

Searching Cognitive Correlates of Anti-Social Personality By Tests and Ceeq*

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*ANTI-SOSYAL KİŞİLİKBOZUKL UĞU GÖSTERENLERİN
KOGNİTİF KORRELA TLARININ TESTLER VE
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SUMMARY

The purpose of this study is to search and discuss the cognitive correlates of anti-social personality disorder by using computerized EEG, Brain mapping and neuro-psychological tests. The statistical liaisons among attention deficits soft neurological signs and aggressiveness were aimed to be analysed.

Of the 38 subjects in this study 23 were aggressive anti-socials and 15 were inadequate socials. EEG abnormalities in the form of general slowness especially in the theta band of the temporal region were observed as diffts the literature. Furthermore, this abnormality was found to be statistically significiant in the aggressive anti-social group.

We recommend the utilization of techniques such as Regional Cerebral Blood Flow, Computerized Brain Imaging PET and BEAM hoping that tehy will help us unravel the riddle of mental pathology.

KeyWords: Anti-social Personality, CEEG, Cognitive correlates, Brain mapping.

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ÖZET

Bu çalışma anti-sosyal kişilik bozukluğu gösterenlerin kognitif korelatlarını CEEG, Brain mapping ve nöropsikolojik testler yardımı ile araştırmayı amaçladı. Dikkat bozuklukları, soft nörolojik signler ve agressivité arasında istatistiksel ilişkiyi incelemeye çalıştık.

Çalışmaya aldığımız 38 deneğin 23'ünü agresif antisosyaller, 15'ini inadaquet alanlarda theta bandında genel bir yavaşlama tarzında EEG abnormalitesi bulduk. Ayrıca agresif davranış gösteren grupta bu abnormalite istatistiksel olarak anlamlı bulundu. Mental hastalıkların bulmacasını çözmeye belki yardımcı olacak bir yöntem olarak "Regional cerebral blood flow'u, Computerize brain imaging, PET, BEAM" gibi teknikleri Temporal bölge ile agresyon ve antisosyal davranışların ilişkisini araştırmada kullanmayı tavsiye ediyoruz.

Anahtar Kelimeler: Anti-sosyal kişilik, CEEG, Kognitif korrelat, Brain mapping.

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INTRODUCTION

The term "Anti-social Personality" encompasses those with a chronic anti-social behavior who don't have the ability or drive to bind themselves with other individuals, groups of people or with their way of living.

The first signs of this pathology can be detected during early childhood. These children

show signs such as emotional immaturity, stubbornness, peevishness, anger-proneness, deceitfulness, running away from home and wetting their beds. They revolt against their parents and don't conform with family traits. These children are liable to become anti-social individuals as they grow up.

There are several viewpoints as to the causes and the psychopathology of anti-social behavior.

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Table 1. Abnormal E E G Incidence In
Personality Disorders (Osselton, 1972)

[ATEGORY	ABNORMAL EEG INCIDENCE	AUTHOR
MIXED CONTROL GROUP	% 15	Hill and Watterson, 1952
CONVICTEO CONTROL GROUP	% 25	Stafford -Clark Fara and Doust, 1951
MIXED GROUP PSYCHONEVROTIC	% 26	Williams 1941
INADEQUATE PSYCHOPATHS	% 32	Hill and WGFterson, 1942
AGRESSIVE PSYCHOPATHS	% 15	Hill and Watterson, 1942
UNMOTIVATED HOMICIDAL GROUP	% 73	Stafford-Clark and Taylor 1949
AGRESSIVE CONVICTEO PSYCHOPAFE	% 83	Stafford -Clark-Pord and Doust,1951

These are the genetic-constituonal and environmental opinions. According to the environmental etiology viewpoint, the important factors are the parental deprivations such as in a caotic household, parental quarrels or a cold and rejecting family which the child had to endure during early years. According to the genetic-constitutional viewpoint: the organic bases of anti-social personality is not exact and not clearly understood (9,10,31). However, head injuries and some neurological defects are commonly accepted to cause certain alterations of personality.

In many studies about anti-social individuals, excessive E E G abnormalities determined (21,31).

The Table 1. shows the results of some of the studies according to the literature. The most striking finding is the high incidence of abnormal E E G in aggressive convicted anti-socials.

Certain researches try to explain the E E G abnormalities of anti-social persons in this way: "These people are often exposed to dangerous situations and have frewuent head traumas which are the main reasons of E E G pathology; personality disolder is essentially present (3).

Whatever the reason is, there is a statistical liaison among aggression attention deficits and sof neurological signs (31). In this study, it was aimed to illuminate new light upon this liaison utilizing new and sensitive techniques such as computerized E E G and neuro-psychological tests (16,17,24, 27,33).

SUBJECTS AND METHOD

The subjects were individuals with anti-social personality disorder according to the DSM III-R criteria (1).

Of the 38 subjects, 23 were defined as aggressive anti-socials and 15 were defined as without aggression anti-socials. Criteria for aggressiveness were the presence of auto-mutilation (scars on body as a result of auto-agression) and having to commit at least two acts or aggression during the past month. The results were discussed in two groups.

To every subject: 1. Computer analysed E E G . 2. Neuro-psychological tests (Benton-Fraisse, STAI forms 1 and II anxiety scales) 3.Routine blood and urinary tests and clinical observation were applied. In selecting the subjects 5 negative criteria were eliminated (28):. Mental retardation 2,Organic Brain Syndromes 3.Psychosis 4.Neurozis 5.Stiutaional Adaptation Disorder.

Computer analysed E E G were applied in Istanbul HZİ center. The apparatus consisted of a 8-channel GRASS MODEL 6 E E G data collection equipment and a microcomputer (IBM Personal Computer). Other characteristics were like this: The amplification standart the system is set for was 1: 15600 (where 50 micro v is amplified to approximately. 7 mm) with 1:1 ratio at the signal output, a frequency response or 1 Hz-70 Hz, with sharp cut at 50 Hz and band pass at 1.3-50 Hz. Evaluation of the data was made by using both the absolute and relative powers.

Electrodes were applied to the scalp using 10-20 system. Reference electrodes were applied to the ears. Spectral analysis of the data was made by computer and the final evaluations were made by Neurologist Dr. Arif ÇELEBİ.

FINDINGS

The average age of the subjects was 28, all males and had educations primary and/or secondary school levels.

In Table 2. C E E G abnormalty results were found to be quite high relative to general means. In which band the abnormality is located can be observed from Table 4.

Table 2. C EEG Results

CEEÜ	H	%
NORMALS	18	47,4
ABNORMALS	20	52,6
A. BORDERLINES	13	34.2
B. COMPLETELY ABNORMALS	7	18,4

Table 3. The Comparison Of The Aggressive-Nonaggressive And The Normal-Abnormal In The C EEG

	AGRESSIVE ANTI-SOCIALS		NON-AGRESSIVE ANTI-SOCIALS		TOTAL	
	n	%	n	%	n	%
NORMAL CEEG	18	44,4	10	55,6	18	100
ABNORMAL CEEG	15	75	5	25	20	100
TOTAL	23	100	15	100	38	100

*P < 0,05, Fisher Used Strict x Tests CEEG Abnormalities in Aggressive Anti-Socials Are Significantly

Table 4. The Distribution Of Pathological Features Among Anti-social Personality Disorders With Abnormal CEEG

	N	Wave Class	Dominant Activity				Seconder Activity				Spike
			M-1	M-2	M-3	M-4	M-1	M-2	M-3	M-4	
ABNORMALS	7	Alfa	4	4	5	4	2	3	2	3	1 average
		Beta	-	1	1	1	1	1	1	1	
		Theta	3	2	2	3	3	3	4	3	
		Delta									
BORDERLINES	13	Alfa	9	11	11	11	2	1	2	2	1 average
		Beta	-	1	2	2	1	2	2	3	
		Theta	3	1			10	10	9	8	
		Delta	1								

Table 5. The Distribution Of Pathological Features Relative To Localization Among Anti-Social Personality Disorders With Abnormal CEEG

	N	5	1	1	1	2	5	2
Abnormals	7	5	1	1	1	2	5	2
Borderlines	13	2	-	-	-	-	11	1

Table 6. Evaluation Of Cognitive Properties By Using Neuro-Psychological Tests

	N	BENTON AVERAGE	FRAISSE AVERAGE	STAI FORM I AVERAGE	
				I MOMENTARY	II GENERAL
AGRESSIVE ANTI-SOCIAL	23	10%	25,2 (Deficient 1)	56,1	52,9
NON-AGRESSIVE ANTI-SOCIAL	15		26,3 (Deficient)	35,2	53,2
		P> 0,05	P > 0,05	P<0,05	P> 0,05

As can be observed from Table 3, EEG abnormalities (including borderlines) were 65% in aggressive anti-socials, while EEG abnormalities (including borderlines) were 33.3% in non-aggressive anti-socials.

Features that can be observed in Table 4 are:

M-1: Montage No: 1-R-82-q;

M-2: Montage No: 2 Mod.R-82b;

M-3: Montage No: 3 Mod.Bipolar;

M-4: Montage No: 4 Bipolar HV.

According to this results, dominant activity is alpha wave type band and secondary activity is markably theta wave band in anti-social personality disorder. The difference of borderline abnormalities is observed only quantitatively. By saying quantitatively, it is meant that the pathology observed in secondary activity can be expressed numerically in most cases (as borderline 10,10,9,8..) There are no spikes or sharp waves significantly. (The montage outline is shown in Table 7).

As to the localisation, the principal results were the dominance of the temporal and the diffuse appearance in borderline cases.

As can be deduced from the Table 6., Benton (Attention Testing) and Fraise (Memory Testing) results are quite low in all cases. In anxiety scales (STAI forms); state anxieties of non-aggressive anti-socials are in normal limits, other anxiety points are a little above average. In Bender (Organicity Testing) there were no spesific results but soft or ganicity findings were generally observed.

DISCUSSION

We recognize the names of Hill and his colleagues in the earliest researches made about the neurophysiology of anti-social behaviour. In 1942

Hill and Watterson found EEG abnormalities in 33% of cases in a controlled study with 151 anti-social cases (in the control group the result was 15%). In 1952 this study was repeated and 4 kinds of characteristics were described: 1. Central temporal theta activity, 2. Focal posterior slow wave activity 3. Post central dominant theta activity 4. Sub harmonic alpha variants in occipital regions. (12,13) Silverman, in a study of a group of homicidal convicts, realized a rate of 53% EEG abnormalities (26). In a research made in 1948, Stanford-Clarke and Taylor found the highest percentage of 86% EEG abnormalities in a study of criminal psychotics. EEG abnormalities proved to be 17% with provoked murderers and 27% in aggressive anti-socials (21). Knott recognized a high rate of EEG abnormalities in extremely criminal anti-social (18,19). Cohn, in a research made with 172 subjects who had behavioral disorders pointed out that "immature interpersonal activity was directly related to immature brain cell functions" (3). In 1955 Verdeaux researched a jailhouse population and concluded that the brain bioelectrical activity had an abnormality in the form of theta rhythms (32). Gilbert found 40-75% EEG abnormality in subjects with behavior disorder and emphasized extreme theta and delta activities (7). Gibbs and Gibbs pointed to a relation between temporal lobe spikes and behavioral patterns of non-psychopathic behavior disorders (6). Osselton realized 22% abnormality in anti-social, 11.7% in control group and 3-5 Hz slow activity in the posterior temporal region (21). Williams found 57% EEG abnormality in aggressive convicts and 12% in a group each of whom had only one major theft (21).

Larry established slow wave activity in the posterior hemispherical regions of 33% of the common population and 58% of those with behavior disorders (30). Hare arrived at the conclusion that a depression in the cortical excitability was significantly present in sociopathy (9,10). According to Solomon, adult with aggressive personalities often had temporal theta activity or posterior temporal and occipital 3-5 cycles per second slow activity in one or both hemispheres (31). He also pointed out that this activity increased with hyper-ventilation. Hoenig realised 48% EEG abnormality in 46 transexual subjects which he studied in 1979 (14). Salley made a study of REM sleep and

EEG abnormalities of homicidal anti-socials in 1980 and found 40% abnormal EEG with theta activity. No relation was established between REM sleep and EEG (25). Still more authors point to certain EEG pathologies which are not entirely specific to anti-socials (22). Tanelli has observed more definitive pathologies of the temporal regions in a study of 4 obsessive-compulsive groups (29). According to Gomez: "Those with personality disorders, particularly aggressive sociopaths, have immature EEG in 60 percent, involving the posterior part of the temporal lobes in particular (8).

In our research of literature, we couldn't find a EEG study of anti-socials. Authors had recognised significant slow delta waves in chronic schizophrenics (5,15,20). In two case reports made in 1985 Heath and Walker pointed out to the presence of spindle bursts in the right hippocampus and right medial geniculates of agitated and hallucinatory schizophrenic (11). Inguar et al (1976) found a decrease in frontal blood flow of schizophrenic patients with a control group of alcoholics. They pointed to a decrease in neural metabolic activity of frontal areas. They also realise a possibility of frontal lobe dysfunction in schizophrenia and encourage advanced research on this subject even if they couldn't arrive at a significant result yet (20).

The slowing down of the theta band especially manifest in the temporal regions which we recognised in our study is in compliance with other studies on anti-socials. It is important that EEG pathologies in aggressive anti-socials in relation to the control group proved to be significantly high both in our study and others (Table 2,3,4,5).

The improvement of aggressive behavior following temporal lobe operations puts notice on temporal lobes of anti-social personality disorders (23). Here it must be emphasized that those patients have attention, visual and auditory deficits. Is it possible that there is a decrease in the neural metabolic activity of the temporal lobes of anti-socials as is the case of schizophrenics?

According to the group mappings: In aggressive and non-aggressive antisocials and normals can be observed as related to the dominant activity in Unipolar recording. It is significant that there is

Tablo 7. CEEG-Scan Montage Listing (C. 1986 HZI Research Center İne.)

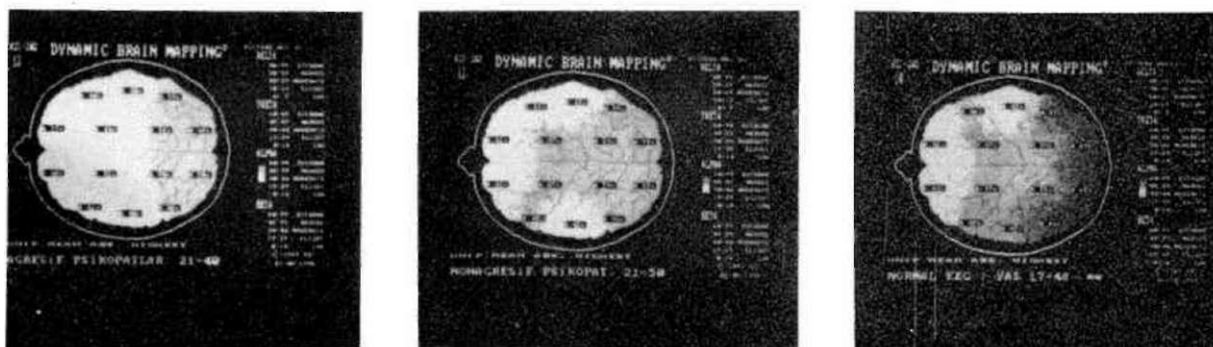
Montage #: 1	Montage Name: R-82a						#Of Channels: 8	
F3-A1	F4-A2	C3-A1	C4-A2	P3-A	P4-A2	O1-A1	02-A2	
Montage #: 2	Montage Name: Mod R-82b						#Of Channels: 8	
F7-A1	F8-A2	T3-A1	T4-A2	T5-A1	T6-A2	O1-A1	02-A2	
Montage #: 3	Montage Name: Mod Bip						#Of Channels: 8	
F3-C3	C3-T3	T3-P3	P3-01	F4-C4	C4-T4	T4-P4	P4-02	
Montage #: 4	Montage Name: Bipolar Hv						#Of Channels: 8	
F3-C3	C3-T3	T3-P3	P3-01	F4-C4	C4-T4	T4-P4	P4-02	

CEEG-Scan System Band Value Listing (C. 1986 HZI Research Center İne.)

Band #:1	Band Name: Enhanc Clin								# Of Bands: 19	
I. 3	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	
11. 5	12.5	13.5	15.0	17.0	20.0	26.0	32.0	38.0	48.0	
0= >2 Delta	2= >6Theta									
6 = > 12 Alpha	12 = > 20 Beta									
Band #: 2	Band Name: Collapsed								# Of Bands: 3	
13	3.5	7.5	13.0							
0= >1 Delta	1= >2Theta									
2= >3 Delta	3= >4Beta									

We Accept The Montage List And Band Values Used in This Table As Technical Data.

Tablo 8. The Dominant Activity Group Mappings



In this table, the group brain mappings of aggressive and non-aggressive anti-socials and normals can be observed as related to the dominant activity in unipolar recording. It is significant that there is slowing of activity from normals (x) on to the aggressive anti-socials (As from extreme to marked-moderate, slight and low) (x) normal group brain mapping is taken from the archives of Istanbul HZI Foundation

slowing of activity from normals onto the aggressive anti-socials (Table 8). Also in the secondary activity: The domination of seconder activity from normals to aggressive anti-socials changes from beta band to theta band in unipolar recording (Table 9).

CONCLUSION

In this study, 20 abnormal CEEG (borderlines included) were found. In a population of 38

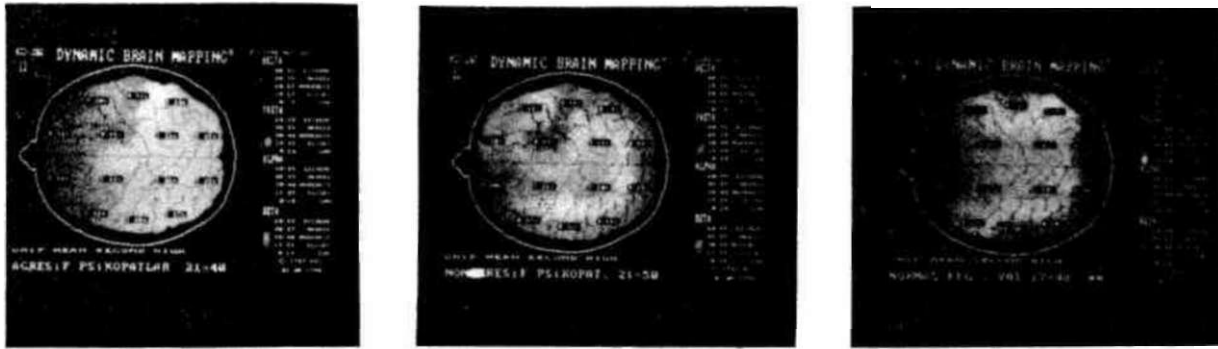
subjects. We classified them in two groups of 23 aggressive and 15 non-aggressive types.

1. In general, there was a CEEG abnormality in temporal lobes as a common slowing down of the theta band.

2. This abnormality was more manifest in the group with aggressive traits.

3. We came into the conclusion that it was a new and objective opportunity to apply CEEG to the quantitative results of our studies.

Tablo 9. The Secondary Activity Group Mappings



In this table it is observed that the domination of seconder activity from normals to aggressive anti-socials changes from beta band to theta in unipolar recording.

We suggest techniques like regional cerebral blood flow, positron emission tomography (PET), brain electrical activity mapping (BEAM) can be

used to point out the relation of the temporal lobe with aggression and anti-social behavior and help us solve the puzzle of mental illness.

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