Level of Variability of Participants' Scores

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Participant's score	Baseline Mean		Intervention Mean		Standard deviation		Recovery percentage MPI		Score reduction MPR (%)		Variability Rate of Cohen	
	dep	Dis	Dep	Dis	dep	Dis	dep	Dis	dep	Dis	Dep	Dis
First	34.6	19	18	14.3	9.57	4.55	92.2	32.8	48.8	24.7	1.73	1.03
Second	32.7	21.75	19.6	15.3	8.1	4.58	67.09	42.1	40.2	29.6	1.62	1.35
Third	27	20.33	10	15	9.87	5.21	170	35.5	62.9	26.9	3.2	1
Fourth	28	16	12.6	8.3	9.85	4.39	122.2	92.7	55	48.12	1.56	1.75

Dis or means distress, dep or depression

Figure 1: Scores of Depression, Distress, SUD and Trust in Cognition

