

RECOGNITION OF EMOTIONAL FACIAL EXPRESSIONS IN ALCOHOL
DEPENDENT INPATIENTS

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ABSTRACT

RECOGNITION OF EMOTIONAL FACIAL EXPRESSION IN ALCOHOL DEPENDENT INPATIENTS

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The ability to recognize emotional facial expressions (EFE) is very critical for social interaction and daily functioning. Recent studies have shown that alcohol dependent individuals have deficits in the recognition of these expressions. Thereby, the objective of this study was to explore the presence of impairment in the decoding of universally recognized facial expressions -happiness, sadness, anger, disgust, fear, surprise, and neutral expressions- and to measure their manual reaction times (RT) toward these expressions in alcohol dependent inpatients. Demographic Information Form, CAGE Alcoholism Inventory, State-Trait Anxiety Inventory (STAI), Beck Depression Inventory (BDI), The Symptom Checklist, and lastly a constructed computer program (Emotion Recognition Test) were administered to 50 detoxified alcohol dependent inpatients and 50 matched-control group participants. It was hypothesized that alcohol dependents would show more deficits in the accuracy of reading EFE and would react more rapidly toward negative EFE -fear, anger, disgust, sadness than control group. Series of ANOVA, ANCOVA, MANOVA and MANCOVA analyses revealed that alcohol dependent individuals were more likely

to have depression and anxiety disorders than non-dependents. They recognized less but responded faster toward disgusted expressions than non-dependent individuals. On the other hand, two groups did not differ significantly in the total accuracy responses. In addition, the levels of depression and anxiety did not affect the recognition accuracy or reaction times. Stepwise multiple regression analysis indicated that obsessive-compulsive subscale of SCL, BDI, STAI-S Form, and the recognition of fearful as well as disgusted expressions were associated with alcoholism. Results were discussed in relation to the previous findings in the literature. The inaccurate identification of disgusted faces might be associated with organic deficits resulted from alcohol consumption or cultural factors that play very important role in displaying expressions.

Keywords: Emotion; Emotional Facial Expression; Recognition Accuracy; Alcoholism

ÖZ

ALKOL BAĞIMLISI OLARAK YATAN HASTALARDA YÜZDEKİ DUYGU İFADELERİNİN ALGILANMASI

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Yüzdeki duygu ifadelerini doğru bir biçimde tanıyabilmek, sosyal etkileşim ve gündelik işlevsellik adına çok önemlidir. Son yıllarda yapılan çalışmalar, alkol bağımlılarının yüzdeki duygu dışavurumlarını algılamalarında sorun yaşadıklarını göstermektedir. Böylece, bu çalışmanın amacı, alkol bağımlılarında evrensel olarak kabul edilen yüzdeki duygu dışavurumlarının- mutluluk, üzüntü, kızgınlık, iğrenme, korku, şaşırma ve nötr- algılanmasında bir bozukluk olup olmadığını saptamak ve bu dışavurumların algılanmasındaki reaksiyon zamanlarını ölçmektir. Bu amaçla, 50 arındırılmış alkol bağımlısı yatan hasta ve eşleştirilmiş 50 kontrol grubu katılımcılarına, Demografik Bilgi Formu, CAGE Alkol Bağımlılığı Skalası, Durumluk-Süreklilik Kaygı Envanteri (DSKE), Beck Depresyon Envanteri (BDE), Ruhsal Belirti Tarama Testi (SCL-90-R) ve son olarak araştırmacılar tarafından geliştirilmiş “Duygu Tanıma Testi” uygulanmıştır. Hipotezlerimiz; alkol bağımlılarının kontrol grubuna göre bu dışavurumları algılarken daha fazla hata yapacağı ve negatif dışavurumlar olan korku, kızgınlık, iğrenme ve üzüntüyü algılarken daha çabuk reaksiyon göstereceği yönündedir. Uygulanan bir çok

ANOVA, ANCOVA, MANOVA ve MANCOVA analizleri, alkol bağımlılarının bağımlı olmayanlara göre daha fazla depresyon ve anksiyete bozukluklarına eğilimi olduğunu ortaya koymuştur. Bağımlılar, öğrenme ifadesini daha az ancak daha hızlı algılamışlardır. Öte yandan, iki grup, doğru yanıtlarının toplamında istatistiksel olarak anlamlı bir farklılık göstermemişlerdir. Ayrıca, depresyon ve anksiyete düzeylerinin algılama doğruluğunda ya da reaksiyon zamanlarında bir etkisi olmadığı görülmüştür. Stepwise Regresyon Analizi, SCL'nin obsesif-kompulsif alt ölçeğinin, BDE'nin, SDKE-D Formunun ve korku ve ek olarak öğrenme duygu dışavurumlarının algılanmasının alkolizm ile ilişkili olduğunu göstermiştir. Çalışmanın sonuçları literatürdeki bulgular bağlamında tartışılmıştır. Öğrenme ifadesinin yanlış algılanması, alkol tüketiminin sonucu olan organik bir bozuklukla ya da ifadelerin yanlış yorumlanmasında rol oynayan kültürel faktörlerle ilişkilendirilebilir.

Anahtar Sözcükler: Duygu; Yüzdeki Duygu Dışavurumları; Algılama Doğruluğu;
Alkol Bağımlılığı

To my parents İnci-Ahmet Dursun, my sister Ekin Dixmier
and my dearest friends,
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CHAPTER I

INTRODUCTION

In this chapter, firstly description, perspectives of emotion and emotional facial expressions are explained. Then, inaccurate recognition of facial expressions in the literature review is presented. Secondly, general information regarding alcohol dependence and related literature review about impairment in decoding emotional facial expression are mentioned. Finally, the purposes and the hypotheses of the present study are explained.

1. 1. EMOTION

Generally, in Western culture, emotions are always seen as the enemies of rationality. Mostly, they are considered as primitive or childish rather than mature or civilized. Tears are stupid, tears are childish, and tears are sign of weakness. However, as Ekman and Friesen says "... emotions are the most private, personal, and unique part of ourselves. They are parts of ourselves that have enormous power over our lives" (1975, p. 5). If emotions had not been existed, we would not have felt proud when our loved ones do something worthy, we would not have experienced joy at the birth of our children, anxiety when threatened, and grief at the loss of our loved ones (Lazarus, 1991, p. 3; Planalp, 1999, p. 10). Actually, without emotion, nothing makes any difference, we become totally indifferent. They determine the quality of our lives.

1. 1. 1. Philosophical Background of Emotion

Emotions have always been central concern to human beings. Almost every great philosopher from the periods of BC to contemporary ages had been concerned with the nature of emotion and had theorized about its origins and expressions.

According to one of the well-known philosophers, Democritus (500 BC)

happiness or positive emotion was characterized by a state of mental and physical equilibrium (Wikipedia, 2007). Similarly, Hippocrates, coeval of Democritus and almost regarded as the founder of modern medicine, claimed that emotional states were characterized by brain temperature, aridity, and moisture and he was the first philosopher to establish a relationship between brain functioning and emotion. For instance, according to him grief and anxiety arise from brain cooling, fear arises from brain overheating (Wikipedia, 2007).

Plato (427-347 BC) was also one of the pioneers in proposing the interaction between soul and body. He proposed a “Three State Theory.” These states were *Pleasure, Pain, and Neutral*. Plato described pain as “the destruction of organic harmony, pleasure as the recovery of this destruction, and neutral state as the harmony itself” (Wikipedia, 2007).

However, according to Aristoteles (384-322 BC) who was a student of Plato, pleasure was a normal state of a living and conscious being. Pain arose if any obstruction occurred in this normal state. In other words, pain was the contrary of nature. Clearly, Aristoteles distinguished emotional mental processes in three parts. First one was potentialities of experiencing passions, capacities or predispositions; second one was formed habits, namely repeated experience of Passions, disposition or character; and third one was passions which are states accompanied by pain and pleasure. According to Aristoteles, there were opposite feelings such as anger and mercifulness, and love and fear. Additionally, in “rhetoric”, which is one of Aristoteles’ famous books, emotions were described as only biological products such as sneezing, and they were contrary of thoughts and they affect the judgments (Oatley & Jenkins, 1996, p.12). In short, Aristoteles suggested that emotions had effects on cognition and actually, they were based on our interpretation of events. Namely, Aristoteles unwittingly claimed that emotions had cognitive roots.

In Patristic, Medieval, and Renaissance periods, emotion was a popular issue among philosophers and literacy authors. Later, 17th century became more significant than previous periods. For instance, Descartes, the founder of modern philosophy was the first philosopher to propose the separation of mind and body. In his most well

known book “The Passions of the Soul”, he discussed the relationship between emotion and neurophysiology. In addition, he claimed that there were six fundamental emotions, which were *love, hatred, sadness, joy, desire, and lastly wonder*. And he discussed these emotions in terms of neurophysiological dimensions (Oatley & Jenkins, 1996, p.15). According to Descartes, emotions that were related to our physiological structure resulted from soul, in which thinking takes place and he concluded that emotions could be controlled by our thoughts. Moreover, Descartes agreed with Aristoteles’ assumptions that emotions rely on our evaluations of events. However, in his attempt to improve upon Aristoteles and Thomas Aquinas, who saw emotion as experiencing and evaluating stimuli in terms of their potential for gain and pleasure, Descartes’ research led writers to confuse the mind-body problem with a soul-body problem (Candland et al., 1977, p. 21).

Lastly, one of the most important 17th century philosophers Spinoza, who is considered as a rationalist philosopher assumed that, the universe was a reflection of the perfect God and human beings were a part of this great reflection. We human being, God and this universe were all one. According to him, *love* was the main emotion; however, there were other subsequent emotions such as *envy, resentment, or passion* (Frijda, 1986, p. 265). Similar to Aristoteles, Spinoza seemed to have a cognitive view toward emotions, as Spinoza also proposed that although emotion and idea had different characteristics; emotion was determined by ideas (Deleuze, 2000, p. 12-20). Indeed, more or less this vision constitutes a basis of cognitive approach.

1. 1. 2. Perspectives on Emotion

1. 1. 2. 1. Evolutionary Perspective and Charles Darwin

The evolutionary perspective on emotion derives from Charles Darwin the father of modern biology. At the beginning of 20th century, in “the expression of the emotions in man and animals”, that is one of the most important books of Darwin; he (1934) stated that expressions of emotions were heritages from our past evolutionary habits. Generally, emotions were derived from habits in which our evolutionary or individual past had once been useful. However, some expressions of emotions still have served an

adaptive purpose. Darwin stressed their communicative function, animals including humans, signal their readiness to fight, run, or attend to each other's needs through a variety of postural, facial, and other nonverbal communication. For instance, a baby's cry sends a signal to its parents, just as bared teeth display anger (Kowalski & Westen, 2005, p. 363). Additionally, "when infants feel hunger or discomfort or suffer, they scream and in that case, their eyes are firmly closed so that their round skin becomes wrinkled. The mouth is widely opened, with the lips retracted in a strange manner, which makes it as a squarish form. The breath is inhaled inconsistently. This expression, the firm closing eyelids and compression of the eyeball serve to protect the eyes from becoming gorged with blood" (Darwin, 1934, p. 74). However, Darwin (1934) proposed that some expressions of emotions did not have any function today, for example, sneering is undeveloped remain of snarling that was functional in previous stage of development of human beings (cited in Oatley & Jenkins, 1996, p. 2). Darwin gave concrete examples such as weeping that indicates an extreme form of pain, as shown by the writhing of the whole body and teeth clenching that are accompanied by sweating and trembling (1934, p. 72).

Moreover, Darwin (1872) defined and arranged expressions of emotions based on their original functions. He thought that emotions resembled reflex-like mechanisms (cited in Oatley & Jenkins, 1996, p.2). He claimed that emotions were similar to reflex actions that appeared due to the excitement of the peripheral nerve, which transmitted its influence to certain neurons, and these transmissions, excited certain muscles or glands to action. For example, coughing and sneezing were familiar instances of reflex actions (Darwin, 1934, p.10).

According to Darwin, facial expressions of emotions were universal, not learned, same in all cultures, biologically determined and occurred in many animal species (1934, p.1; Ekman & Friesen, 1975, p.23; Stein & Oatley, 1992, p. 161). He strongly emphasized the similarities between nonhuman and human. For instance, animals also showed wonder, curiosity, imitation, attention, memory, and reasoning just like human beings. Darwin (1934) concluded that facial expressions were important tools for communication and recognition of emotions served a healthy relationship

between both humans and nonhumans (cited in Lazarus, 1991, p. 71).

1. 1. 2. 2. The Psychodynamic Perspective

Indeed, Sigmund Freud (1856-1939) the founder of classic psychoanalytic theory did not directly propose a theory of emotion. He had little to say about the structure of emotions. Instead, he emphasized determinable relationship between perception and sensation (Candland et al., 1977, p. 62). His views on the nature of emotions are complex and primarily on anxiety. Generally, he focused on emotional traumas, inner conflicts, and personality. He considered emotions to be “archaic discharge syndromes”. He thought that emotions are not always simple. Often they are felt obscurely, some emotions and their meanings become clear only by expressing them, or in talking them to another person or in reflecting upon them. In his famous book on emotions “Inhibitions, symptoms and anxiety,” Freud formulated a new conception of nature of anxiety that is considered as the result of an evaluation by the ego of dangerous aspects of external or internal environment (Candland et al., 1977, p. 63).

Briefly, psychoanalysis has been primarily concerned with certain classes of danger situations: birth, hunger, and absence of mother, loss of love, fear of castration, fear of death, and fear of conscience. Namely, anxiety is not the result of repression that is used in order to cope with dangerous situations, on the contrary, the reason for repression (Candland et al., 1977, p. 193; Lazarus, 1991, p.235). According to psychodynamic theorists, people can be unconscious of their own emotional experience, that unconscious emotional processes can influence thought, behavior, or even health. This perspective also suggests that we regularly delude ourselves about our own abilities and attribute these abilities due to avoid unpleasant emotional consequences (Kowalski & Westen, 2005, p. 360).

1. 1. 2. 3. Peripheral Perspective and James-Lange Theory of Emotion

Contemporary wisdom claims that William James’ great achievement was to introduce psychology to American people. As a psychologist, one of his intellectual

achievements was to emphasize the peripheral component of the emotional experience, an emphasis James made explicit in what has come to be called the James-Lange theory of emotion over a century ago. In 1884, W. James proposed the first important physiological theory of emotion. He suggested that bodily changes directly follow the perception of an exciting “fact” and that “our feeling of the same changes as they occur is the emotion”. In other words, James argued that emotion is rooted in the bodily experience. According to him, first, we perceive the object then bodily response occurs and lastly emotional arousal appears (Kowalski & Westen, 2005, p. 347). For instance, when we see a stimulus such as a bear, we have a pounding heart, we begin to run and then we fear. We do not run because of fear, we fear because of running. We feel sorry because we cry, angry because we strike, afraid because we tremble (Candland et al., 1977, p. 25). When his Danish colleague Carl Lange independently proposed a similar view in 1885, since then this theory has been known as James-Lange theory of emotions (Kowalski & Westen, 2005, p. 348). Lange proposed that vasomotor disturbances following environmental events constitute emotional reactions, that the cognitive qualities of emotion are secondary to the physiological qualities (Candland et al., 1977, p. 87). According to Candland et al. although these two theories have obvious differences, the two theoretical positions have historically been grouped together into one theory (1977, p. 87).

In detail, James described two kinds of emotions, *the coarser*, and *the subtler*: the former means that “one recognizes a strong organic reverberation”, the second one is “those whose organic reverberation is less obvious and strong”. He implied an acceptance of the evolutionary nature of emotion: there are many emotions, they are changeable, not stable, and they shade the coarser emotions into one another (Candland et al., 1977, p. 24). Specifically, the subtle emotions are learned or acquired ones. For example, resentment is learned through association with past events. However, the coarser emotions are emotions that all human beings experience identically such as fear.

To sum up, the most influential writers on emotion were Aristoteles and Descartes who were able to look toward the body and used physiological functioning of the human beings. Continental theories from Descartes to James were primarily

centralistic, and they posited some form of a mind that based on the interpretation of events, this interpretation provided us emotions or feelings. Undoubtedly, James changed the emphasis from the central mind to periphery organs. Thanks to James, he did not only make physiological researches but also he shifted attention from the central mind to the peripheral structures of the body (Candland et al., 1977, p. 20).

1. 1. 2. 4. Central Perspective and Cannon-Bard Theory of Emotion

James-Lange theory of emotion could not be replicated and this theory met with a great deal of criticism. Generally, these criticisms included the secondary position of cognition when compared to physiology; it was questioned that the same environmental stimulus did not elicit identical emotions in different people. Among these criticisms, perhaps the most ardent one belong to Walter B. Cannon (1927-1931). Cannon proposed an alternative theory suggesting that emotions are cognitive rather than physiological state of arousal. He perceived the sequence of events as external stimulation followed by neural processing followed by physiological reactions. Philip Bard expanded Cannon's theory by showing the thalamic structures for the expression of emotion, this general theoretical position came to be referred to as the "Cannon-Bard Theory". This novel theory included that emotion-inducing stimuli simultaneously elicit both an emotional experience, such as fear, and bodily responses such as sweating (Candland et al., 1977, p. 87-88; Kowalski & Westen, 2005, p. 348). In the central view, overt response follows upon brain activity that produces experience; response thus follows upon experience. In other words, we run and tremble because we feel frightened (Frijda, 1986, p. 177).

To conclude, indeed only certain aspects of James-Lange and Cannon-Bard theories of emotion are opposite. The major point of disagreement between these positions really concerns the point in time or in the sequence of events when physiological functioning is an important concept in explaining emotions. James stressed the importance of precognitive or determining physiological states, whereas Cannon emphasized the importance of post-cognitive or response-type physiological states (Candland et al., 1977, p. 88). In fact, these theories can be assumed as

complementary rather than opposites.

1. 1. 2. 5. Cognitive Perspectives

During the past decade, interest to the role of emotion in cognition and in behavior has increased dramatically. In fact, it can be assumed that there have been two approaches to the issues concerning cognition and emotion. The first was initiated by Charles Darwin and was concerned with emotional expression and behavior. The second approach was associated primarily with the work of William James. Indeed, both Darwin's and James' writings indicated that they took for granted the assumption that some kind of perception and evaluation must precede an emotional response (Candland et al., 1977, p. 192). However, the relationship between cognition and emotion seemed to be based on the 5th century, for instance Plato believed that reason must direct the passions. Nowadays, contemporary theories are predominantly based on cognitive principles to explain both the causes and consequences of emotions.

In terms of the nature of emotions, many cognitive theorists believe that emotion depends on the interpretation or appraisal system. Appraisal can be defined as a kind of personal meaning of an event, which includes the evaluations of the significance of the facts for personal well-being (Leon & Hernandez, 1998). Similarly, Eich et al. suggested that people have a perceptual-interpretive system that analyzes and evaluates environmental stimuli for their emotional significance. This environmental stimulus is interpreted based on cognitions and then the appropriate emotion arises (2000, p. 88). First, the facts must be appraised for personal benefit and harm, and then an emotion occurs. The way people respond emotionally depends on the appraisals they make, in other words, their inferences about causes of the emotion and surely, their own bodily sensations are crucial in emotional experience (Leon & Hernandez, 1998).

According to Stanley, Schachter and Jerome Singer (1962) (Schachter- Singer theory) emotion involves two factors, first is the physiological arousal and second is the cognitive interpretation of this arousal (cited in Kowalski & Westen, 2005, p. 361). Specifically, when people experience a state of nonspecific physiological arousal, which could be anger, happiness, or others, they attempt to figure out what these arousals

mean for their own sake. Meanwhile, although facial expressions are major source of information about people's emotions, knowledge about the situation can influence or sometimes override information from the face (Kowalski & Westen, 2005, p. 362). In order to interpret the arousal, people generally use situational cues. They respond as what the situational cues suggest. Shortly, cognitive processes play a central role in interpreting other people's emotions. However, numerous studies support some degree of Schachter-Singer theory. According to many cognitive theorists, people's emotions also reflect their judgments and appraisals of the situations or stimuli that confront them not only their appraisal mechanisms (Kowalski & Westen, 2005, p. 361).

Specifically, in terms of the antecedents of emotions, basic emotions are typically caused by the perceptions of general categories of events: happiness arises with a perception of the progress towards a goal; sadness arises when a goal is lost or when major loss of an anticipated pleasure; anger occurs when a plan is blocked; perceived threats to one's body and self-esteem leads to anxiety; a goal conflict or a threat to self-preservation leads to fear; a perception of something to reject leads to disgust; and desire is produced by a perception of something to approach and so on. These emotion production rules are also central to various appraisal theories of emotion (Eich et al., 2000, p. 88; Stein & Oatley, 1992, p. 209).

Some cognitive theorists prefer to explain emotion profoundly as a process that includes five basic components; first is objects or precipitating events, second is appraisal, third is physiological changes, fourth is action or expression, and final component is regulation (Planalp, 1999, p. 11). According to their point of view, this process begins with a precipitating event. It seems better to explain process theories of emotion by giving a specific example on sadness. For instance, sadness is generally felt when an undesirable event happens, such as loss of loved one or separation or being rejected. Surely in order to generate sadness, this event must be appraised not only as negative but also as feeling of weakness. Otherwise anger or fear can be felt. And physiologically one can be tired, has low in energy. In action stage, withdrawing from social contact or talking less cause sadness, regulation stage includes talking to someone closer about sad feelings or events, or trying to act happily (Planalp, 1999, p. 12).

To sum up, there are many perspectives and theories about the nature or causes of emotions. Some has been able to replicated; some has been rearranged based on contemporary findings.

1. 1. 3. Emotion and Related Concepts: Feeling, Affect, Emotional States, Mood, and Emotional Disorders

The phenomena to which the label “emotion” or “emotional” is a difficult matter, also there has not been an agreement due to distinguish them. For example, some people consider hunger as an emotion; others do not (Frijda, 1986, p. 1). For this reason, to begin with, it is very important to define some terms.

Literally, the word *emotion* and its derivates have passed through identifiable stages. In 17th and 18th centuries, written language remained faithful to the Latin derivation of emotion, namely, *emovere* “to move away from”.

Emotion refers to in:

1695: a moving out, a migration

1735: causing movement

1822: a physical moving, stirring, or agitation

The application of the word to mental states developed simultaneously:

1660: a vehement or excited mental state

1735: tending or able to excite emotion

1808: a mental feeling or affection (for example, of pain, desire, hope)

1847: connected with the feelings or passions (Candland et al., 1977, p. 4).

By the late 19th century, it was accepted to distinguish emotion from cognition (reasoning) and volition (willing). This separation still continues. Emotion is commonly thought to be a separate faculty, but it interferes with rational aspects of our minds, and subverts or distorts our motivation or values. In sum, neither common usage nor the definitions offered by theorists clarify the problem of defining emotion because the meanings of the term continue to evolve.

To begin with, *emotion* can be defined as an internal reaction of feeling, which

may be either positive (such as joy) or negative (such as anger), and may reflect a readiness for action (Vasta, Haith & Miller, 2000, p. 448).

According to Oatley and Jenkins, *emotion* is generally caused by a person consciously and unconsciously evaluating an event as relevant to a goal that is important; the emotion is felt as positive when a goal is reached, as negative when a goal is obstructed. Another definition of these authors is that, “an *emotion* is usually experienced as a distinctive type of mental state, and sometimes is accompanied or followed by bodily changes, expressions and actions” (1996, p. 96). On the other hand, Eich and et al. stated that “an *emotion* has properties of a reaction: it often has an identifiable cause such as a stimulus or antecedent thought, intense experience of short duration, emotions usually have high cognitive involvement and the person is aware of them” (2000, p. 89).

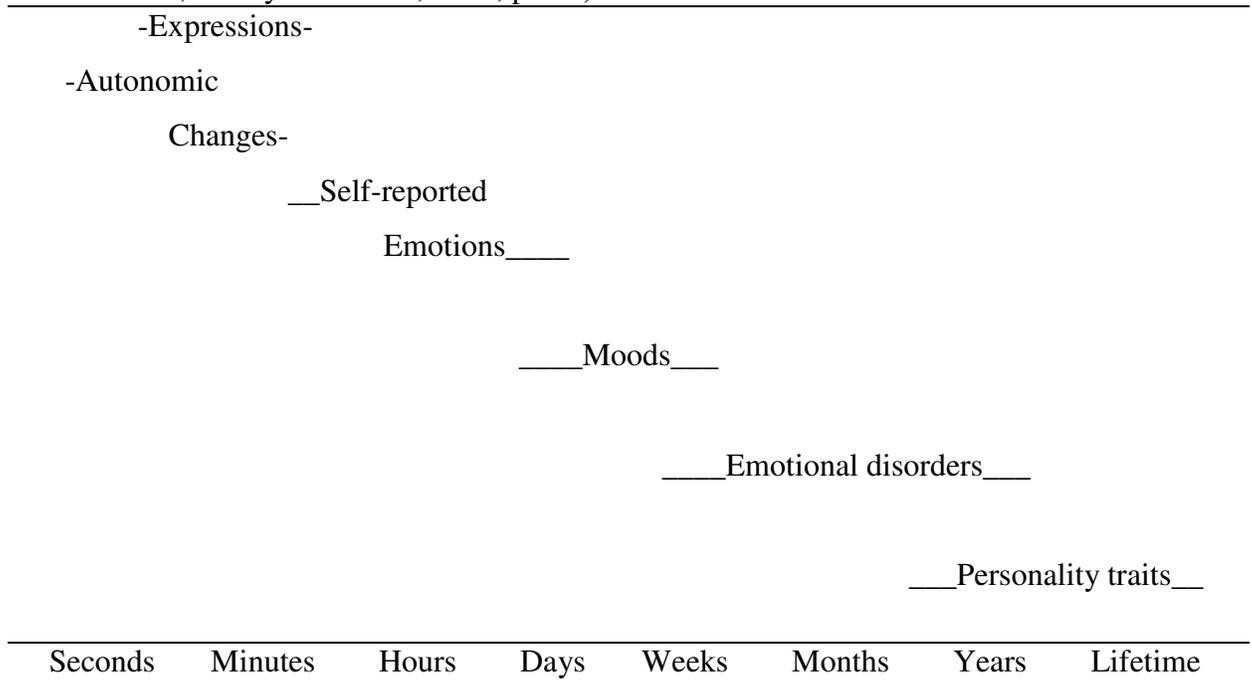
Probably, the most comprehensive definition belongs to Ekman who defines *emotion* as a whole process, “a particular kind of automatic appraisal is influenced by our evolutionary and personal past, and then a set of physiological changes and emotional behaviors begin to deal with the situation”. Usually, they occur in a response to a social event that can be real, remembered, or imagined (Ekman, 1993). Surely words are important in terms of defining and dealing with our emotions however, as Ekman says “emotions are not so simple to reduce into words” (2003, p. 13).

In general, many terms are used to illustrate emotion such as *mood*, *affect*, and *feeling*, which are generally used interchangeably; however, there are some distinctions between these terms. Contemporary American and English oral usage often differentiates these terms: for instance, primarily *emotion* is used to refer to observable behavior, and *feelings* to inferred states. Thus, emotion is assumed as intense but temporary, and feelings as weak but more permanent (Candland et al., 1977, p. 4). On the other hand, Lazarus defines *feeling* as a sensory perception, such as feelings of pain, pleasure, and distaste, rather than as emotion (1991, p. 57). Indeed, in many studies, the term “feeling” is used as the synonym of emotion.

The term *affect* is more general term is used any phenomena related with emotion such as moods and disposition or both (Eich et al., 2000, p. 89). Lazarus

defines *affect* as subjective quality of an emotional experience (1991, p. 57). Alternatively, Vasta et al. define *affect* as the outward expression of emotions through facial expressions, gestures, and innotation etc (2000, p. 448). In addition, the terms “emotion” and “emotional episode” are used for states that endure a limited amount of time (see, Figure 1).

Figure 1. Episodes of Emotion . (A spectrum of affective phenomena in terms of the time course, Oatley & Jenkins, 1996, p.124).



One of the important concepts that is often confused with emotion is *mood*. Actually, mood differs from emotion in that the feelings or emotions involved last over a longer period (Ekman & Friesen, 1975, p.12). Moods have a tendency to be diffuse rather than directed toward individuals, events, or objects in the environment. Yet moods have dramatic effects on our behavior, they affect the intensity of our reactions to emotion and provoke stimuli (Canland et al., 1977, p. 108). According to Eich et al. *mood* tends to be more subtle, longer lasting, less intense and nonspecific compared to emotions. In contrast, people may not be aware of their mood (2000, p. 89). For instance, a feeling of anger lasting for just a few minutes, or even for an hour, is called

an emotion. However, if the person remains angry all day or becomes angry for days, then it is called mood (Ekman & Friesen, 1975, p.12). On the other hand, Oatley & Jenkins (1996) define *moods* as an emotional state that endures for hours, days and sometimes weeks and generally, they do not have any intention. However, emotions have an intention or have an object. The best way to discriminate mood and emotion is that, emotion tends to change more easily than mood, which is more resistant to change (p. 125). Despite these differences, apparently, it is not easy to discriminate mood and emotion.

If emotional states last longer than moods, then this state is called as *emotional disorders* that refer to mood disorders on the basis of currently used classification system DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, APA, 1994). One step ahead from emotional disorders is called as *personality disorders* which last a lifetime (Oatley & Jenkins, 1996, p. 127). It is found that people with personality disorders have more emotional intensity than others do (Linehan, 1987). Therefore, people can differ in terms of subjective experience of emotion that refers to what the emotion feels like to the individual. For example, when we have a blue mood, we feel sadness for hours or days; a melancholic personality is prone to feeling sad; depression is the mental disorder in which sadness and agony are central (Ekman, 2003, p. 93).

For instance, in terms of subjective experience, one of the most prominent psychological disorders is *Alexithymia* refers to difficulty in distinguishing emotions (Helmers & Mente, 1999). Literally, “A-lexi-thymia” means “without language for emotions” (Westen, 1999). In other words, alexithymic individuals have difficulty telling their emotions; mostly it is believed that they misinterpret their emotional arousal as symptoms of physical illness (Helmers & Mente, 1999).

1. 1. 4. Emotional Facial Expressions (EFE)

Human emotions are the language of human social life. They provide the outline patterns that relate people each other. For instance, the smile; the best-established universal signal of emotion, happiness is the emotion of cooperation; anger is the emotion of interpersonal conflict (Oatley & Jenkins, 1996, p.87). According to Oatley

and Jenkins, “emotions are heuristics”. Emotional states organize ready repertoires of action. In other words, they occur without our need to say to ourselves, “this situation is dangerous”, instead we simply feel frightened and we take action (1996, p. 258). Specifically, facial expressions are the readouts of these internal emotional states (Lazarus, 1991, p. 70).

Actually, *emotional facial expression (EFE)* refers to the overt behavioral signs of emotion or it indicates something within that is externalized (Oatley & Jenkins, 1996, p.124). In detailed, emotional facial expressions can be defined as a means of communication that are more rapid than language and they facilitate communication in everyday life in order to interpret the intentions, goals, opinions and attitudes of others (Erickson & Schulkin, 2003; Batty & Taylor, 2003).

In daily life, generally, we monitor the emotional reactions of others and prefer reacting and regulating our behaviors based on them. Thus, they constitute very powerful tools in social coordination (Batty & Taylor, 2003). According to Erickson & Schulkin (2003) “as human beings, we construct and interpret the world around us into useful and understandable categories in order to predict and understand events central to human survival and experience”. Similarly, Ekman postulated that emotional expressions were crucial to the development and regulation of interpersonal relationships (1992, p. 177).

Surely, when interpreting facial expressions of others, we consider the situational and social settings in which expression is produced. Our main tool for reading expressions is usually a “face”. It is assumed that emotions are often revealed on the face that can display more than ten thousand expressions (Ekman, 2003, p. 14; Ekman, 1993; Lazarus, 1991, p. 70). Kowalski & Westen support Ekman that, face is the primary center of emotion (2005, p.351). The face is not only a means of communicating emotions, but also is a vehicle to communicate intentions (...) (Erickson & Schulkin, 2003). Face is a very important source of social information and it appears as if we are biologically prepared to perceive and respond to faces in a universal manner (Eastwood & Smilek, 2005). Also, it is known that specific signals in each part of the face that convey the messages of fear, surprise, sadness, happiness or enjoyment, anger,

disgust, and combinations of these emotions (Ekman & Friesen, 1975, p.14). Even though, some people believe that they can read attitudes, personality, moral character, and intelligence from face, it is certain that sex, age and ethnicity may be read more accurately and easily than all above (Ekman & Friesen, 1975, p.13). More specifically, a person is most easily identified by his face than his body. For instance, when we are told a person that we have not met yet, usually we want to see the photograph of his face. According to Ekman and Friesen, problems in understanding facial expressions arise because most of the time people do not watch each other's faces (1975, p.13). In fact, watching someone's face is intimate, thereby, we generally do not want to be intrusive or rude by staring at people's faces.

Ekman and Friesen pointed out that some facial expressions are extremely rapid, brief, and lasts merely a fraction of a second. These are called *micro-expressions*. It is rare for a facial expression of emotion to last as long as five or ten seconds, very long facial expressions are not genuine expressions, these exaggerated form of the expressions are called as *mock expressions* (1975, p.14; Ekman, 1993).

Due to test their assumptions, Ekman and Friesen constructed *Facial Atlas* of the face, which is aimed to portray photographically each of the universal facial expressions of emotion. For this, they first constructed a table which all the facial muscles and six emotions including famous theorists such as Darwin, Duchenne, Huber and Plutchik and their proposals about the relationship between emotion and muscles. And they filled the gaps based on their deep experiences. Then, they took of photos of the models and each of the facial areas (brow/forehead; the eyes/lids, and the root of the nose, and the lower face including the cheeks, mouth, most of the nose, and chin). In conclusion, the completed Atlas consists of series of photographs of the three different areas of the face, each photograph keyed to one of the six emotions (Ekman, 1993).

1. 1. 5. Basic or Discrete Emotions

According to Frijda, emotions can be characterized in terms of action readiness mode corresponds to what are often called “primary”, “elementary”, “basic” or “fundamental” emotions. For instance, anger is the urge to attack or urge to regain

freedom of action and control. Fear is the urge to separate oneself from aversive events (1977, p. 72). On the other hand, Lazarus claimed that primary or basic emotions express universal biological rules handed down genetically through evolution because they have proved adaptively useful (1991, p. 70).

Ekman postulated that each of the emotions is not a single affective state but a “family” of related states. Each member of an emotion family shares a certain characteristics, such as commonalities in expression, in physiological activity, in nature of the antecedent events and appraisal processes. And these shared characteristics are the products of our evolution. According to him basic emotions arise from an inherited neural structure, involve a characteristic neuromuscular response pattern, and are correlated with distinctive subjective qualities for each emotion. He distinguished basic emotions from one another and from other affective states, such as moods, emotional traits, etc. on the basis of these criteria (1992, p. 173-175).

Recently, there are six universally accepted basic emotions; *fear, surprise, sadness, happiness, anger, disgust*. Each emotion has its own characteristics and appearance figures. In fact, Ekman (1993) emphasized that, there is no single expression for each emotion. For instance, there are 60 anger expression variations in intensity stretching from annoyance to rage. These emotion families distinguish from the family of other expressions.

Furthermore, there are other emotions such as *love, jealousy, hatred, envy, regret, interest, guilt or despair* that are spoken in some societies but not in others. The elaborations or combinations of these basic emotions are called as *social emotions* (Stein & Oatley, 1992, p. 162). These social emotions are not primarily of survival or biologically based but very critical for social interaction of individuals. For instance, *pride* has been proposed to be a combination of joy and anger; *love* a combination of joy and acceptance; *envy* or *hatred* arise from a comparison of oneself with another person (Stein & Oatley, 1992, p. 209; Oatley & Jenkins, 1996, p. 88). Indeed, as Stein and Oatley emphasized that it is more common to experience the mixed feelings instead of single ones in almost all cultures (1992, p. 209).

1. 1. 5. 1. Basic or Discrete Emotions: Definitions

Basic emotions are distinguished as negative and positive. *Happiness* is a positive emotion. *Fear*, *anger*, *disgust*, and *sadness* are negative emotions and most people do not enjoy them. *Surprise* is neither positive nor negative (Ekman & Friesen, 1975, p. 99). Ekman (1992b) stated that all negative emotions differ in their appraisal, antecedent events, behavioral responses, physiology, and other characteristics. Generally, people strive to attain emotions if pleasant, to avoid them if unpleasant (Stein & Oatley, 1992, p. 203). People differ in whether they can enjoy, tolerate of surprise, fear, disgust, happiness, anger, or sadness. No one feels emotions in the same way. People also differ tremendously in experiencing the emotional intensity. For instance, the extent to which people experience happiness is relatively stable across age and gender but differs substantially across cultures. More specifically, cultural traditions and upbringing within a culture play a role in shaping one's attitude about feeling or displaying emotions.

1. 1. 5. 1. a. Happiness

Happiness is the emotion that most people want to experience. People like being happy. It makes feel good. People choose conditions in which happiness are experienced and almost organize their lives based on feeling good. Oatley and Jenkins defined happiness as the emotion or mood of achieving subgoals and of being engaged in that one is doing (1996, p. 259). It is observed that when people are happy, they are more cooperative and altruistic (Oatley & Jenkins, 1996, p. 87).

In English, happiness is used almost synonymous with the pleasure and excitement. *Pleasure* is defined as a product of positive physical sensations that is opposite of the physical sensation of pain. Usually people feel happy when they experience pleasurable sensations, unless they get punishment for these feelings or feel guilty about them. *Excitement* is defined as the opposite of boredom. People become easily excited when something arouses their interests. However, in boredom nothing is new and attracts attention you. Certainly, people can feel happy without excitement or it

is also possible to be excited without happiness. Instead of happiness, excitement can blend with fear or anger (Ekman & Friesen, 1975, p. 100). Briefly, excitement and pleasure are different experiences, which often involve happiness. Therefore, it seems that there are four routes of happiness; pleasure-happiness, excitement-happiness, relief-happiness or happiness involving self-concept. When pain stops, people get happy. When people do not feel negative emotions such as fear, anger, or disgust, commonly they feel happy. This kind of happiness is the *relief-happiness*. Fourth kind of happiness is about self-concept. Something, which enhances your view of yourself happens, this situation affirms or further elaborates a favorable self-concept. Praise, friendship, the esteem of others is rewarding and makes you feel happy. This kind of happiness originally is developed from experiences in which people get approval. It is a more contented, smiling happiness, rather than laughing.

Happiness varies not only in type, but also in intensity. It can vary from a smile to a broad grin, in the extreme form, laughter with tears. Surely, the presence of laughter does not always indicate the intensity of the happiness. People can extremely feel happy and may not laugh. Smiles that are a part of the happiness facial expression often occur when a person is not happy. People can smile in order to mask their emotions.

Happiness is exhibited in the lower face and lower eyelids. The intensity of a happy expression is primarily determined by the lip position. The mouth may or may not be parted, with teeth exposed or not. Additionally, a happy person shows wrinkle lines running from the nose out and down to the area beyond the corners of the mouth. These *naso-labial folds* occur. In addition, the cheek becomes raised when there is a pronounced smile or grin. The more extreme the smile or grin, the more pronounced will be the naso-labial folds, the raising of the cheek, the crow's feet, and the lines under the eyes (Ekman & Friesen, 1975, p. 110).

Happiness often blends with surprise, which is the shortest emotion. This blend lasts only for a moment. Happiness also blends with contempt, producing a smug, scornful, or superior expression. Additionally, it can blend with anger. Most commonly, a smile or slight grin is used to mask anger, in which case the person looks happy, not angry. Interestingly, a person can feel both happy and angry at the same time, enjoying

his/her anger. Lastly, happiness blends with fear. Indeed, the expression is not a blend, but either a comment or a mask. It can be felt at the same time for instance in a roller coaster. Happy- sad emotions can also blend. This kind of expressions generally occurs in bittersweet experiences or when the happy expression is being used as a mask- laughing on the outside, crying inside (Ekman & Friesen, 1975, p. 112).

1. 1. 5. 1. b. Sadness

There are many words to describe sad feelings: distraught, disappointed, dejected, blue, depressed, despairing, grieved, helpless, miserable, and sorrowful. According to Oatley and Jenkins, sadness is the opposite of happiness. It can be described simply as the emotion of losing a goal or social role (1996, p. 259). Specifically, anything can make you sad, but the most often you are sad about losses. Many types of loss can trigger sadness. For instance; loss through death or rejection by a loved one or loss of an opportunity or reward through your own effort, or another's disregard. As compared with fear that looks toward future, sadness seems to look toward the past (Oatley & Jenkins, 1996, p. 260; Ekman, 2003, p. 83; Ekman & Friesen, 1975, p. 114).

Ekman distinguished sadness from *agony*. According to him, in sadness there is more resignation and hopelessness whereas in agony there is a protest. Therefore, agony attempts to deal actively with the source of the loss, it seems to include rebellion. However, sadness in which suffering is muted is a passive feeling. People silently endure their distress. This suffer is not like physical pain; it is the suffering of loss, disappointment, or hopelessness. Thus, sadness is rarely a brief feeling. It is one of the long-lasting emotions. People are usually for at least minutes and more typically for hours or even days (2003, p. 84).

Even in such intense grief, there are moments when other emotions may be felt. For instance, we feel angry toward the person who is responsible for a loss, while we feel sadness and agony about the loss itself (Ekman, 2003, p. 85; Ekman & Friesen, 1975, p. 114). Or grieving person may feel fear in terms of how s/he will survive without her/his loss. Moreover, when recalling some funny moments with the deceased,

amusement can be felt.

There is a distinctive appearance in each of the three facial areas during sadness. The inner corners of the eyebrows are drawn up and the inner corner of the upper eyelid is raised, and the corners of the lips are down.

Sadness blends with fear and anger mostly. Blends of sadness with disgust and blends of sadness with happiness are also common types.

1. 1. 5. 1. c. Fear

Fear is the emotion of anticipated danger (Oatley & Jenkins, 1996, p.260). In other words, the antecedent event for fear is physical or psychological harm (Ekman, 1992, p. 184). Survival depends on learning to avoid or escape from situations that cause severe pain and the physical injury (Ekman & Friesen, 1975, p. 47). Namely, fear renders a mode of readiness to cope with danger. Thus, it promotes vigilance for the feared event that can be an imagined or real. Even though fear is accepted as unpleasant, it has function to protect the body from further injury (Oatley & Jenkins, 1996, p.260). According to Darwin, fear is the most depressing of all the emotions, it lowers the temperature, induces utter, and might be associated with the most violent and prolonged attempts to escape from the danger. Nevertheless, extreme fear often acts as a powerful stimulant (1934, p.32).

Fear differs from surprise in three ways. Firstly, fear is a horrible experience, surprise is not and fear is unpleasant, moreover can be traumatic, but surprise can be pleasant or unpleasant. Secondly, you can be afraid of something familiar that you know very well is going to happen. For example, although it is not surprised for you to go to the dentist, you can still be frightened. Thirdly, in terms of duration, surprise has always a short duration, but fear can also occur gradually (Ekman & Friesen, 1975, p. 48-49). Even danger disappears; you may still feel fear depending upon your appraisal of the feared situation.

Just like surprise, fear may be followed by any of the other emotions or by no emotion at all. You may become angry or disgusted or sad or even happy if threat has been avoided (Ekman & Friesen, 1975, p. 50). Nevertheless, the most common blend

with fear is surprise. Because usually fearful events are unexpected and it is common to be both surprised and frightened at the same moment or nearly at the same moment.

The appearance of full-face fear is characterized as; the eyebrows are raised and drawn together, the eyes are open, and the lower lid is tensed, and the lips are stretched back unlike in surprise expression (Ekman & Friesen, 1975, p. 50). Actually, there are two-way fear expressions; each of these expressions has a slightly different meaning. One is *apprehensive fear* that refers to an impending a harmful event. In this expression, fear is shown only in brow and eyes, not in lower face (mouth), another is *frozen or horrified fear*. Unlike apprehensive fear, the expression of horrible fear does not include a brow component. Mouth is more stretched (Ekman & Friesen, 1975, p. 55-60). According to Frijda who considered fear as a protective response, extreme fear is expressionless (1986, p. 18).

On the other hand, Frijda describes the fear expression as “forceful eye closure, frowning by drawing the eyebrows together, bending the head, hunching the shoulders, bending the trunk, and knees” (1986, p. 16).

1. 1. 5. 1. d. Anger

Ekman and Friesen claimed that anger is very likely the most dangerous emotion. When people are angry, they hurt others purposefully (1975, p. 76). However, according to Lazarus, although anger is commonly classified as negative emotion, people often report feeling good about their anger. Nevertheless, he added that when anger is acted out, it can have harmful social or physiological consequences, especially when it is not managed (1991, p. 5).

Oatley & Jenkins defined anger as asserting ourselves in dominance. In other words, according to them, it is the emotion of frustration with anything we are trying to do, or with anyone who shows lack of consideration or who obstructs us (1996, p. 260). They confirmed the frustration-aggression hypothesis of Berkowitz (1989) including that aggressive behavior arises from frustrated needs or desires. The frustrating obstacle may not be a person, you can be angry at an object or natural event that frustrates you, even though you may feel a bit embarrassed or less justified in your anger (Ekman &

Friesen, 1975, p. 79). Surely, your anger will be more likely and more intense if you believe that the agent of the interference acted arbitrarily. As a result of this feeling, you may express your anger directly, indirectly, symbolically or displacing it onto a safer or more convenient target, such as a scapegoat.

Beside frustration, a second major provocation to anger is a physical threat. However, you may feel fear if the threatening injury is much more powerful than you are, if this injury is insignificant or unable to hurt then you feel more contempt.

Third major source of anger is someone's action or statement that causes you to feel psychologically rather than physically hurt, such as a rejection, an insult. Doubtlessly, the more you care the person that rejects you, the more you get angry. An insult from someone you have little regard for, a rejection by someone, whom you never consider as a friend or lover, may make you feel contempt or surprise rather than anger. On the other hand, if hurt comes from the person you care greatly about, you may feel sadness instead of anger or both. This type of source, at the same time may cause you to rationalize this anger feeling and make you feel guilty.

Fourth major source of anger is someone's action or statement toward you or someone that violate your moral values. If someone treats another person in a manner you consider immoral you may become angry even though you are not directly affected. For instance, sexual or physical abuse or anything that is opposite to your values, clearly, if you have a value about marriage like "until death us a part" when a husband leaves his wife, this situation may lead to anger you.

Absolutely, there are other sources of anger, such as a person's failure to meet the expectations, and another person's anger are two of the causes of anger.

Anger varies in intensity from slight irritation or annoyance to rage or fury. People differ not only in terms of what makes them angry or in terms of what they do when they are angry but also in terms of how long it takes them to become angry (Ekman & Friesen, 1975, p. 81).

Also, boys and girls differ in showing anger, girls are taught to control or not to show anger toward anyone but boys are encouraged to express their anger (Ekman & Friesen, 1975, p. 76).

Similar to other emotions, anger also blends with other emotions; a person may also feel anger-sadness, anger-fear, and anger-disgust at the same time. Some people even like being angry. They enjoy argument. Moreover, intimacy can be established or reestablished by an angry exchange between two people.

Human anger has a large variety of manifestations especially is manifested in each of the three areas; the eyebrows are lowered, and drawn together, the eyelids are tensed, and the eye appears to stare in a hard fashion. The lips are either tightly pressed together or opened in a square. Actually, the nostrils may be widened, but this is not essential to the anger facial expression and also may occur in sadness (Ekman & Friesen, 1975, p. 76; Frijda, 1986, p. 19).

Generally, the blended expressions are accomplished by two blended emotions registering in different areas of the face. However, with anger unless the expression is registered in all three areas of the face, the message becomes ambiguous. Anger message is overwhelmed by the other emotion in blend. In other words, anger is easily masked except two expressions in which anger message remains salient. One is anger-disgust blend expression. The other is the blend need not require different facial areas show the different emotions. There are other blends in which the blending is accomplished by separate facial areas rather than mixing within facial areas, contempt-anger blend, anger-surprise blend, happiness-anger blend, and sadness-anger blend (Ekman & Friesen, 1975, p. 92-94). One of the most common mixtures is sadness and anger, which may be caused by a loss that also frustrates some plan (Stein & Oatley, 1992, p. 209).

1. 1. 5. 1. e. Surprise

Ekman and Friesen indicated that surprise is the most brief emotion (1975, p. 34). It is sudden. If you have a time to think about that event, you will not feel surprised. Also, it does not take long time unless the surprising event unfolds new surprising elements. Correspondingly, Frijda defined surprise as a response to sudden stimuli that consists of widening of the eyes, brief suspension of breathing, and general loss of muscle tone. The loss of muscle tone causes the mouth to fall open, and may make the

subject stagger or force him to sit down (1986, p. 18). The more unexpected event, the greater the surprise you feel (Teigen & Keren, 2002). Specifically, Ekman and Friesen postulated that surprise is triggered by both *unexpected* and *misexpected* events. Unexpected events can be defined as an unusual event, which is unanticipated. At that moment, the surprised person does not expect anything in particular to happen. In misexpected surprise, there is an aroused specific anticipation for something different to happen at that moment. In this situation the event needs to be usual but unexpected for surprising (1975, p. 34).

Almost anything can be surprising; a sight, smell, taste, touch and surely, the greater the unexpected thing, the more surprised you will be. In other words, surprise has different intensity levels from mild to extreme, depending upon the event itself. Because of the brevity of the experience of surprise, another emotion quickly follows it, the face generally shows a blend of surprise, and subsequent emotion depending upon how you feel about what surprised you. Therefore, surprise may turn to pleasure or happiness, or disgust, or aggression, or fear depending on the event. Ekman (1992) states that fear is the most common subsequent emotion to surprise, because unexpected events are usually dangerous, and mostly people associate surprise with fear. While some people seek novelty, love being surprised, and organize their lives, moreover some people cannot stand being surprised (Ekman & Friesen, 1975, p. 36).

The appearance of full-face surprise is characterized as; the curved and high eyebrows, stretched skin below the brow, opened eyelids, and opened mouth with parted lips and teeth, dropped jaw. The mouth may be just slightly open, moderately open or widely open depending upon the intensity level of surprise (Ekman & Friesen, 1975, p. 39-40).

There are four types of surprise; first is *questioning* or *uncertain surprise* includes only the eyes and brow movements of the full-face surprise expression. Second is *astonished* or *amazed surprise* that is characterized only the eyes and mouth movements. Third is *dazed surprise* or *less interested surprise*. Dazed surprise occurs when only the brow and mouth movements appear. The last type is the combination of these three facial areas. Its message is clear that is surprise (Ekman & Friesen, 1975, p.

43).

1. 1. 5. 1. f. Disgust

Disgust is a feeling of aversion. Specifically, disgust is the emotion of revulsion and avoidance of anything that makes one sick (Ekman & Friesen, 1975, p. 66). People can feel disgust from any taste, a smell, a sight, a touch or a sound or even an idea. According to Oatley and Jenkins, disgust may be an innate rejection of substances because they are decayed, infectious, or toxic (1996, p.262). However, Ekman and Friesen argued that what is repulsive to one culture might be attractive to another culture. Because, culture usually expresses itself in eating habits as well. For instance, a popular food can be an aversive food in other cultures.

Disgust usually involves getting-rid-of and getting-away-from responses. Removing the object or oneself from that object is a goal. Generally, nausea and vomiting accompany with disgust. Nausea and vomiting occur without disgust and likewise disgust occurs without nausea or vomiting (Ekman & Friesen, 1975, p. 66).

Disgust can blend with surprise, fear, happiness and also with sadness but mostly disgust blends with anger. The appearance of full-face disgust is characterized as; the upper lid is raised, the lower lip is raised and pushed up to the upper lip, or is lowered and the nose is wrinkled, the cheeks are raised, lines show below the lower lid is pushed up but not tense, the brow is lowered, lowering the upper lid (Ekman & Friesen, 1975, p. 76).

1. 1. 6. Universality of Emotional Facial Expressions (EFE)

Are facial expressions of emotion the same for people everywhere? Are they all cultural products? Are facial expressions universal or specific to each culture? Alternatively, are facial expressions an accurate reflection of emotional experience? These questions have played a central role in many studies.

In fact, the innateness of an expression was one of the widespread questions that Darwin had curiosity. In 1872, Darwin sent questionnaires to 36 observers inquiring the way of expressions of emotions such as astonishment by eyes and mouth being opened

widely etc. As a result of this survey, he found impressive agreement among observers (Frijda, 1986, p. 67). Definitely, even though this survey had many methodological problems, it gave considerable strength to the global conclusion, which has been confirmed by recent studies.

In terms of universality of expressions of emotions, especially Izard in 1969 and 1971, Ekman and his colleagues in 1972 and 1982 made major studies concerning Western, Japan and African cultures.

As a result of these major studies, Paul Ekman in 1972 proposed a *Two-factor theories* of emotion (one factor is universal/biological, other is cultural) or *Neurocultural theory* that refers to an innate neural patterning of expressions is accompanied by culturally variable display rules that regulate when each expression can be made. Ekman and his colleague Wallace V. Friesen (1975) postulated that six basic emotional categories are universally recognized. Namely, these are; *happiness, sadness, surprise, anger, fear, and disgust* (Oatley & Jenkins, 1996, p. 67; Abboud, Davoine, & Dang, 2004). However, Izard (1977) adds interest, shame, guilt, and contempt to this list of universal expressions (cited in Frijda, 1986, p. 68). Yet, there has not been confirming studies of Izard's list of emotions.

Briefly, in a study of Ekman and his colleagues, they displayed to the participants some photographs, which include the faces of North American actors that express fear, anger, happiness, surprise, disgust, sadness. Different cultural groups, ranging from Swedes and Kenyans to the members of a preliterate tribe in New Guinea (Ifaluk tribe) with minimal Western contact, participated to this study. Consequently, results revealed that all groups recognized six emotions correctly. Then these emotions have been accepted as universal (Ekman & Friesen, 1975, p. 23). Shame and excitement or interest may be considered as universal but they have not been firmly established yet (Ekman & Friesen, 1975, p. 22; Westen, 1999, p. 489). On the other hand, Lewis & Haviland-Jones (2000, p. 239) mentioned that the literature recently focuses on seven emotions: *happiness, fear, sadness, disgust, anger, surprise*, and nowadays *contempt*. Contempt is defined as the emotion of interpersonal rejection especially toward members of out-groups (Oatley & Jenkins, 1996, p. 262). With regard to Lewis &

Haviland-Jones, Ekman stated that contempt facial expression which is expressed as a variation on the closed-lips disgust mouth were not included in preliterate culture studies (1992, p. 176). Therefore, contempt can not be assumed as one of the basic emotions. Because, the universal feature of basic emotions is based on the appearance of the face for each of the primary emotions. To conclude, there are still debates on the universality of contempt emotion.

Furthermore, it was found that all facial expressions could vary from one culture to another. People in different cultures may change in what they have been taught about managing or controlling their facial expressions of emotions or display rules (Ekman & Friesen, 1975, p.24; Malatesta and Haviland, 1982). People learn to control the way they express many emotions by using different patterns of emotional expression that are considered appropriate within their cultures. For instance, in another study of Ekman and Friesen (1975), findings revealed that, although Japanese and Americans had virtually identical facial expressions, in terms of display rules Japanese masked their facial expressions of unpleasant emotions more than Americans did (p. 24). Corresponding to this study, another study proved that the same facial expressions were judged as showing the same emotions in all the countries like US, Japan, Chile, Argentina, and Brazil regardless of language or culture (Ekman & Friesen, 1975, p. 24).

Shortly, people in two different cultures may feel sadness at the death of a loved one, however, one culture may prescribe that they mask their facial expression with a mildly happy appearance. More specifically, if a language does not have any words for describing an emotion, it does not mean that emotion does not occur in this culture. For example, Ekman (1993) argued that although the Tahitians have no word for describing sadness, sad expressions were observed in Tahitian people who had experienced a loss.

In sum, emotions and emotional expressions are strongly affected by cultural ideas. The unwritten codes or display rules are internalized as a function of an individual's culture, gender, and family background. Nevertheless, the questions of how far emotions are universal, how far they are socially constructed by cultures are still very difficult to answer.

1. 1. 7. The Neuropsychology of Emotion

Doubtlessly, physiological dimension of emotion is very critical, although there has not been generally accepted theory to date about emotional processing and associated neural systems (Herba & Phillips, 2004). On the other hand, neuroscience studies have demonstrated that emotion like cognition is distributed throughout the nervous system and not located in any particular region. Also, selective impairments in recognizing facial emotions without a deficit in facial identity, and conversely have been reported indicating that different aspects of faces are processed in separate neural subsystems. Three areas of the brain in forebrain however, are particularly important: *the hypothalamus, limbic system, and the cortex* (Batty & Taylor, 2003; Kowalski & Westen, 2005, p. 357; Frijda, 1986, p. 379; Candland et al., 1977, p. 152).

1. 1. 7. 1. The Hypothalamus

The hypothalamus that is situated in front of the midbrain and adjacent to the pituitary gland helps regulate behaviors ranging from eating and sleeping to sexual activity and emotional experience. In terms of emotion, this tiny structure becomes a central link in a central circuit that converts emotional signals generated at higher levels of the brain into autonomic and endocrine responses. Especially in anger or rage attacks, hypothalamus is stimulated particularly in nonhumans (Kowalski & Westen, 2005, p. 79). Furthermore, because of its characteristics of producing hormones that affect other endocrine glands, the hypothalamus is often thought as a part of the endocrine system. As it is known that, the hormonal state of the organism contributes to the determination of the individual's reactivity to emotional stimuli or to the intensity of the response (Candland et al., 1977, p.106). Even though hormones may not induce emotions, they certainly seem to affect them.

1. 1. 7. 2. The Limbic System

It is a set of interrelated structures with diverse functions involving emotion, motivation, learning, and memory. The limbic system includes the septal area, the amygdala, and the hippocampus that is important especially for storing new

information. The role of septal area is newly understood and it appears to be involved in some forms of emotionally significant learning such as avoiding aversive experiences (Kowalski & Westen, 2005, p. 81). Stimulation of the septal area elicits pleasure (Candland et al., 1977, p. 156). The amygdala, which is a complex of nuclei, resides in the anterior temporal lobe involved in many emotional processes, especially learning and remembering emotionally significant events. One of its primary roles is to attach emotional significance to events (Kowalski & Westen, 2005, p. 81; Frijda, 1986, p. 381).

1. 1. 7. 3. The Cortex (Neocortex)

The cortex that reaches its largest development in human beings plays several roles with respect to emotion. It allows people to consider whether a stimulus is safe or harmful. People with damage to the regions of the frontal cortex that receive input from the amygdala have difficulty making choices guided by their emotions. One of its roles is interpreting the meaning of peripheral responses, for instance, a person's shaky knees and dry throat while speaking in front of a group gives a clue that she is anxious (Kowalski & Westen, 2005, p. 81; Oatley & Jenkins, 1996, p. 144). Most of the researches have shown that the right and the left hemispheres of the cortex appear to be specialized, with the right hemisphere is dominant in processing emotional cues from others and producing facial displays of emotion (Oatley & Jenkins, 1996, p. 144). In other words, the right side of the cortex has been found to be more closely associated with the processing of emotional events.

Furthermore, in terms of emotional facial expression, recent neuroscience studies have demonstrated that particular brain regions are responsible in processing of faces such as fusiform gyrus and superior temporal sulcus. Especially cortical (prefrontal, frontal, and orbito-frontal cortices, occipito-temporal junction, cingulate cortex, and secondary somatosensory cortex) and subcortical structures such as amygdala, basal ganglia, and insula are important structures (Damasio et al., 2000). Among these structures, the amygdala has often been linked with the mediation of emotional behavior (Batty & Taylor, 2003; Amaral, 2002). Particularly processing of

fearful faces and sad faces are associated with amygdala, happy faces are linked with cingulate sulcus, and orbital frontal regions are activated by angry faces. Disgust seems to activate basal ganglia and insula (Batty & Taylor, 2003). Kowalski and Westen mentioned that amygdala is associated with the expression of rage, fear and calculation of the emotional significance of a stimulus (2005, p. 81). In other words, it is involved in detecting others' emotions from their facial expressions and vocal tone (Kowalski & Westen, 2005, p. 359). It was found that impairment in the recognition of facial expressions of fear is commonly found in patients with damage to amygdala (Adolphs et al., 1994).

To sum up, emotional processes are distributed throughout the nervous system. The emotional reaction to a stimulus appears to occur through two distinct neural pathways: a quick response based on circuit from the thalamus to the amygdala, and a slower response based on a more through cognitive appraisal, based on thalamus-to-cortex-to-amygdala circuit. In both cases, the amygdala passes information to the hypothalamus that is involved in regulating autonomic responses. The cortex plays multiple roles such as interpreting the meaning of events and translating emotional reactions into socially desirable behaviors (Kowalski & Westen, 2005, p. 360; Oatley & Jenkins, 1996, p. 158).

1. 1. 8. The Development of Emotions

Facial expressions are very important for children to regulate their social behaviors as well as for the quality of parent-child relationships. The abilities to accurately interpret and express emotions through facial expressions develop during infancy and childhood. As children mature, they learn to modify their emotional expression in socially appropriate ways (Erickson & Schulkin, 2003; Dunn & Hughes, 1998). Around the age of 10 years, the ability to categorize facial expressions of basic emotions reaches an almost adult level (Gosselin & Larocque, 2000).

Emotions are assumed as the first language that parents and infants communicate with before the infant acquires speech. In terms of communication, faces are not only interesting stimuli to view; they are also sources of social information.

Infants react to their parents' facial expressions and tones of voice. In addition, this communicative and social role of facial expression is the result of extended use of basic survival responses (Erickson & Schulkin, 2003).

The sensitivity of babies to emotional expressions in faces grows slowly over the first two years of life. Even three month-old babies may look longer at faces as the intensity of the smile increases (Vasta et al., 2000, p.215; Santrock, 1997, p. 199). Infants use eye gaze direction, along with facial expression, to gather information about the environment by the end of the first year of life (Erickson & Schulkin, 2003).

By far the most important form of communication for the newborn is "crying". Crying is a part of the infant's larger affective communication system. Darwin believed that crying in newborns evolved as a means of providing the mother with information about the baby's state or condition (1934, p. 118). Caregivers should understand whether baby is saying for example "I am hungry", "I am wet" or "I am frightened" on the basis of crying style that can be interpreted based in part on experience.

Newborns do not only use crying as a communication tool but also can communicate "likes" using behaviors such as smiling, vocalizing, and gazing at an object that they find interesting (Vasta et al., 2000, p.448; Oatley & Jenkins, 1996, p.163). Many theorists believe that initially a close correspondence exists between what babies feel and what they express (Vasta et al., 2000, p.449). Researchers have found that even newborn babies possess all the facial muscle movements necessary to produce virtually any adult emotional expression (Vasta et al., 2000, p.449; Oatley & Jenkins, 1996, p.163). For instance, facial responses to sweet that elicit positive facial responses and bitter tastes that elicit aversive responses are expressed by infants and adults of primate species (Erickson & Schulkin, 2003).

1. 1. 8. 1. The Development of the Expression of Emotions

Infants express some emotions earlier than other emotions. At birth, babies can display "distress" by crying and "interest" by staring attentively. The facial expression of "disgust" has been observed in newborns in response to sour tastes or odors (Santrock, 1997, p. 200; Oatley & Jenkins, 1996, p.163). By 10 to 12 weeks of age,

smiling (reflecting pleasure) appears in response to the human voice or moving face. Sadness and anger are first evidences in facial expressions at 3 or 4 months. Fearful expressions do not appear until about 7 months. Guilt, shame, and embarrassment, which are some of the complex affective responses, are not apparent until near the end of the baby's first year (Santrock, 1997, p. 200; Vatsa et al., 2000, p. 449; Oatley & Jenkins, 1996, p.164). By four years of age, children can infer desires of others through direction of eye gaze (Erickson & Schulkin, 2003).

In terms of the recognition of facial expressions, previous studies have consistently shown that expression of happiness and sadness are more recognizable than fear and disgust (Gosselin & Larocque, 2000). Gosselin & Larocque (2000) suggested that expressions of anger and surprise were easier to identify than disgust but harder than happiness and sadness. Nelson and Dolgin (1985) found that even 7 months old infants were able to categorize between happiness-fear and happiness-surprise by looking at the faces of different people.

In sum, even though infants can able to display expression of emotions, their accurate recognition of expressions improves sooner. As they mature they able to discriminate better. Thus, gradually they learn to express their emotions in a socially appropriate way and identify facial expressions, which contribute to the appraisal of other people's emotions in order to organize social interactions.

1. 1. 9. Emotional Facial Expressions (EFE) and Cognition

1. 1. 9. 1. Affective/Mood Disorders, Anxiety Disorders and Recognition of Emotional Facial Expressions (EFE): The Literature Review

It is apparent that emotional or affective states can influence cognitive processes such as memory, learning, and judgments. Most of the studies have demonstrated that mood or emotional states influence the way people make judgments, inferences, and predictions.

Early theories such as Beck's (1976) *schemata theory* and Bower's (1981) *network theory* proposed that in both anxiety and depression, cognitive biases operate through information processing. The main difference between these two is about the

content of bias. (cited in Persad & Polivy, 1993). Specifically, anxious individuals selectively perceive threatening information, whereas depressed individuals have a bias for information related to sadness, loss and failure (Mogg, Millar, & Bradley, 2000; Mogg & Bradley, 2006; Rohner, 2002). Several authors suggested that biases in selective attention play a causal role in the onset and maintenance of anxiety and mood disorders. In addition, during social interactions, misinterpreting emotional expressions may interrupt the flow of conversation, may cause discomfort, and confusion both in the speaker and the listener. Hence, these biases of facial expressions constitute one of our purposes in this study.

From the research carried out so far, there appears to be substantial support that individuals with affective disorders show some mild impairment, because it is accepted that cognitive processes in depression is characterized by the negative schemata that distort one's world, the self and the future (Cavanagh et al., 2005). The negative perceptual bias may be consistent with this negative cognitive triad. In other words, depressed individuals tend to underestimate the probability of their own success and overestimate the probability of bad events occurring in the future. Their negative perceptions toward the world, self and future also affect their social interactions. They are more likely to infer negative conclusions or appraisals from their spouses or friends' behaviors (Persad & Polivy, 1993). Hence, these patients are usually expected to judge facial stimuli more negative than do non-depressed individuals.

In order to examine the attributional style of depressed patients, Leppanen et al. (2004) conducted a study in which recognition of different facial expressions were compared in patients with moderate to severe depression. In this study, also reaction times were measured. Totally, 18 depressed and 18 matched healthy controls were presented neutral, happy, and sad expressions. As a result of this study, it was found that depressed individuals and controls were equally accurate at recognizing happy and sad faces. However, depressed individuals attributed neutral faces to sad faces and they recognized neutral expressions both more slowly and less accurately than healthy participants did. This result confirms that depressed individuals have some impairment on recognition of neutral expressions due to their attentional bias towards negativity.

The findings of reaction times will be mentioned in the next part in this study.

Similarly to the findings above, according to Hale (1998) depressed individuals tended to perceive negative emotional states in others improperly. Specifically, these individuals were more likely to attribute sadness to neutral faces, and neutral faces to happy faces.

On the other hand, Mendlewicz and her colleagues (2005) designed a study in which they aimed to investigate the recognition of facial expressions among female adolescent inpatients with major depression and female adolescents with eating disorders. They also compared these two inpatients groups with the healthy control group. As a result of this design, they did not find any significant differences between eating disorder group and controls in their facial expression recognition. As expected, depressed patients demonstrated less accuracy rates in decoding angry expression than inpatients with eating disorders and control group. This study also supports the existence of decoding impairment in depression.

Furthermore, Surguladze et al. (2005) examined the neural basis of attentional biases toward happy and sad facial expressions in major depressed and healthy individuals. They found that preferential increases in neural response to sad but not happy facial expressions were observed in depressed individuals. The results indicated the existence of association of attentional biases and neural basis for the negative cognitions and social dysfunction in depressed individuals.

There are also other studies, which are designed to compare major depression with other disorders in terms of facial expression impairments. For instance, Weniger et al. (2004) examined facial expression recognition abilities in subjects with various schizophrenia subtypes and subjects with major depression. As predicted, disorganized and paranoid schizophrenic subjects showed strong impairments, whereas depressive subjects demonstrated only minor impairments. Surely, schizophrenia is one of the disorders, which has deleterious effect on the mind. The authors found that both schizophrenia groups and depressed individuals identified happy expressions at higher rates than negative facial expressions, interestingly depressed individuals rated expressions less aroused than other groups.

In sum, because of the exhibition of poor social communication skills of depressed individuals, our one of the hypotheses was that these interaction problems might be associated with deficits to recognize facial expressions.

1. 1. 9. 2. Anxiety Disorders, Affective/Mood Disorders and Reaction Times towards Emotional Facial Expressions (EFE): The Literature Review

There has been extensive research about anxiety, which is supposed to interfere with cognitive and emotional processing. It is observed that anxious individuals are more sensitive to threatening information and they are more likely to exhibit attentional bias or hypervigilance and evaluative bias to these threatening-content stimuli. It is assumed that attentional vigilance for threat may be an important figure in both causing and maintaining anxiety (Bradley et al., 2000; Mogg et al., 2000; Mogg & Bradley, 2006). In each anxiety disorders, vigilance appears according to the domain concern of the individuals. Specifically, in panic disorders physical threats, in social anxiety socially threatening situations, in generalized anxiety disorders idiosyncratic worries constitute the subjects of biases (Rossignol et al., 2005; Mansell et al., 2002).

Several studies about the existence of attentional biases, generally used Stroop task in which participants are asked to name the colors of the words as faster as possible without ignoring the content. The findings of these studies usually manifested that participants who had anxiety, expressed greater interference in color naming tasks, which were associated with their fears. Nevertheless, when Stroop task method was found as questionable, recently probe detection task has been developed. Moreover, nowadays in order to obtain ecological validity, facial expressions have begun to use. (Mogg & Bradley, 2006; Bar-Haim et al., 2005; D'Argembeau et al., 2003).

With respect to facial expressions, there have been discrepant findings of the studies so far. For instance, Bradley et al. (2000) proposed that anxious individuals were faster in responding to probes that replace threat rather than neutral stimuli. Accordant with the study of Bradley et al. (2000), Mogg and Bradley (2006) found consistent findings with their primary hypothesis, which was initial and rapid attentional bias for fear-related stimuli in spider-fearful individuals. In other words, high fear is associated

with an enhanced initial attentional bias for fear-relevant stimuli. However, in a study of Mogg et al. (2000), findings revealed that there were no significant differences between patients with generalized anxiety disorders and normal control individuals in terms of reaction times toward threat, sad and happy faces. Also, they did not find any significant results in individuals with depressive disorder in terms of showing an attentional bias or processing bias for sad faces. However, Leppanen et al. (2004) found that depressed individuals were slower to react toward neutral faces than sad faces, whereas control individuals recognized neutral faces faster than sad ones. They found that healthy individuals recognized happy expressions faster and more accurately than sad expressions.

Furthermore, Surcinelli et al. (2006) investigated the relationship between trait anxiety and recognition of emotional facial expressions. They found that individuals with high-trait anxiety recognized only fear faces significantly better than individuals with low-trait anxiety. And they were more likely to classify ambiguous faces as expressing fear. The two groups did not differ in terms of the recognition of anger, sadness, happiness, surprise, disgust, and neutral faces. As it is known, a primary function of fear is considered a facilitation of the detection of danger in the environment. Participants with high anxiety may perceive many daily situations as threatening and they organize their lives based this fear expectation.

On the other hand, Philippot and Douilliez (2005) found that a group of anxiety disorders such as generalized anxiety disorder, social phobia, panic disorder with agoraphobia, obsessive-compulsive disorder did not cause any attentional or evaluative biases in the process of threatening facial expressions. It was assumed that especially socially anxious individuals would evaluate facial expressions more negatively. However, in three studies, they presented a set of photographs of EFE to patients with generalized anxiety disorder, patients with social phobia, patients suffer from panic disorder with agoraphobia, obsessive-compulsive disorder and surely to a control group. Their decoding accuracy was measured based on participants' ability to infer the emotion that was presented on computer screen. As a conclusion, no significant differences could be found between anxiety disorders and control group in terms of EFE

decoding accuracy. Indeed, the authors believed that these unexpected results were due to several methodological limitations.

In the study of D'Argembeau et al. (2003) which was designed to examine identity and expression memory in social anxiety, results showed that individuals with high and low socially anxiety did not differ on total correct responses and this expression memory was better for happy than angry expressions in both groups. However, they added that high anxious participants remembered happy faces less than low anxious participants did. This decreased encoding of positive information in memory may take a role in maintenance of social anxiety.

On the other hand, Cooper et al. (2006) who contribute new dimensions to the issue of attentional bias in anxiety investigated the existence of an attentional bias to angry faces in non-anxious populations by using the dot-probe task in 100 ms and 500 ms conditions. They expected the inability to find any evidence for attentional cues. They used thirty pictures from Ekman and Friesen (1976) set of emotional expressions. This set includes neutral, happy, and angry expressions. Participants were asked to press the keyboard button when they saw a dot. There were eight conditions: two emotional expressions (angry or happy), two probe locations, and two gaze directions. The analysis was based on the reaction times for correct responses. Results revealed that at 100 ms there was an attentional bias towards the location of the relatively threatening stimulus; the angry face in angry/neutral pairs, the neutral face in neutral face in neutral/happy pairs. In sum, Cooper et al. (2006) examined whether previous attempts to observe an attentional bias towards angry expressions in the general populations using the dot-probe task would fail when they used 500 ms dot-probe task. However, in 100 ms condition, the findings were interpreted as vigilance to the angry faces for angry/neutral pair, as avoidance of the happy faces for neutral/happy pair. The authors elucidated these results as an attentional bias towards threat, which is a universal feature of human cognitive processing, and this feature is not only specific to anxiety. Instead, evolutionarily, humans detect threat from their environment in order to fight or flight. Angry facial expression is one of the threat signals for survival.

Furthermore, recent studies have focused on the differing brain regions for different emotions, however little attention has been paid to the timing of this emotional processing. For this aim, Batty and Taylor (2003) used event-related potentials (ERPs) in their study in order to find out latency and amplitude differences in timing of processes between fearful, disgusted, sad, surprised, happy, and neutral faces. According to them, six basic facial emotional expressions are processed very quickly in normal individuals suggesting that facial details, reflecting emotional content, are included in rapid processing. Their study concluded that positive emotions (happy and good surprise) evoked the measure component-N170 significantly earlier than negative emotions (fear, disgust, and sadness) and the amplitude of N170 evoked by fearful faces was larger than neutral or surprised faces. In other words, negative emotions were processed later than positive emotions according to the localization in the brain.

Similar to the study of Batty and Taylor, Rossignol (2005) examined whether there was a non-clinical anxiety bias toward facial expressions, based on STAI scores. For this aim, twenty students were distinguished as high or low anxious group. By using event-related potentials, they investigated neurophysiological dimension of non-clinical anxiety toward fearful and happy expressions. Consequently, the amplitude of N170 evoked by fearful faces was larger than happy expressions. Even though there was no significant difference between anxiety groups, fearful expression was processed earlier than happy expression. This increase was found only for the expression of fear. This outcome was interpreted, as it might be the result of unconscious attention.

To conclude, even though still no firm conclusion can be drawn from the existing studies, it is obvious that anxiety and depression affect the processing of facial expressions in terms of reaction times or accurate decoding. However, there are still debates in the determination of the most affected expression and it is still difficult to find the clear-cut results of information processing systems in depression and anxiety.

1. 1. 9. 3. Other Psychopathological Disorders, Recognition of Emotional Facial Expressions (EFE) and Reaction Times towards EFE: The Literature Review

The deficits in social interactions are shown in some psychopathological disorders may be partly related to difficulties in the recognition of facial expressions. Such deficits have been demonstrated in various clinical populations such as schizophrenia, personality disorders especially psychopathic and borderline personality characteristics, Alzheimer's disease, Parkinson's disease, autism and attention-deficit hyperactivity disorder (Shayegan and Stahl, 2005; Dujardin et al., 2004; Mendlewicz et al., 2005; Roudier et al., 1998; Blair et al., 2004).

The empirical evidences so far have displayed that individuals with schizophrenia have stronger deficits in the recognition of facial expressions. These deficits may prevent them to interpret others' intentions, goals, and desires. In one of the most prominent studies, Weniger et al. (2004) compared different subtypes of schizophrenia (disorganized, paranoid, and residual types). The results indicated that particularly individuals with disorganized schizophrenia were the most impaired subtypes in all schizophrenia spectrums. Whereas individuals with paranoid schizophrenia were significantly impaired in identifying sadness and fear, disorganized individuals had impairment in all emotions. All subtypes were better on happy than disgusted, angry and sad faces. The expressions of surprise and fear were found as the most difficult expressions to identify than other expressions for all groups. This study has confirmed that one of the markers in schizophrenia can be a deficit in reading facial expressions.

Similar to Weniger et al., Martin et al. (2005) examined the abilities of patients with schizophrenia in recognition of facial expressions and identity matching. Totally 20 patients and a control group that was composed of 20 healthy individuals participated in the study. They were asked to choose the correct emotion or correct person of the photos of five persons expressing five different emotions (happiness, sadness, fear, anger, and disgust). Consequently, performance in patients with

schizophrenia was more impaired than controls. As predicted, they were found as less successful on both identity-matching and reading facial expressions.

Exner et al. (2004) investigated the volume of amygdala in patients with schizophrenia in their recognition of emotional expressions. 9 patients with paranoid schizophrenia, 6 undifferentiated subtypes, 1 disorganized subtype and 16 matched control individuals were asked to match the corresponding emotion on a probe stimulus of a face exhibiting one of the six expressions. As expected, individuals with paranoid schizophrenia showed a deficit in recognizing all emotional expressions. Also, this study has confirmed that cognitive deficits are more likely to appear in disorganized symptoms. As hypothesized, the findings have proved that there was a reduced volume in right amygdala in schizophrenic individuals. That decrease can be associated with the impairment in the recognition of facial expressions.

From the research carried out so far, there appears to be a substantial support that individuals with schizophrenia have cognitive impairments in terms of recognition facial expressions. That impairment has been linked to the serious interruption in their social relationships.

Besides schizophrenia, recently, most studies have demonstrated that in Parkinson's disease (PD) because of the enormous loss of dopaminergic neurons, cognitive deficits arise. Mainly, these deficits concern tasks including planning or organizing the sequential actions. (Dujardin et al., 2004). Dujardin et al. (2004) examined whether PD has an effect on any impairment in reading facial expressions. 18 unmedicated PD patients and healthy individuals participated in this study, as a conclusion, they found that untreated PD patients were significantly impaired in the recognition of all facial expressions.

Likewise, Roudier et al. (1998) investigated the recognition of facial expressions and processing faces identity in patients with Alzheimer's disease (AD). Based on assumption, which is that specific brain lesions affect the ability to discriminate unfamiliar faces, they compared 31 AD patients with 14 control group. These participants were administered to tasks of discrimination of faces and emotions by presenting emotional faces test of Ekman and Friesen (1975). The findings

demonstrated that AD patients were significantly impaired in discrimination of facial identities, and in naming and pointing emotions. However, unexpectedly, discrimination of facial expression was preserved in AD patients, only verbal identification of emotions significantly impaired. These results suggested that the operations of facial discrimination and facial discrimination are separate issues. Surely, these findings bring new debates on brain structures and damages of Alzheimer's disease especially on linguistic area. Parkinson's and Alzheimer's Diseases are relatively recent studies that still have no firm conclusions.

Nowadays, there have been studies with the individuals of personality disorders. It is accepted that one of the symptoms of borderline personality disorder is their significant problems in interpersonal relationships that may be associated with facial expression decoding. Based on this assumption, Renneberg et al. (2005) investigated the expressiveness of facial reactions to emotion-eliciting film material among 30 female Borderline Personality Disorder (BPD) inpatients, depressed inpatients, and non-clinical control group. They expected depressed patients to display less facial expression of emotions than normal control group, and BDP patients to show more facial reactions than non-clinical group. As expected, the results indicated that depressed individuals showed less happy expressions when compared to control group, whereas clinical groups were not found as different from each other in the reading of facial expressions of happiness. There was almost no difference between BDP patients and control group. Interestingly, regarding surprise expression, BDP patients displayed no surprise expressions while watching the film.

Similarly, psychopathic individuals are accepted as having low level of fear emotion and empathy dysfunction (Patrick, 1994). Because of these features, they display emotional dysfunctions and relationship problems. In order to clarify this assumption, Blair et al. (2004) investigated the ability of psychopathic individuals to process emotional expressions. They expected a recognition deficit particularly on negative expressions. As predicted, the results displayed that psychopathic individuals showed selective impairment for the recognition of fearful expressions than control individuals. In other words, they did more errors for fearful expressions than other

expressions. In addition, these individuals considered that fearful faces were the most difficult expression to recognize. Researchers proposed that this impairment could be associated with the amygdala dysfunction.

In support of Blair et al., Montagne et al. (2005) studied on the accuracy of perception of emotional faces in normal individuals with scoring high or low on psychopathic personality characteristics that are characterized by lack of fear. As expected, the results showed that participants with high scores on psychopathic personality characteristics were significantly less accurate in recognizing the expression of fear when compared to participants with low scores on psychopathic personality characteristics. These two studies have suggested that individuals with psychopathic tendencies have difficulty to distinguish fearful expression. This inability may be related with amygdala dysfunction that can be responsible from their antisocial behavior and their inability to perceive of victim's distress.

To sum up, it is proved that identification difficulty of emotional facial expressions is not only specific to alcohol dependence. There are many disorders, which have proved serious impairments in their decoding of expressions.

1. 2. ALCOHOL DEPENDENCE or ALCOHOLISM

1. 2. 1. Ethyl Alcohol

Literally, alcohol has been derived from an Arabic word *al kihl* that refers to *the essence of something* and it is accepted as the first psychopharmacological agent (Ceylan & Türkcan, 2003. p.1). Anthropological evidences have suggested that use of alcohol has been widespread throughout history. The origins of alcohol use pre-date recorded history and it is believed that ethanol was known even by Neolithic man. For instance, in China archaeological evidence dates the origin of alcohol from fermented grain to some 6000-7000 years ago (Heather, Peters & Stockwell, 2001, p. 16). Alcohol can be described as the world's favorite substance. While the pains of alcohol are the numerous and diverse, its popularity continues.

1. 2. 2. Alcohol and Harm

In fact, use of alcohol and related problems were encountered even in ancient ages such as Ancient Greek, Roman, or Egypt. Hippocrates, the Greek physician described symptoms such as nausea, insomnia, palpitations and delirium which, centuries later, became a familiar part of the clinical picture of “alcoholism”. However, scientific attention to alcohol problems has accelerated during the past 30 years, when substantial advances have occurred in understanding of drinking problems as well as their prevention and treatment. It has been known that alcohol consumption is responsible for increased illness and death (Room, Babor & Rehm, 2005). However, alcohol and health outcomes are complex and multidimensional. Alcohol has been shown to be causally related to more than 60 different medical –physical and mental-conditions. It causes many disruptions in social, occupational, and family life (Miller, 1990; Hodgson et al.).

Furthermore, gender differences in the consequences of drinking alcohol are large and consistent. Generally, these studies suggest that women appear to suffer serious negative consequences of alcohol consumption earlier and to a greater degree than men do. Specifically, they suffer more cognitive and motor impairment due to heavy alcohol than men (Nolen-Hoeksema, 2004). These negative effects on cognitive, motor, and reproductive health as well as social norms pressures on women mostly discourage women from excessive alcohol intake when compared to men. Therefore, in our study merely males were used.

1. 2. 3. Alcohol Dependence or Alcoholism

Specifically, alcohol can be a problem, but identifying who is an alcoholic, who is a problem drinker, and who is a responsible drinker can be difficult at times. A person is identified as having *alcoholism* when s/he is physiologically dependent on alcohol, and therefore shows withdrawal symptoms when no alcohol has been consumed. *Problem drinkers* are not physiologically addicted to alcohol, but still have a number of problems stemming from alcohol consumption, including problems with work and family, and health-related complications (Kowalski & Westen, 2005, p. 391).

Alcoholism or *alcohol dependence* is a deeply pervasive, malignant, long-term, and multifaceted problem (Hoes, 1997). It can be defined as a condition in which individuals drink alcohol habitually and excessively and individuals continue to drink even though this results in serious harm to their physical, mental health and family and school or occupation (Berger, 1993, p.11). In other words, alcoholics have problems to keep their drinking habit under control. On the other hand, some theorists suggest that alcoholism is a family disease because the entire family hurts when one or more members are alcohol dependent. A serious drinking problem mostly lead to economic problems, a loss of self-respect, psychological and emotional difficulties such as divorce, suicide, delinquency (Berger, 1993, p.11).

1. 2. 4. History of Classification

Various classification systems were published by medical writers in US and Europe. Bruhl-Cramer introduced the concept of *dipsomania* or *drink seeking*. In 1849, the term *alcoholic* was coined by Magnus Huss in Sweden to describe people who suffered negative consequences of alcohol use. Between 1850 and 1941, totally 39 classifications of alcoholism were developed around the world. Generally, these classification systems were rooted on excessive drinking (Ceylan & Turkcan, 2003, p. 2; Heather, Peters & Stockwell, 2001, p. 49).

In US from the 19th century to 1933 alcohol was seen as a dangerous substance that should be avoided. When alcohol was legalized in 1933, American disease model of alcoholism has started. In 1941, Bowman and Jellinek published an elaborate classification scheme for the disease, based on the pattern of drinking frequency, etiology, co-morbid disorders, and ability to abstain (Heather, Peters & Stockwell, 2001, p. 49). For instance, Jellinek postulated five species of alcoholism: alpha, beta, gamma, delta, and epsilon. His classification became the most popular alcohol typology for the next 20 years. However, these classification systems were not found as sufficient to be used currently.

1. 2. 5. Current Diagnostic Classification

Current nosology for alcohol use disorders and dependence relies on the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1952, 1968, 1980, 1987, 1994) and the International Statistical Classification of Diseases, Injuries, and Cause of Death (ICD; World Health Organization, 1967, 1978, 1989, 1992). Current Diagnostic criteria for both the DSM and ICD are based on years of evolution of the concept of excessive use, associated negative consequences, and physical dependence. However, as illustrated below using DSM-IV one can be diagnosed as *Alcohol Dependent* without having physiological dependence. The *Alcohol Abuse* diagnosis is more detailed and better operationalized, and the threshold is lower, that is, only one of the four symptoms must be positive in order to get a diagnosis. Diagnosis of Alcohol Dependence and Alcohol Abuse are mutually exclusive. A patient who has ever been diagnosed with Alcohol Dependence cannot be diagnosed with Alcohol Abuse (Heather, Peters & Stockwell, 2001, p. 57).

Based on DSM-IV-TR (APA, 2000) *Alcohol use disorders* are the alcohol-related psychiatric disorders. These include *alcohol abuse*, which involves persistent drinking behavior in the face of repeated social, interpersonal, and occupational problems that are due to excessive alcohol consumption. *Alcohol dependence* includes these psychosocial problems, but can also involve physiological dependence on alcohol, such as tolerance and withdrawal symptoms. This syndrome is often referred to as alcoholism. *Heavy drinking* and *binge drinking* are operationalized in different ways across different studies. *Alcohol-related problems* will be used to refer scores on measures of negative psychosocial consequences of excessive alcohol consumption such as arrest for drunken driving. Finally, *social drinkers* is the label for people who drink alcohol at least occasionally, but do not meet the criteria for alcohol abuse or dependence (Nolen-Hoeksema, 2004).

DSM-IV Criteria for Alcohol Dependence (APA, 1994)

A. A maladaptive pattern of substance use, leading to clinically significant impairment or distress as manifested by three or more of the following occurring at any time in the same 12-month period.

(1) Tolerance, as defined by either of the following:

- a. Need for markedly increased amounts of a substance to achieve intoxication or desired effect.
- b. Markedly diminished effect with continued use of the same amount of the substance.

(2) Withdrawal, as manifested by either of the following: (a) characteristic withdrawal syndrome for the substance, or (b) the same (or a closely substance is taken to relieve or avoid related) withdrawal symptoms.

(3) The substance is often taken in larger amounts or over a longer period than was intended.

(4) There is a persistent desire or unsuccessful efforts to cut down or control substance use.

(5) A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover its effects.

(6) Important social, occupational, or recreational activities are given up or reduced because of substance use.

(7) The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

Specifiers;

*With a physiological dependence

*Without a physiological dependence

1. 2. 6. Epidemiology

Nowadays the most common substance-related disorder has been alcoholism around the world. Surely, a number of genetic and environmental variables contribute to the development of alcohol abuse.

- As in other Western countries, alcoholism is the third largest health problem in the US, following heart disease and cancer.
- There is a sex difference (male/female) of 17.7 % vs. 6.3 %.
- In the US, an estimated 13 million or 7.4 percent of the population meet the diagnostic criteria for alcohol abuse or alcoholism. When alcoholism is an index disorder, its lifetime prevalence in males under the age of 60 years varies between 9.8% (USA) to 43.8% (Canada).
- The highest prevalence is in 14-19 to 40-59 year-old.
- More than one half of American adults have a close family member who has or has had alcoholism (Hoes, 1997; Health Risk, 2000, cited in Kowalski & Westen, 2005, p. 391).

A research indicating that alcohol use in Turkey is increasing, particularly in the last twenty years, has been recently carried out by Ministry of Health. The alcohol use prevalence was found to be 42.6% and the rate of regular alcohol use was 20.5% in young population. Additionally, Ceylan and Türkcan (2003) reported that in a sample of 1550 individuals, aged between 12 and 65, representing İstanbul population in terms of age, gender and districts, prevalence of alcohol use was 33.5%. Furthermore, 25.6% of the sample stated that they currently use alcohol, 7.9% stated they cut down alcohol use and those who use alcohol, 12.6% stated that they use alcohol more than once during a day.

To sum up, accordant with research carried out in abroad, studies on alcohol prevalence in Turkey displayed that alcohol use has been increasing among population, particularly in young adults. Moreover, they demonstrated that prevalence of alcohol dependence disorders have been also increasing.

1. 2. 7. Alcohol Dependence and Co-morbid Disorders

Alcohol dependence is usually exhibited other forms of mental disorder particularly mood disorders, anxiety disorders and occasionally antisocial personality disorders (Oltmanns & Emery, 2001, p.382; Preisig et al., 2001).

The relationships between alcohol dependence and mood or anxiety disorders have been well documented in many studies. The associations between alcoholism, mood, and anxiety disorders have not only been found in clinical settings, but also in community samples. It has been suggested that individuals with alcohol dependence show moderate to severe depressive symptomatology and they are more prone to anxiety symptoms than non-dependent individuals do (Tedstone et al., 2004; Gratzer et al., 2004, Terra et al. 2006). Grant and Harford (1995) have suggested that dependent individuals up to 70% meet criteria for a lifetime diagnosis of depression. Preisig et al. (2001) postulated that in alcohol dependent individuals the frequency of depressive symptomatology ranged from 16% to 59%.

Some researchers believe that alcohol misuse especially in men is a mask for depression (Nolen-Hoeksema, 2004). Similarly, regarding the anxiety disorders, Gratzer et al. (2004) found that 35-54% of individuals with an anxiety disorder had a lifetime diagnosis of an alcohol use disorder. Additionally, their findings revealed that depression had a stronger relationship with alcohol dependence than anxiety. In another study, again it was found that there was a stronger association between alcohol misuse and negative affect such as anxiety and depression (Berger and Adesso, 1991).

Ceylan and Türkcan (2003) pointed out on gender differences about the relationship between alcohol use and some mental disorders. They proposed that in men mostly antisocial personality disorder and anxiety disorders-phobia and panic disorder (15%), depression (5%) however in women mostly anxiety disorders-phobia and panic disorder (38%), depression (19%), antisocial personality disorder (10%) displayed co-morbidity with alcoholism.

Possible sources of the associations between depression, anxiety disorders, and alcoholism have been studied extensively. Generally, it is assumed that alcohol is used in order to manage or regulate the affects of drinkers, to increase positive affect when

people are fatigued, decrease when they are anxious, or over aroused. However, the evidence regarding the nature of these associations remains vague.

In sum, the above studies provide strong evidence that both anxiety disorders and depression are associated with high rates of alcohol dependence or alcohol abuse. Hence, in this study one of the aims is to find the concordant findings with previous studies.

1. 2. 8. Alcohol Dependence and Cognition

In recent years, substantial evidence has shown that alcohol dependent individuals suffer some degree of brain dysfunction. It has been proved that chronic alcohol dependence has deleterious effects on central nervous system functioning (Chelune and Parker, 1981). Long-term chronic alcohol misuse causes disturbances just like brain aging.

Neuropsychological studies have revealed that dependence causes essential cognitive impairments such as on neocortex or on hippocampus that decrease in abstract concept-formation or abstract reasoning ability, cognitive flexibility, problem-solving ability, new learning, perceptuomotor speed, accuracy processes and lastly visuoperceptual area and surely memory processes (Miller, 1990; Brandt & Provost, 1985; Garcia-Moreno et al., 2002; Chelune and Parker, 1981; Loas et al., 2000).

Chelune and Parker (1981) proposed that alcohol dependent individuals were good at on familiar settings but they had troubles on complex or new settings. As a result of their study, whereas the verbal skills remained same, performance and adaptive abilities significantly disrupted when compared to non-dependent individuals.

Although Chelune and Parker (1981) did not find any significant results regarding verbal skill impairment, Monnot et al. (2001) found that on affective prosody functioning (nonlinguistic feature of language such as pitch, intonation patterns, stress, timing, rhythm etc) which, is an essential element in social interaction localized to the right hemisphere, detoxified alcoholics demonstrated significant deficits in their ability to identify emotion in the voices of others.

Accordant with previous studies, Obernier et al. (2002) postulated that alcohol dependent individuals displayed decreased neuropsychological performance on the tests of learning, memory, abstract thinking, problem solving, visuospatial and perceptual motor functioning, and information processing. In addition, they suffered damage to the hippocampal formation, frontal cortex, and grey and white matter loss.

As conclusion, most of the literature up to now has focused on traditional intellectual cognitive skills. However, other skills may be impaired in alcohol abusers or in alcohol dependent individuals. For instance, emotional processing abilities in alcohol dependent individuals have been studied less extensively with a few notable exceptions. Thus, in this study the relationship between emotional facial expression and alcohol dependence was focused.

1. 2. 9. Alcohol Dependence and Recognition of Emotional Facial Expressions (EFE): The Literature Review

It is apparent that alcohol dependent individuals frequently have severe interpersonal difficulties. It has been also proved that accurate recognition of facial expressions enables healthy social relationships. Numerous studies have been designed to examine the association of alcohol dependence with the recognition of facial expressions especially towards negative emotions. Some studies have confirmed this assumption and some have not.

In order to find out any deficit in the perception of alcohol dependent individuals, Philippot et al. (1999) conducted a study. As a result of this study, they found that recognition of facial expressions seemed to be severely impaired in recovering alcoholics. They suggested that particularly alcoholic dependents had a bias in the recognition of angry and contempt. Specifically, according to these authors, alcoholic participants had a systematic bias in interpreting faces expressing disgust as showing anger or contempt.

In accordance with the findings of Philippot et al., the findings of Frigerio et al. (2002) study manifested that alcohol dependent individuals did more errors in the recognition facial expressions. However, it was found that alcohol dependent

individuals had a specific deficit in recognizing sad faces. Based on the study of Frigero et al. (2002), alcoholics had a tendency to interpret sad faces as anger or disgust. If so, they may be more sensitive to feelings to threat from faces looking at them and they are more likely to interpret facial expressions as hostile than as sadness.

Furthermore, according to the study of Philippot et al. (1999), alcohol dependent individuals also showed overattribution of anger and contempt and they systematically overestimated the intensity of all emotions. However, Kornreich et al. (2001) found that recovering alcoholics tended to overestimate the intensity of the EFE for only happiness and anger. Similarly Kornreich et al. (2001) found that recovering alcoholics displayed accuracy deficits especially for happiness, anger, disgust, and sadness but not for fear. Both studies did not find any gender differences in decoding EFE (Philippot et al., 1999; Kornreich et al., 2001).

However, inconsistent with the findings of both Philippot et al. (1999) and Kornreich et al. (2001), Townshend & Duka (2003) displayed that alcoholics showed different patterns in responding on anger and disgust but they did not find any differences between experimental and normal control groups in responding on happy, sad and surprised expressions.

Kornreich et al. (2003) replicated their studies in order to explore that whether impairment in EFE decoding is specific to alcoholism compared with opiate dependence. They found that accuracy scores were significantly lower in alcoholics rather than opiate dependents. Surprisingly, they noted that opiate dependence was also associated with an impaired EFE decoding however less than alcoholism.

That is to say, substantial evidences have presented the deficiency in the recognition of facial expressions in alcohol dependent individuals whereas still there have been no stable conclusions yet.

To sum up, alcohol perhaps more than any other substances, touches the lives of most people dramatically in the whole world as well as in Turkey. The long-term use of alcohol has devastating impact on many areas of a person's life. Besides the effect on organ systems, especially the disruption of relationships with family and friends can be very painful. On the other hand, one of the crucial sources in regulating interpersonal

relationships in daily life depends on the ability to perceive the emotional state of other people. However, it seems obvious that alcoholic individuals frequently have severe interpersonal difficulties that may be related to poor or inaccurate perception of emotional facial expressions (EFE).

1. 3. Purposes of the Present Study

Emotional expressions are important sources in terms of social communication in daily life. Therefore, any confusion or any impairment in understanding emotional facial expression may interrupt daily relationships. A growing number of studies have demonstrated that individuals with some disorders such as affective disorders, anxiety disorders, personality disorders, psychotic disorders, and substance disorders have some deficits in reading these expressions. Some may have attentional bias in reading or reacting toward sad expressions, some in angry or fearful that they assume as threatening (Mogg et al., 2000; Rohner, 2002; Blair et al., 2004).

Numerous studies have shown that long-term alcohol consumption can lead to cognitive and neurological impairments. So far, little attention has been given to studies that are related with the recognition deficits in alcohol dependent individuals. These rarely studies consistently have proved that individuals with alcohol dependence have some impairments in recognizing emotional expressions, which may be associated with interpersonal conflicts (e.g. Garcia-Moreno et al., 2002; Frigerio et al., 2002; Kornreich et al., 1998, 2001, 2002; Philippot, 1999).

Thereby, this study aimed to investigate the accuracy of recognition of universally recognized Emotional Facial Expression (EFE) -happiness, sadness, anger, disgust, fear, surprise, and neutral expressions- and to measure the manual reaction times (RT) towards these expressions in alcohol dependent inpatients and in normal control group. Depression and anxiety levels were measured that may influence the results in terms of attentional or evaluative biases. Besides the differences of two groups, some similarities would be predicted in terms of the tendency of expressions.

1. 4. Hypotheses of the Study

1. Alcohol dependent group would score higher than normal control group on the CAGE inventory, Beck Depression Inventory, State-Trait Anxiety Inventory, and Symptom Checklist (SCL-90-R) and its nine subscales as compared to normal control group.
2. Alcohol dependent group would show more deficits in total emotional recognition accuracy than normal control group.
3. Alcohol dependent group would show more deficits especially in the recognition of negative emotional expressions, which are anger, fear, sad, and disgust, than non-dependent individuals. In other words, it was predicted that alcohol dependents would display less accurate scores than normal control group.
4. Alcohol dependent group would react faster to the negative expressions as compared to normal control group.
5. When Beck Depression Inventory, State-Trait Anxiety Inventory, and SCL-90 were accepted as covariates, alcohol dependent group would show more evaluative bias (misinterpretation) especially toward negative expressions as compared to normal control group.
6. When Beck Depression Inventory, State-Trait Anxiety Inventory, and SCL-90 were accepted as covariates, alcohol dependent group would show more attentional bias/hypervigilance and thus they would react faster to the negative expressions as compared to normal control group.
7. The most correct recognition would be for happy facial expression than other expressions for both groups.

CHAPTER II

METHOD

2. 1. Participants

In order to test the proposed hypotheses, totally 101 volunteers participated in the current study. From Alcohol and Substance Treatment Center (AMATEM) of İstanbul Mazhar Osman Bakırköy Education and Research Hospital for Psychiatry and Neurological Diseases, 51 (50%) detoxified alcohol dependent inpatients who were treated with antidepressants or anxiolytics at the time of the study and 50 normal control group (49%) that were match for age, sex and years of education participated. Inpatients who were treated with antipsychotics were excluded from the study. At least 10 years of dependence was the inclusion criterion for the inpatient participants. All the participants were males because it was easier to access. The presence of a psychotic disorder, antisocial personality disorder, or dementia led to exclusion from the study. Approximately, inpatients with 15 days participated in the study.

As a control group, volunteer judges, prosecutors, clerks, and other employees in İstanbul Beyoğlu Courthouse; teachers and other personnels in a private education centre; volunteers in ordinary cafés participated in the present study. While selecting the participants for control group, first they were administered CAGE inventory to detect possible alcohol dependence.

The mean age of all participants was 46.21 ($SD = 7.19$, $range = 30-67$). The mean age of alcohol dependent group was 45.50 ($SD = 7.56$), control group's mean age was 46.94 ($SD = 6.79$).

2. 2. Materials

Both groups were administered a battery of self-report measures including Demographic Information Form, CAGE Alcoholism Questionnaire, The Symptom Checklist (SCL-90-R), Beck Depression Inventory (BDI), and State-Trait Anxiety

Inventory (STAI) and finally a Emotion Recognition Test that was constructed by using a set of photographs from Ekman and Friesen's (1976) "Pictures of Facial Affect".

2. 2. 1. Demographic Information Form

It was developed by the authors in order to collect some information including gender, age, educational level, marital status, occupational status, years of alcohol use, hospitalization number, use in family, and reason of use. A copy of this form was presented in Appendix A.

2. 2. 2. CAGE Alcoholism Inventory (1968)

The CAGE (Cut Down, Annoyed, Guilty, Eye Opener) inventory that is quite simple and rapid was originally developed by Ewing and Rouse in 1968. It was designed to detect current alcoholism. It consists of four items that are asked to with respect to an occurrence during the previous one year. Each item can have either *yes* or *no* response. Two or more positive answers are the common cut-off for detecting alcoholism. The items are:

1. Have you ever felt you should *cut down* on your drinking?
2. Have people *annoyed* you by criticizing your drinking?
3. Have you ever felt bad or *guilty* about your drinking?
4. Have you ever had a drink in the morning? (*eye opener*)

It has proven to be a valid instrument (Bisson et al., 1999, Ewing, 1984, Bühler, et al. 2004). It shows high internal consistency with a Cronbach alpha coefficient of .85. Furthermore, it shows some similarities with DSM-IV dependence items such as cut-down attempts in CAGE and quit/cut-down attempts in DSM-IV; annoyed in CAGE, social problems in DSM-IV; eye-opener in CAGE, tolerance and withdrawal in DSM-IV (Bühler et al., 2004). Although this simple questionnaire is used in medical area, its reliability and validity coefficients could not have been found for Turkey. A copy of the Turkish version of CAGE was presented in Appendix B.

2. 2. 3. The Symptom Checklist (SCL 90-R, 1977)

SCL-90-R was developed by Derogatis and Clearly (1977) in order to assess the symptoms and these symptoms' severity in preceding one week. Kılıç (1987) translated it into Turkish and by using 416 university students he found .91 as the internal consistency value of the scale (Öner, 1997, p.463). Then Dağ (1991) investigated the psychometric properties of Turkish version of the Symptom Checklist- Revised (SCL-90-R) by using 532 students from Hacettepe University and reported that SCL-90- R is a reliable and valid instrument. It includes totally 90 items under 10 subscales respectively:

1. *Somatization (SOM)* that consists of 12 items concerning with somatic distress of the body;

2. *Obsessive-Compulsive (O-C)* that consists of 10 items related with distress of unwanted and uncontrollable thoughts and behaviors (compulsions);

3. *Interpersonal Sensitivity (INT)* consists of 9 items that is associated with personal distress about feeling inferiority and incompetency when meeting with people;

4. *Depression (DEP)* consists of 13 items that is related with the distress of general pessimism, anhedonia, hopelessness, lack of motivation, suicidal ideations and other cognitive & somatic symptoms;

5. *Anxiety (ANX)* consists of 10 items that concerns with the distress of high level of anxiety and irritable mood;

6. *Hostility (HOS)* consists of 6 items that is related with distress of aggressiveness, being oppositional, hostile.

7. *Phobic Anxiety (PHOB)* consists of 7 items that is associated with the distress of having specific phobia;

8. *Paranoid Ideation (PAR)* consists of 6 items that is concerning with the distress of projective thoughts, persecutions, grandiosity feelings and delusions;

9. *Psychotism (PSY)* consists of 10 items that is related with the distress of socially introversion, schizoid style of living or having hallucinations or delusions;

10. *Additional Items* consist of 7 items that are associated with the distress of sleep and eating disturbances, guilty feelings.

SCL-90-R is 5-point Likert type checklist. By asking “how much below problems or symptoms affected you for last one week?” participants sign the most appropriate choice based on their conditions (*never, a little, half, very much, completely*) and take respectively 0, 1, 2, 3, or 4 scores. For the calculation of the score of each subscale, total subscale scores are added and are divided into the number of the items in that subscale. SCL-90-R was used in three ways: Global Symptom Index (GSI), Positive Symptom Total (PST), and Positive Symptom Distress Index (PSDI). In order to determine Global Symptom Index (GSI) score, except unanswered ones, all subscale scores are added, and after total score is found, this score is divided to 90. The possible score ranged between 0 and 4. For each subscale validity, at least 40% of the checklist should have been completed. For the interpretation of scores, scores from 0 to 1.5 accepted as *normal*, scores between 1.51- 2.50 were considered as *high distress*, scores between 2.50-4.00 were considered as *a very high distress*.

Originally Derogatis et al. (1980) found that reliability coefficients of the scale ranged from .77 to .90 (.86 for SOM subscale, .86 for O-C subscale, .86 for INT subscale, .90 for DEP subscale, .85 for ANX subscale, .84 for HOS subscale, .82 for PHOB subscale, .80 for PAR subscale, .77 PSY subscale).

In Dağ (1991) study, test-retest reliability of the scale was found as .90 ($n=99$), for each subscale test-retest reliability ranged from .65 to .87, (.75 for SOM subscale, .87 for O-C subscale, .84 for INT subscale, .87 for DEP subscale, .73 for ANX subscale, .70 for HOS subscale, .65 for PHOB subscale, .73 for PAR subscale, .79 PSY subscale) and internal consistency was found as (Cronbach Alpha) .97. Pearson correlation coefficients between MMPI and SCL-90-R and BDI were .10 - .77 and .78, respectively. Convergent and discriminant validities were tested by correlations between SCL-90-R, MMPI, and BDI and it was found as satisfactory. Briefly, results showed that the SCL-90-R is a reliable and valid instrument for normal university students in Turkey. Higher scores on this scale indicate greater symptoms. A copy of the Turkish version was presented in Appendix C.

2. 2. 4. State- Trait Anxiety Inventory (STAI, 1970)

STAI is a 40-item self-report scale designed by Spielberger et al. in 1970 in order to measure the level of state (situational- how a person feels at that moment) and trait (continual- how a person feels in general independently from any specific situation or time) anxiety of individuals. It consists of two parts; State and Trait Anxiety Inventories, and each one consists of 20 items. In practice, state anxiety inventory is given first, so that the individual could declare her/his anxiety because of seeking help from mental health professional. In State Anxiety Inventory, by asking “how do you feel now” to participants, the items are rated on a 4-point scale with 1 standing for *not at all*, 2 for *a little*, 3 for *very much*, and 4 for *completely*. In Trait Anxiety Inventory, by asking "how do you feel in general" to participants, the items are rated on a four-point scale with 1 standing for *almost never*, 2 for *sometimes*, 3 for *mostly* and 4 for *almost always*.

Originally, test-retest reliability of the scale ranged from .16 to .54 for state anxiety inventory and from .73 to .86 for trait anxiety inventory. The internal consistency of the former one varied from .83 and .92, and between .86 and .92 for latter one. Construct and criterion validity values were reported to be satisfactory (Spielberger et al. 1970).

Öner and Le Comte (1985) performed adaptation study of STAI by examining both normal and psychiatric patients. Test-retest reliability was found to be ranging .71 to .86 for trait anxiety inventory, from .26 to .68 for state anxiety inventory. Internal consistency of trait anxiety inventory ranged from .83 to .87, while that of state anxiety inventory ranged from .94 to .96. Criterion and construct validities were demonstrated to be satisfactory. A copy of the Turkish version of STAI was presented in Appendix D.

2. 2. 5. Beck Depression Inventory (BDI, 1972)

Depressive symptomatology was assessed by using BDI that is a 21-item self-report inventory of depression and its levels. It was designed by Beck in 1972. Participants were asked to circle the most appropriate choice by considering last week. Each choice has its own score and as a result of these scoring the level of depression is

determined. The highest score on this scale is 63. Scores less than 10 refer to no depression, 11 to 19 mild depression, 20 to 25 to moderate depression, and scores 26 and higher to severely depression.

Beck (1982) found split-half reliability as .74, and Miller & Seligman (1973) found test-retest reliability as .74. Also, when compared to Hamilton Depression Scale, validity coefficient was found to be as .75.

In Turkey, Teğin translated BDI into Turkish in 1980 and found test-retest reliability as .65 on University students. Split-half reliability coefficient was found for inpatients as .61, for university students as .78. Lastly, Turkish adaptation of BDI has been developed by Hisli (1998; cited in Şahin & Savaşır, 1997) will be used in the study. Internal consistency of the Turkish version BDI has been found as .74 and test-retest reliability coefficient was between .74 and .86 (Şahin & Savaşır, 1997). A copy of the Turkish version of BDI was presented in Appendix E.

2. 2. 6. Emotion Recognition Test

This computer-based test was constructed by the authors by using a set of photographs from Ekman & Friesen's (1976) "Photos of Facial Affect". It included the photos of four male and four female models (totally 56 photos) with happy, surprised, fearful, sad, disgusted, angry, and neutral facial expressions that were selected from Ekman & Friesen's (1976) series. The mixed photos were digitized on a computer presentation via JAVA application developed for the presentation on a portable computer (ASUS XP 2800 2 Ghz processor, 512 MB main memory, 15" LCD screen with 1024x768 resolution). It had a trial section that was composed of the first seven photos. The trial section included every emotional facial expressions (anger, sadness, happiness, neutral, fear, disgust and surprise) that was presented in the same order for each participants. Rest of the 49 photos was used for the analyses in the study. There were equal numbers of happy, sad, surprised, fearful, disgusted, angry, and neutral expressions overall ensuring that participants did not become familiarized to one specific emotional category. These 49 photos were presented randomly for each participant. There were 20-second intervals for each photo. On the monitor, participants

saw both photos and colorful seven options in the below of these photos and they were asked to push the same color button option on the keyboard that match on the monitor. On the keyboard, *D* button represents happiness, *F* button represents sadness, *G* button represents fear, *H* button represents disgust, *J* button represents anger, *K* button represents surprise, and *L* button represents neutral facial expressions.

2. 3. Procedure

The volunteer inpatients that were under the treatment of alcohol dependence were asked to participate in the study. Then, they were asked to read and sign the informed consent form before starting to fill the questionnaires and conducting of Emotion Recognition Test.

For the control group, predetermined places (courthouses, private schools, and ordinary cafés) were visited and asked for permission to administer the questionnaires and Emotion Recognition Test. Differently from experimental group, they were not asked to fill some questions such as hospitalization number and reasons of drinking in the demographic information form.

After all participants (N = 101) were assessed with CAGE, SCL-90-R, BDI and STAI, two groups were administered on an Emotion Recognition Test. All participants were tested individually in a quiet room. They were instructed to respond as accurately and as quickly as possible. All stimulus material took approximately 2 or 3 minutes to complete. Instructions were given in the same way for two groups. No feedback was given regarding the appropriateness of any response. After completing the questionnaires and administration of computer based Emotion Recognition Test, participants were debriefed and thanked for their participation.

2. 4. Data Analyses

All statistical analyses were conducted with the Statistical Package for Social Sciences for Windows (SPSS) version 13.00. Demographic information was analyzed through descriptive statistics.

For the analyses of Beck Depression Inventory, State-Trait Anxiety Inventory, Symptom Checklist (SCL-90-R), and CAGE Alcohol Inventory, two-tailed t-test analyses were applied in order to compare group differences.

In order to examine the decoding accuracy of emotional facial expressions in both groups, first of all, for each participant the number of correct responses for each type of facial expression was calculated and an accurately identified expression received 1 score, and misidentified expression received 0 score. Same procedures were carried out in order to examine the reaction times; each participant's recognition/reaction times toward each expression were calculated. Only accurate responses were considered for the analysis of reaction times. To sum, each participant obtained a total reaction time score and a recognition accuracy score. Additional to these total scores, accuracy scores and reaction times scores toward each facial expression were also calculated.

A series of 2 (group: dependents vs. non-dependent individuals) *4 (negative emotional expressions: sadness, fear, anger, disgust) multivariate analysis of variance (MANOVA) were performed in order to find out group differences in the recognition accuracy and reaction times. In the analyses of decoding accuracy and reaction times for happy, surprised and neutral expressions, a series of one-way between subjects ANOVAs were conducted because of the different natures of emotions.

In order to determine whether there was a group difference on accuracy scores and general reaction times when depression, state-trait anxiety, and general symptom distress levels were taken as covariates, a series of one way with covariates between group designs (ANCOVA) were conducted. To find out the effects of four covariates (BDI, STAI, SCL-90-R) on each expression, all facial expressions again were analyzed based on their characteristics. For negative facial expressions 2*4 MANCOVA analysis was run for the comparison of group differences in the recognition accuracy and reaction times. For happiness, surprise, and neutral expressions, a series of one-way between subjects with covariates -ANCOVAs were conducted.

Misinterpretations of emotional facial expressions were found by calculating the frequencies of each participant's incorrect responses. The most frequent inaccurate

responses were revealed and their percentages were calculated for both groups.

Furthermore, in order to find out whether alcoholism would be predicted by predictors, we conducted a stepwise multiple analysis.

CHAPTER III

RESULTS

First of all, data was examined for missing values, univariate and multivariate outliers, and 3 cases were deleted. All analyses were carried out by totally 101 cases.

3. 1. Demographic Characteristics of Participants

Based on demographic information form, education levels, marital status, occupational status, and lastly the duration of alcohol use were determined.

General results revealed that, as illustrated in Table 1 and 2, in terms of educational level among the all participants (N = 101), 4 individuals (4%) were literate, 27 individuals (26.7%) were graduated from primary school graduated, 23 individuals (22.8%) were secondary school graduated, 26 individuals (25.7%) had a high school degree and lastly 21 individuals (20.8%) university graduates.

In terms of occupational status; among the all participants (N = 101), 7 individuals (6.9%) were workers, 45 individuals (44.6%) worked as a state officer, 30 individuals (29.7%) were employers, 15 individuals (14.9%) were retired and finally only 4 individuals (4%) were unemployed (see Table 2).

Among the all participants (N = 101), 6 individuals (5.9%) were single, 79 individuals (78.2%) were married, 14 individuals (13.9%) were divorced, and 2 individuals (2%) were separated (see Table 2).

Finally, our experimental group ($n = 51$), in terms of the duration of alcohol use; their mean is 22 years. Specifically, 23 individuals (46%) reported their use from 10 to 20 years, 20 individuals (40%) reported that from 21 to 30 years, and 7 individuals (14%) reported more than 31 years (see Table 2).

Table 1. Demographic Variables

	Alcohol Dependence	N	Mean	S.D.	t (df)
Age	dependent	51	45.49	7.56	-1.013(99)
	non-dependent	50	46.94	6.79	
Education	dependent	51	3.29	1.17	-1.276(99)
	non-dependent	50	3.36	1.22	

* $p < .001$

Table 2. Demographic Variables

		N	%
Education			
Literate	Dependent	1	2%
	Non-dependent	3	6%
Primary S. Graduation	Dependent	16	31%
	Non-dependent	11	22%
Secondary S. Graduation	Dependent	11	21%
	Non-dependent	12	24%
High School G.	Dependent	13	25%
	Non-dependent	13	26%
Undergraduate or above	Dependent	10	19%
	Non-dependent	11	22%
Occupational Status			
Worker	Dependent	5	9.8%
	Non-dependent	2	4%
State Officer	Dependent	11	21.6%
	Non-dependent	34	68.4%
Employer	Dependent	17	33.3%
	Non-dependent	13	26%
Retired	Dependent	14	27.5%
	Non-dependent	1	2%
Unemployed	Dependent	4	7.8%
	Non-dependent	0	0
Marital Status			
Single	Dependent	5	9.8%
	Non-dependent	1	2%

Table 2. Demographic Variables (Continued)

		n	%
Divorced	Non-dependent	48	96.2%
	Dependent	13	25.5%
Separated	Non-dependent	1	2%
	Dependent	2	3.9%
	Non-dependent	0	0
Alcohol Use in Family			
Yes	Dependent	8	15.7%
	Non-dependent	3	6%
No	Dependent	43	84.3%
	Non-dependent	47	94%
Duration of Alcohol Use			
10-20 years		23	46%
21-30 years		20	40%
≥ 31 years		8	14%

3. 2. CAGE Alcoholism Inventory, Beck Depression Inventory (BDI), State-Trait Anxiety Inventory, (STAI) and Symptom Checklist (SCL-90-R) Scores

In order to compare experimental and control group in terms of their depression, state-trait anxiety, alcohol dependence, and psychopathological symptoms, two-tailed t-test analyses were conducted on the CAGE, BDI, STAI, and SCL-90-R scores. As hypothesized, the two groups differed significantly in all measures except state anxiety as illustrated in Table 3. Inpatients were significantly more alcohol dependent than control group indicating that CAGE is an appropriate instrument to classify the two groups in terms of dependency, $t(99) = 27.32$, $p < .001$. In terms of BDI scores, the results have displayed that alcohol dependent individuals obtained significantly higher scores on BDI than non-dependent individuals, $t(99) = 4.340$, $p < .001$; they had significantly higher trait anxiety levels indicating that these inpatients were generally but not currently more anxious than control group, $t(99) = 4.169$, $p < .001$. Finally they had significantly more psychopathological symptoms on total psychopathology checklist $t(99) = 4.814$, $p < .001$. As illustrated in Table 5, when 9 subscales of SCL-90-R were considered, results revealed that alcohol dependent group significantly scored higher on all subscales; t-test

values were respectively; for somatization $t(99) = 3.657, p < .001$; for obsessive thoughts $t(99) = 4.867, p < .001$; for interpersonal sensitivity $t(99) = 4.052, p < .001$; for depression $t(99) = 3.926, p < .001$; for anxiety $t(99) = 2.898, p < .001$; for hostility $t(99) = 2.898, p < .05$; for phobic anxiety $t(99) = 5.213, p < .001$; for paranoid thoughts $t(99) = 3.075, p < .05$; and finally for psychotism $t(99) = 5.036, p < .001$. In other words, alcohol dependent individuals have had significantly more discomfort on these nine subtypes than non-dependent individuals (see Table 4).

Table 3. Descriptive Statistics of BDI, STAI, CAGE and SCL-90-R Results

Measures	Alcohol Dependence	N	Mean	SD	t-test (df)
BDI	Dependent	51	13.96	7.94	4.340(99)*
	Non-dependent	50	7.72	6.40	
Total		101	10.87	7.84	
STAI-S	Dependent	51	37.58	9.02	1.639(99)*
	Non-dependent	50	34.68	8.80	
Total		101	36.14	8.99	
STAI-T	Dependent	51	46.52	8.25	4.169(99)*
	Non-dependent	50	40.08	7.26	
Total		101	43.33	8.39	
CAGE	Dependent	51	3.49	.78	27.32(99)*
	Non-dependent	50	.12	.35	
Total		101	10.87	1.80	
SCL-90-R	Dependent	51	73.50	52.35	4.814(99)*
	Non-dependent	50	33.28	27.36	
Total		101	53.59	46.41	

* $p < .001$

Table 4. Descriptive Statistics of Subscales of SCL-90-R Results

Subscales of SCL-90-R	Alcohol Dependence	N	Mean	SD	t-test (df)
Somatization	Dependent	51	8.45	7.81	3.657(99)**
	Non-dependent	50	3.76	4.65	
Total		101	6.12	6.83	
Obs.Com.	Dependent	51	10.37	7.07	4.876(99)**
	Non-dependent	50	4.66	6.83	
Total		101	7.54	6.52	
Inter.Sens.	Dependent	51	8.60	11.43	4.082(99)**
	Non-dependent	50	4.42	3.76	
Total		101	6.53	5.54	
Depression	Dependent	51	11.84	9.30	3.926(99)**
	Non-dependent	50	5.92	5.26	
Total		101	8.91	8.10	
Anxiety	Dependent	51	6.74	6.63	3.768(99)**
	Non-dependent	50	2.76	3.38	
Total		101	4.77	5.62	
Hostility	Dependent	51	3.66	3.92	2.898(99)*
	Non-dependent	50	1.82	2.22	
Total		101	2.75	3.31	
Phobia	Dependent	51	4.17	3.92	5.213(99)**
	Non-dependent	50	1.02	1.72	
Total		101	2.61	3.41	
Paranoia	Dependent	51	5.81	4.71	3.075(99)*
	Non-dependent	50	3.46	2.90	
Total		101	4.67	4.08	
Psychotism	Dependent	51	6.74	6.63	5.036(99)**
	Non-dependent	50	2.76	3.38	
Total		101	4.77	5.62	

** $p < .001$, * $p < .01$

3. 3. Decoding Accuracy in General

Decoding accuracy was defined as the participants' ability to infer the presented emotion correctly on the monitor. An accurately identified expression received 1 score, misidentified expression received 0 score. Each participant had his own total scores. To investigate whether there was the group differences on accuracy scores, one way ANOVA was run with group on total accuracy scores. The results indicated that although the mean scores of non-dependent individuals were higher than alcohol dependent individuals, they did not differ significantly from each other in terms of

accurate recognition toward scores of all seven-expression scores. In other words, it was found that alcohol dependent individuals did not perceive the expressions significantly worse than non-dependent individuals. $F(1, 99) = 3.34, p > .05$ (ns.) (see Table 5 and 6).

Table 5. ANOVA Results of Recognition of Accuracy

	Sum of Squares	df	Mean Square	F	Sig.
Between Gr.	161.33	1	161.33	3.34	.071
Within Gr.	4789.83	99	48.38		
Total	4951.16	100			

Table 6. Descriptive Statistics of Accuracy Scores toward all Emotional Expressions

	Alcohol Dependence	N	Mean	SD
Accuracy Scores	dependents	51	32.39	7.41
	non-dependents	50	34.92	6.45
Total		101	33.64	7.03

3. 3. 1. Decoding Accuracy of Each Facial Expression

In order to assess whether there was a group difference between alcohol dependent individuals and control participants' performances in their ability to decode emotional facial expression, a between subject multivariate analysis of variance (MANOVA), 4 (negative facial expressions: anger, sadness, disgust, fear) * 2 (group: alcohol dependent individuals vs. control) was carried out. The results showed that according to Wilks' Lambda criterion, these 4 expressions were significantly affected by group, $F(4, 96) = 3.50, p < .05$. Surprisingly, univariate analyses demonstrated that alcohol dependent individuals and non-dependent individuals did not differ from each other in the recognition of angry, fearful, and sad expressions. The only significant difference was observed in the recognition of the expression of disgust. $F(1, 99) = 10.424, p < .05$. As presented in Table 7, alcohol dependent individuals had lower accuracy scores in the recognition of disgusted expressions than other expressions when

compared to non-dependent individuals.

Accuracy scores for happy (a positive emotion), neutral and surprised (neither positive nor negative emotions) were treated separately because of their different nature from negative emotions; they were analyzed by univariate analysis of variance (One-Way ANOVA). As expected, findings have suggested that no expression exhibited a significant difference between groups (see Tables 7, 8, 9, 10, 11).

In sum, it was found that the performances of alcohol dependent inpatients were similar to control group's performances in the recognition of six expressions- happy, sad, angry, surprised, and neutral faces. Surprisingly, the results displayed that true scores of alcohol dependent individuals towards fearful faces were higher than the scores of control group. However, this difference did not reach a statistical significance (see Table 7).

Table 7. Descriptive Statistics of Accuracy Scores towards Negative Emotional Expressions

Facial Expressions	Alcohol Dependence	N	Mean	S.D	Univariate F (1,99)
Angry	Dependents	51	4.68	1.66	n.s
	Non-dependent	50	4.90	1.63	
	Total	101	4.79	1.64	
Fearful	Dependents	51	3.00	1.57	n.s
	Non-dependent	50	2.72	1.77	
	Total	101	2.86	1.67	
Disgusted	Dependents	51	4.01	1.81	10.42*
	Non-dependent	50	5.14	1.66	
	Total	101	4.57	1.82	
Sad	Dependents	51	4.23	1.97	n.s
	Non-dependent	50	4.72	1.75	
	Total	101	4.47	1.87	

* $p < .05$

Table 8. Descriptive Statistics of Accuracy Scores towards the Expressions of Happiness, Surprise, and Neutral

EFE	Alcohol Dependence	N	Mean	S.D
Happiness	Dependent	51	6.78	.576
	Non-dependent	50	6.82	.481
Total		101	6.80	.529
Surprise	Dependent	51	5.33	1.43
	Non-dependent	50	5.68	1.30
Total		101	5.50	1.37
Neutral	Dependent	51	4.33	2.46
	Non-dependent	50	4.94	1.94
Total		101	4.63	2.30

Table 9. ANOVA Results of Happy Emotional Expressions

	Sum of Squares	df	Mean Square	F	Sig.
Between Gr.	.032	1	.032	.114	.737
Within Gr.	28.07	99	.283		
Total	28.04	100			

Table 10. ANOVA Results of Surprised Emotional Expressions

	Sum of Squares	df	Mean Square	F	Sig.
Between Gr.	3.03	1	3.03	1.613	.217
Within Gr.	186.21	99	1.88		
Total	189.25	100			

Table 11. ANOVA Results of Neutral Expressions

	Sum of Squares	df	Mean Square	F	Sig.
GROUP	9.292	1	9.292	1.885	.173
Error	488.15	99	4.93		
Total	2666.0	101			

a R Squared = .019 (Adjusted R Squared = .009)

3. 4. Manual Reaction/Recognition Times for Accurate Responses in General

Due to investigate whether there was a group difference on reaction times toward all accurately recognized expressions, one way ANOVA was run with group (dependents vs. non-dependent individuals) on total reaction time scores. Unexpectedly statistical analysis did not manifest any significant differences between alcohol dependent individuals and non-dependent individuals in terms of reaction times towards all seven expressions. In other words, alcohol dependent individuals did not react quicker or slower toward expressions than non-dependent individuals, $F(1, 99) = 2.20$, $p > .05$ (ns.) (see Table 12).

Table 12. ANOVA results of Reaction Times towards all Expressions

	Sum of Squares	df	Mean Square	F	Sig.
GROUP	9625663785	1	9625663785	2.203	.141
Error	432518541237	99	4368874153		
Total	3210788526867	101			

a R Squared = .022 (Adjusted R Squared = .012)

3. 4. 1. Reaction Times for Accurate Responses towards Each Facial Expression

In order to find out the group differences on the reaction times towards negative expressions, a multivariate analysis of variance (MANOVA) was conducted on 4 negative expressions (anger, fear, disgust and sadness). The findings displayed that alcohol dependent individuals did not perform significantly different from non-dependent individuals in any of the negative expressions (see Table 13). According to Wilks' Lambda criterion, $F(4, 96) = .872$, $p > .05$ (ns.).

Table 13. Descriptive Statistics of Reaction Times towards Negative Expressions

Reaction Times	Alcohol Dependence	N	Mean (seconds)	SD
RT Sadness	Dependent	51	24.36	17.29
	Non-dependent	50	27.33	20.04
Total		101	25.83	18.67
RT Fear	Dependent	51	17.83	14.36
	Non-dependent	50	18.09	15.55
Total		101	17.96	14.87
RT Anger	Dependent	51	24.96	14.00
	Non-dependent	50	30.87	22.45
Total		101	27.89	18.81
RT Disgust	Dependent	51	21.74	10.85
	Non-dependent	50	24.60	13.41
Total		101	23.16	12.21

For examining the reaction times towards happy, neutral, and surprised expressions, each of facial expressions was calculated separately on univariate analysis of variance (One way ANOVA). As expected, no significant results were found between alcohol dependent individuals and non-dependent individuals in terms of the reaction times toward happy, surprised, and neutral expressions. $F(1, 99) = .319, p > .05$ (ns.); $F(1, 99) = .569, p > .05$ (ns.); $F(1, 99) = .1620, p > .05$ (ns.) respectively (see Tables 14, 15, 16, 17).

Table 14. ANOVA results of Reaction Times towards Happy Expressions

	Sum of Squares	df	Mean Square	F	Sig.
Between Gr.	124930496.9	1	124930496.9	.319	.573
Within Gr.	38736661107.3	99	391279405.1		
Total	38861591604.3	100			

Table 15. ANOVA results of Reaction Times towards Surprised Expressions

	Sum of Squares	df	Mean Square	F	Sig.
Between Gr.	74694218.6	1	74694218.6	.569	.453
Within Gr.	13001339299.3	99	131326659.5		
Total	13076033517.9	100			

Table 16. ANOVA results of Reaction Times towards Neutral Expressions

	Sum of Squares	df	Mean Square	F	Sig
GROUP	324358034	1	324358034	1.620	.206
Error	00.853	99	200214387		
Total	65110990639	101			

a R Squared = .016 (Adjusted R Squared = .006)

Table 17. Descriptive Statistics of Reaction Times toward the Expressions of Happiness, Neutral and Surprise

Reaction Times	Alcohol Dependence	N	Mean (seconds)	SD
RT Happiness	Dependent	51	22.74	9.18
	Non-dependent	50	24.91	26.54
Total		101	23.84	19.71
RT Neutral	Dependent	51	19.32	13.41
	Non-dependent	50	22.90	14.86
Total		101	21.09	14.19
RT Surprise	Dependent	51	24.91	11.43
	Non-dependent	50	26.63	11.48
Total		101	25.76	11.44

3. 5. Covariates with Accuracy Decoding in General

In order to examine whether there was a group difference on accuracy scores when depression, state-trait anxiety and general symptom distress levels were taken into the account, one-way variance analyses with covariates between group design (ANCOVA) was conducted with group (dependents vs. non-dependent individuals) and covariates as BDI, STAI and SCL on total accuracy scores. The findings yielded that no significant difference was observed. $F(1, 95) = 1.50, p > .05$ (ns.) (see Table 18).

Covariates did not cause any significant differences on the recognition of all facial expression scores.

Table 18. ANCOVA Results of Accuracy Decoding

Measures	Sum of Squares	df	Mean Square	F	Sig.
SCL-90-R	38.65	1	38.65	.789	.377
SAI	31.65	1	31.65	.646	.424
TAI	55.62	1	55.62	1.135	.289
BDI	35.63	1	35.63	.727	.396
GROUP	73.350	1	73.350	1.497	.224
Error	4653.3	95	48.98		

a R Squared = .060 (Adjusted R Squared = .011)

3. 5. 1. Covariates with Decoding Accuracy in Each Facial Expression

Group differences for the accuracy of 4 negative emotions: fear, disgust, anger, sadness were examined by taking the scores Beck Depression Inventory (BDI), State-Trait Anxiety (STAI), and Symptom Checklist (SCL-90-R) as the covariates. Results of MANCOVA revealed significant group differences. On the basis of Wilks' Lambda criterion $F(4,92) = 5.35$, $p < .001$. As presented in Table 19, however, analyses indicated that alcohol dependent group had lower accuracy scores than non-dependent group only for the recognition of disgusted expression, $F(1,95) = 12.32$, $p < .01$.

The separate analyses of one way with covariate design (ANCOVA) for the recognition of happy, surprised, and neutral expressions have exhibited that groups did not differ from each other when trait and state anxiety, depressive symptomatology and general psychopathological distress were considered as covariates. In other words, accuracy of other emotions did not indicate a significant group differences, F values respectively; $F(1,95) = .161$, $p > .05$ (ns.); $F(1,95) = .828$, $p > .05$ (ns.); $F(1,95) = 7.69$, $p > .05$ (ns.).

Table 19. MANCOVA with Decoding Accuracy in Each Facial Expression

Measures	Dependent V.	Sum of Squares	df	Mean Square	F	Sig.
SAI	SAD	3.517	1	3.517	.988	323
	FEAR	3.947	1	3.947	1.419	236
	ANGER	.099	1	.099	.037	.849
	DISGUST	.084	1	.084	.028	.867
TAI	SAD	.567	1	.567	.159	.691
	FEAR	2.416	1	2.416	.869	.354
	ANGER	10.728	1	10.728	3.994	.049
	DISGUST	4.448	1	4.448	1.477	.227
BDI	SAD	.808	1	.808	.227	.635
	FEAR	3.714	1	3.714	1.335	.251
	ANGER	.009	1	.009	.003	.955
	DISGUST	2.586	1	2.586	.859	.356
SCL-90-R	SAD	.755	1	.755	.21	.646
	FEAR	.037	1	.03	.013	.909
	ANGER	2.281	1	2.281	.849	.359
	DISGUST	4.378	1	4.378	1.454	.231
GROUP	SAD	4.643	1	4.643	1.305	.256
	FEAR	8.105	1	8.105	2.914	.091
	ANGER	.013	1	.013	.005	.945
	DISGUST	37.108	1	37.108	12.322	.001*
Error	SAD	338.075	95	3.559		
	FEAR	264.218	95	2.781		
	ANGER	255.145	95	2.686		
	DISGUST	286.096	95	3.012		
Total	SAD	2374.000	101			
	FEAR	1107.000	101			
	ANGER	2590.000	101			
	DISGUST	2446.000	101			

* $p < .01$

3. 6. Covariates with Manual Reaction Times for Accurate Responses

In order to find out any group difference on general reaction times toward accurately recognized expressions by taking the scores of Beck Depression Inventory (BDI), State-Trait Anxiety (STAI), and Symptom Checklist (SCL-90-R) as the covariates, one-way univariate analysis with covariates (ANCOVA) was conducted. However, this analysis did not reveal any significant findings, $F(1,95) = 1.905$, $p. > .05$ (ns.)

3. 6. 1. Covariates with Reaction Times for Accurate Responses towards Each Facial Expression

Due to prove the effect of state-trait anxiety, depression level, and general psychopathology scores on reaction times toward each expression, firstly a multivariate analysis with covariances (MANCOVA) was conducted. Multivariate analysis of 2 (group: dependents vs. controls) * 4 (negative emotions: fear, disgust, anger, sadness) between group design with covariates as STAI, BDI and SCL-90-R was carried out. As illustrated in Table 20, the results manifested that alcohol dependent group differed significantly from non-dependent group only in the recognition time of disgusted faces, Wilks' Lambda criterion $F(1,95) = 4.289$, $p. < .05$. In other words, alcohol dependent group recognized disgusted expression significantly faster than non-dependent individuals.

As predicted, the results of separate univariate analyses with the same covariates (ANCOVA) for the recognition time of happy, surprised and neutral expressions yielded that alcohol dependent group did not differ significantly from non-dependent group, $F(1,95) = .541$, $p. > .05$ (ns.); $F(1,95) = .925$, $p. > .05$ (ns.); $F(1,95) = 1.555$, $p. > .05$ (ns.) respectively.

Table 20. MANCOVA with Reaction Times for Accurate Responses towards Each Negative Facial Expressions

Measures	DV	Sum of Squares	df	Mean Square	F	Sig.
State Anxiety	RT Sad	29597151.1	1	29597151.1	.084	.773
	RT Fear	54020495.1	1	54020495.1	.237	.628
	RT Anger	483183705.9	1	483183705.9	1.378	.243
	RT Disgust	230652923.3	1	230652923.3	1.571	.213
Trait Anxiety	RT Sad	835960005.4	1	835960005.4	2.367	.127
	RT Fear	236971463.4	1	236971463.4	1.038	.311
	RT Anger	135484868.6	1	135484868.6	.386	.536
	RT Disgust	8046209.2	1	8046209.2	.055	.815
BDI	RT Sad	374122208.0	1	374122208.0	1.059	.306
	RT Fear	27168709.6	1	27168709.6	.119	.731
	RT Anger	19168517.3	1	19168517.3	.055	.816
	RT Disgust	265481125.0	1	265481125.0	1.809	.182
SCL-90-R	RT Sad	20129804.5	1	20129804.5	.057	.812
	RT Fear	2712591.0	1	2712591.0	.012	.913
	RT Anger	4105242.5	1	4105242.5	.012	.914
	RT Disgust	61053171.0	1	61053171.0	.416	.521
GROUP	RT Sad	199821735.8	1	199821735.8	.566	.454
	RT Fear	48366281.9	1	48366281.9	.212	.646
	RT Anger	315380593.0	1	315380593.0	.899	.345
	RTDisgust	629605221.2	1	629605221.2	4.289	.041*
ERROR	RT Sad	33553524302.1	95	353194992.6		
	RT Fear	21679128275.5	95	228201350.2		
	RT Anger	33318829809.9	95	350724524.3		
	RT Disgust	13944454432.6	95	146783730.8		

* $p < .05$.

- a. R Squared = .038 (Adjusted R Squared = -.013)
- b. R Squared = .020 (Adjusted R Squared = -.031)
- c. R Squared = .058 (Adjusted R Squared = .009).
- d. R Squared = .065 (Adjusted R Squared = .016)

3. 7. Misinterpretations of Emotional Facial Expressions

In our study, we aimed to find out a group difference in the recognition of facial expressions between alcohol dependent and non-dependent group. Namely, we expected that alcohol dependent group would have less accuracy scores than non-dependent group. However, our results failed to reveal an accuracy deficit in the identification of happy, sad, fearful, disgusted, surprised, and neutral expressions except disgusted ones in alcohol dependent group. Therefore, we decided to concentrate on the number of inaccurate responses of both groups in order to find out the existence of common misinterpretations of facial expressions (see Table 21). The total scores of accurate responses were higher than the scores of inaccurate responses of both groups. Moreover, general accurate scores of non-dependent individuals ranged from 39% (fear) to 88% (happy).

As expected, the findings have suggested that both alcohol dependent and non-dependent groups recognized happy faces more accurately than other expressions at 87% and 88% respectively. Additionally, it was obtained that two groups tended to display same misjudgments toward fearful, angry, surprised, and neutral faces except sad and disgusted faces.

Firstly, the analyses demonstrated that there was a significant difference between alcohol dependent group and non-dependent group in the recognition of disgusted expressions. Alcohol dependent individuals recognized disgusted faces at the ratio of 58%. The rest, 42%, inaccurately responded to the disgusted faces, and 46% of this percentage (42%) perceived the expression of disgust as anger. On the other hand, in the group of non-dependent individuals, the ratio of properly understanding was 74%. Within the incorrect responses (26%), 36% of them failed to perceive disgusted expression and they misunderstood them as surprised ones. This difference may be explained by the effect of alcohol abuse.

In terms of sad expressions, 68% of control group responded accurately. When we consider their inaccuracy scores, it was found that non-dependent group perceived sadness as neutral in the rate of 36%. However, differently from non-dependent

individuals, 60% of alcohol dependent individuals decoded sadness correctly and they tended to misjudge sad faces as surprised faces with the percentage of 35%.

The results exhibited that 70% of non-dependent group evaluated angry faces properly, whereas this ratio declined to 67% for alcohol dependent group. When we focused on their incorrect responses, it was obtained that 33% of alcohol dependent individuals and 32% non-dependent individuals misevaluated angry faces as surprised faces.

Similarly, it was observed that 69% of non-dependent individuals judged neutral faces exactly however this rate decreased to 62% for alcohol dependent individuals. In addition, both groups misinterpreted neutral faces as sad faces. Their inaccurate response rates were 34% in the group of non-dependent individuals and 36% in the group of alcohol dependent individuals.

Interestingly, the findings postulated that non-dependent individuals recognized fearful faces with the minimum scores when compared to all emotional faces. Their percentage of correct responses was only 39%. This ratio was higher for alcohol dependent individuals as 42%. When we consider their misjudgments, it was revealed that both groups tended to misinterpret fearful faces as surprised faces. The inaccurate response rates were 65% in non-dependent individuals and 63% in alcohol dependent individuals. In terms of surprised expression, control group seemed to get the highest score except happy with the ratio of 82%. Just like non-dependent individuals, the accuracy scores of alcohol dependent group were also higher. Their percentage of accuracy scores was 77%. Moreover, two groups' error rates were the same. In both groups, 51% of inaccurate responses exhibited that alcohol dependent and non-dependent individuals tended to perceive surprised faces as fearful faces.

These shared misinterpretations of facial expressions in alcohol dependent and non-dependent groups could be associated with cultural factors. These findings would be discussed in the next chapter.

Table 21. Descriptive Statistics of Accurate Responses of All Participants towards All Emotional Expressions

EFE	Alcohol Dependence	N	%	Mean	SD	Min.	Max.
Happiness	Dependent	51	87	6.78	.576	4	7
	Non-dependent	50	88	6.82	.418	5	7
Total		101		6.80	.052		
Sadness	Dependent	51	60	4.23	1.75	0	7
	Non-dependent	50	68	4.72	1.97	1	7
Total		101		4.47	1.82		
Fear	Dependent	51	42	3.00	1.77	0	5
	Non-dependent	50	39	2.72	1.57	0	7
Total		101		2.86	1.67		
Anger	Dependent	51	67	4.68	1.66	1	7
	Non-dependent	50	70	4.90	1.63	1	7
Total		101		4.79	1.64		
Surprise	Dependent	51	77	5.33	1.43	0	7
	Non-dependent	50	82	5.68	1.30	2	7
Total		101		5.50	1.37		
Disgust	Dependent	51	58	4.01	1.81	0	7
	Non-dependent	50	74	5.14	1.66	0	7
Total		101		4.57	1.82		
Neutral	Dependent	51	62	4.33	2.46	0	7
	Non-dependent	50	69	4.94	1.94	0	7
Total		101		4.57	2.23		

3. 8. Stepwise Regression Analysis

In order to estimate whether alcohol dependence on the basis of CAGE scores would be predicted by demographical variables such as age and education; by psychological symptoms scores obtained from Beck Depression Inventory, State-Trait Anxiety Inventory, and Symptom Checklist and its nine subscales-anxiety, depression, phobic anxiety, hostility, interpersonal sensitivity, obsessive-compulsion, somatization, psychotism, and paranoid ideation; by recognition scores from each seven emotional facial expressions; and lastly by reaction time scores toward accurately recognized facial expressions, a stepwise multiple regression analysis was run. CAGE scores were entered as the Dependent Variable. The results of stepwise multiple regression analyses were presented in Table 24, including multiple R (R), R square (R^2), adjusted R^2 (ΔR^2), the standardized regression coefficients-Beta (β), semipartial correlations (sp^2) and t values.

In the first step, age and educational levels of both groups were submitted; however, they did not predict a significant degree of variance in the alcohol dependence. In the next step, BDI, STAI, and SCL-90-R scores were entered and the results revealed that only obsessive-compulsion, Beck Depression Inventory (BDI), State-Trait Anxiety Inventory State Form (STAI-S) scores predicted alcohol dependence significantly, $R^2 = .22$, $F(1,99) = 27.716$, $p < .001$; $R^2 = .25$, $F(2,98) = 16.555$, $p < .001$; $R^2 = .28$, $F(3,97) = 12.765$, $p < .001$ respectively. Findings indicated that %22 of variance in alcohol dependence or CAGE scores was explained by obsessive-compulsion characteristics of participants; %25 of variance in alcohol dependence was explained by depression scores; %28 of variance in alcohol dependence was accounted for state anxiety scores of groups. In the third step, accuracy scores from seven emotional facial expressions were submitted due to predict alcohol dependence. The results suggested that accurate scores in the recognition of disgusted and fearful faces predicted alcohol dependence significantly, $R^2 = .33$, $F(4,96) = 11.998$, $p < .001$; $R^2 = .37$, $F(5,95) = 11.247$, $p < .001$ respectively (see Table 25). In the last step, reaction time scores were submitted whether they would predict alcohol dependence, nevertheless, the findings did not demonstrate an association between reaction times and CAGE scores.

In sum, stepwise regression analyses indicated that obsessive-compulsive subscale

in other words, distress of unwanted and uncontrollable thoughts and behaviors (compulsions), depression level obtained from Beck Depression Inventory, and recognition of fearful facial expressions predicted positively the existence of alcoholism. Nevertheless, recognition accuracy scores of disgusted facial expression and scores from State Anxiety Inventory predicted negatively the presence of alcohol dependence on the basis of CAGE.

Table 22. Variables in each step for Stepwise Multiple Regressions using Demographics, BDI, STAI, SCL-90, Facial Expressions and Reaction Times to predict Alcoholism Level

	Variables
Step I	Age Education
Step II	STAI BDI 9 subscales of SCL-90-R
Step III	7 Facial Expressions
Step IV	Reaction Times to 7 Facial Expressions
Dependent Variable	Scores on CAGE Alcoholism Inventory

Table 23. Summary of Stepwise Multiple Regressions using demographics, BDI, STAI, SCL-90, Recognition of Facial Expressions due to predict alcohol dependence based on CAGE

Model	R	R ²	ΔR ² (Adjusted)	B (Beta)	sp ² (semi- partial)	t
1. Obs-Com.	.468	.22	.21	.47	.47	5.25***
2. Obs.Com., BDI	.503	.25	.23	.33 .23	.30 .21	3.058** 2.106*
3. Obs. Com., BDI, State Anxiety	.532	.28	.26	.38 .34 -.23	.33 .28 -.20	3.465** 2.841** -.2032*
4. Obs. Com., BDI, State Anxiety, Disgust	.577	.33	.31	.34 .35 -.20 -.23	.31 .30 -.19 -.27	3.187** 3.020** -1.856 -2.690**
5. Obs. Com., BDI, State Anxiety, Disgust, Fear	.610	.37	.33	.34 .35 -.20 -.27 .20	.32 .33 -.21 -.32 .24	3.187** 3.020** -1.856 -3.243** 2.415*

* $p < .05$., ** $p < .01$, *** $p < .001$.

CHAPTER IV

DISCUSSION

4. 1. Alcohol Dependence and Co-morbid Disorders

One of the purposes in our study was to measure the levels of depression, state-trait anxiety, the existence of alcoholism, and the presence of general psychopathological distress of both groups (nine subscales -anxiety, depression, phobic anxiety, hostility, interpersonal sensitivity, obsessive-compulsion, somatization, psychotism, and paranoid ideation). Most of the studies up to now have shown that anxiety disorders and depression are associated with high rates of alcohol dependence both in nonclinical and clinical populations even though the exact nature of these associations remains unclear (e.g. Gratzer et al., 2004; Ceylan & Turkcan, 2003, p.59-63; Nolen-Hoeksema, 2004; Hoes, 1997; Merikangas et al., 1998; Wetterling and Junghanns, 2000; Preisig et al., 2001; Devanand, 2002; Tedstone & Coyle, 2004; Terra et al., 2006). It was observed that in the alcohol dependence population, the probability of developing of a unipolar mood disorder is four times more than healthy population (Ceylan, Turkcan, 2003, p.63). In addition, Ceylan, Turkcan suggested that alcohol dependence is accompanied with mostly agoraphobia, social anxiety and PTSD among all anxiety disorders (2003, p. 63). A prevalence of 30.6% was found for specific phobia, 24.7% for social phobia, 22.2% for anxiety disorder induced by alcohol, 19.3% for generalized anxiety disorder, 5% for obsessive-compulsive disorder, 4.6% for posttraumatic stress disorder, and 2% for panic disorder with agoraphobia (Terra et al., 2006). Merikangas et al. (1998) who investigated co-morbidity between specific subtypes of anxiety and alcoholism postulated that the association was greater for phobic disorders than for panic and generalized anxiety disorder. In the study of Gratzer et al. (2004), their findings exhibited that a significantly higher rate of alcoholism was linked to depression-anxiety rather than only anxiety.

In accordance with previous studies, the results of this study yielded that alcohol dependent group scored higher than normal control group on the CAGE Alcohol Inventory, Beck Depression Inventory, Trait Anxiety Inventory, and Symptom Checklist (SCL-90-R) and on its nine subscales. However, no significant difference was found in State Anxiety Inventory between our experimental and control group. Thus, as expected, alcohol dependent individuals were found as more depressed, had higher scores of psychopathological distress in terms of nine measures, and had higher trait anxiety than non-dependent individuals.

4. 2. Decoding Accuracy of Emotional Facial Expressions

In our study, it was predicted that alcohol dependent individuals would have cognitive impairments in the recognition of universal Emotional Facial Expression (EFE) -happy, sad, angry, disgusted, fearful, surprised, and neutral expressions. However, the results indicated that there was no significant difference between alcohol dependent individuals and non-dependent individuals in the total accurate recognition scores toward seven expressions-happiness, sadness, fear, anger, disgust, surprise, and neutral. Even though alcohol dependent individuals did more errors in the total accuracy scores than non-dependent individuals did, this difference did not reach a statistical significance. On the other hand, their pattern of answers to emotional expressions differs from each other. The findings revealed that alcohol dependent individuals and non-dependent individuals did not differ from each other in their recognition of happiness, sadness, fear, anger, surprise, and neutral except disgusted faces. In other words, alcohol dependent individuals did more errors in their recognition of disgusted expression significantly, than control participants did. Additionally, the findings also suggested that alcohol dependent individuals perceived disgusted faces as angry faces. Almost half of the inaccurate responses showed that they misinterpreted the expression of disgust as angry.

Interestingly, even though there was not any significant difference between two groups in terms of the number of accurate responses, alcohol dependent individuals were found as better in the recognition of fearful expression than non-dependent individuals.

Non-dependent individuals did more errors than alcohol dependent individuals in the decoding of fearful faces. These inaccurate response tendencies will be discussed in Part 4.6.

In sum, although our study failed to manifest total accuracy deficit between experimental and normal control groups, some of the results were in line with previous studies showing a deficit in the recognition of emotional expression in alcohol dependent individuals with a particular bias in disgust and their misinterpretation of disgusted expression as angry. The findings of Philippot et al. (1999) exhibited that recognition of facial expressions seemed to be severely impaired in recovering alcoholics. The authors suggested that particularly alcohol dependent individuals had a bias in their recognition of angry and contempted faces. In other words, it was found that alcohol dependent participants had a systematic bias in interpreting faces expressing disgust as anger or contempt similar to our findings.

Furthermore, Townsend and Duka (2003) postulated that alcohol dependent inpatients tended to perceive angry faces when they were shown to disgusted faces. This result suggests that alcohol dependent individuals may have a difficulty in distinguishing these two emotional expressions. It was also found that alcohol dependent individuals also overestimated the pictures of disgust when compared to angry ones. Townshend and Duka (2003) were not able to clarify this finding; at last, they interpreted this confusion as the damage of long-term alcohol abuse. They concluded that in the processing of anger and disgust, orbitofrontal cortex plays a remarkable role. These authors suggested that there might have been a reduction in the functioning of these critical areas. However, even though alcohol has deleterious effects on brain functioning, there has not been any distinct explanation yet for the impairment of facial expressions. Nevertheless, our findings highlight that alcohol dependent individuals seem to be more sensitive to the feelings of threat on the faces looking at them and they are more likely to interpret those facial expressions as hostile rather than disgusted or angry.

4. 3. The Effects of Depression, State-Trait Anxiety, and Psychopathological Symptoms on the Decoding Accuracy of Emotional Facial Expressions

In particular, previous studies have indicated that there is a general tendency to find emotion-congruent effects when people interpret the ambiguity. That is, if an individual experiences a negative emotion, s/he is more likely to adopt the negative interpretation of an ambiguous stimulus than other individuals. For instance, anxiety is known to be associated with biases towards threat related information and with a bias towards the threatening interpretation of ambiguous stimuli. In other words, it was observed that anxious individuals selectively perceived threatening information such as misunderstanding of negative emotions and depressed individuals having a bias for information related to sad expression. Based on this assumption, in this study, we expected alcohol dependent individuals to display both attentional and evaluative biases towards negative emotional expressions because of their higher levels of depression and higher scores on trait anxiety. Also, by taking these symptoms as covariates, we attempted to take out their roles in the information processing system. However, our findings yielded that when state-trait anxiety level, depression level and nine psychopathological symptoms were taken as covariates, alcohol dependent individuals had impairment only in the recognition of the expression of disgust. This finding can be interpreted by explaining the nature of the emotion of disgust.

Disgust is one of the basic emotions, which is characterized by a distinctive facial expression, specific cognitive, physiological, and behavioral components. It has an evolutionary dimension and it motivates behavior leading to an avoidance of infection (Rubio-Godoy et al., 2007). It was observed that even in primates, bitter stimuli elicit disgusted expression like as three-day-old baby displays disgusted when a stinky odor was added to breast milk (Erickson and Schulkin, 2003). As can be seen, emotional expressions serve a communicative role that human beings and animals use in order to survive. By means of the emotional expression of disgust, animals learn to give aversive responses from a poisonous food. Therefore, a communicative and social function of emotional expressions causes animals to learn what is safe to eat by observing others' reactions to food. As far as it is known, chronic alcohol consumption leads to brain

dysfunction that makes individuals suffer from learning and especially spatial memory impairments (Chelune and Parker, 1981; Oubier et al., 2002). It was found that in the limbic system, septal area takes a major role in emotionally significant learning, such as avoiding aversive experiences. Similar to the interpretations of Townshend and Duka, perhaps the toxic effect of alcohol may decrease the related functioning of brain.

One possible explanation about the confusion of disgusted expressions with angry ones may include the morphological characteristics of two expressions rather than decreased functioning of brain areas. In terms of appearance characteristics, anger is the emotion most often confused with disgust (Ekman, 2003, p.184). Both have the lowered eyebrows. Also, anger is usually masked except anger-disgust expression. However, while looking at closely, there are much more differences than similarities. For instance; eyebrows are not drawn together, upper eyelids are not raised, eyelid muscles are not tense in disgusted faces. Upper lip is raised in disgusted faces like u shape however, in angry expression, lips are pressed together (narrowing the lips).

Furthermore, there has been a growing interest in the role of disgust in psychopathology especially among anxiety disorders, such as Obsessive-Compulsive Disorder-fear of contamination and Specific Phobias, even in Eating Disorders-food rejection (Davey et al., 2006; Rossignol et al., 2007).

Our research has failed to show the effect of state-trait anxiety on the identification of all emotional expressions. Our results are not consistent with those already reported in the literature that especially social anxious people show evaluative or attentional bias towards the processing of social threat. Because angry expression is universally assumed as the salient signal of threat and danger, numerous findings revealed that sub-clinically or clinically anxious individuals misinterpret angry expression (Surcinelli et al., 2006; Ioannou et al., 2004; Rossignol et al., 2007). However, there are also contrary findings in the literature. For instance, Mohlman et al. (2007) found that anxious individuals recognized the expression of anger more easily and accurately than other expressions. On the other hand, Philippot and Douilliez (2005) demonstrated that individuals with generalized anxiety disorder, social phobia, panic disorder with agoraphobia, obsessive-compulsive disorder did not exhibit any attentional

or evaluative biases in the process of threatening facial expressions. When we consider the previous studies, it is difficult to draw clear-cut conclusions about evaluative or attentional bias in anxiety.

Similarly, we hypothesized that when Beck Depression Inventory (BDI) scores were accepted as covariates, alcohol dependent group would show more evaluative bias (misinterpretation) especially toward negative expressions when compared to normal control group. However, we did not find any significant differences between our two groups. In this respect, our study did not confirm the existence of perceptual bias in depression. Indeed, so far there have been discrepant findings of the previous studies about the presence of impairments in the decoding of facial expressions. Some studies revealed that depressed patients exhibited a general deficit in recognizing negative emotional expressions mainly toward sadness, fear, and anger (Surguladze et al., Mendlewicz et al., 2005). However, similar to our findings, Weniger et al. (2004) found that depressive individuals were able to recognize all of the facial expressions as correctly as normal individuals were.

In conclusion, more or less our findings add to a growing body of evidence demonstrating an important effect of emotion on different aspects of cognitive processing.

4. 4. Reaction Times for Accurate Responses towards Emotional Facial Expressions

One of our purposes was to examine the quickness in their recognition of all seven expressions in alcohol dependent individuals and healthy control individuals. Contrary to our hypothesis, the results did not manifest any significant differences between alcohol dependent individuals and non-dependent individuals in terms of total reaction time scores toward all seven expressions. This result is not in line with previous studies (e.g. Tedstone & Coyle, 2004; Foisy, 2007). This discrepancy between the present results and those of former studies may be explained by some methodological limitations.

4. 5. The Effects of Depression, State-Trait Anxiety, and Psychopathological Symptoms on the Reaction Times for Accurate Responses towards Emotional Facial Expressions

It has been well established that clinically or non-clinically anxious individuals display an attentional bias toward the stimuli that they perceived to be threatening. Therefore, we expected them to react more rapidly than normal control group. Similarly, depression is counted as one of the disorders that affect the individuals' positive perception. Depressed individuals' negative points of view toward self, world, and future make them recognize expressions in a more negative manner, which might cause an attentional bias especially toward sadness. Based on these perspectives, we hypothesized that alcohol dependent individuals would perceive negative emotional expressions, anger, fear, sadness, and disgust more rapidly than non-dependent individuals. Nevertheless, the results demonstrated that alcohol dependent group recognized only disgust facial expression significantly faster than non-dependent individuals did. Additionally, findings indicated that BDI, STAI, and SCL-90-R did not affect reaction time scores toward happiness, surprise, and neutral facial expressions.

These results are somehow inconsistent with prior findings. There is a considerable amount of evidence have shown that especially clinically anxious individuals, particularly individuals with social phobia and generalized anxiety disorders were hyper-vigilant to threatening stimuli (e.g. Mansell et al., 2002; Mohlman, et al., 2007; Mogg et al., 2000). In our study when state and trait anxiety levels were taken under control, two groups differed in the reaction times only towards disgusted faces. Alcohol dependent individuals perceived disgusted faces more quickly than non-dependent individuals when their depression, anxiety levels were controlled.

The rapid recognition of disgusted faces of alcohol dependent inpatients may be related to their high exposure of disgusted faces from the faces looking at them rather than an existence of organic deficits. It is well documented that familiar faces are more accurately recognized than non-familiar ones (e.g. Gallegos & Tranel, 2005; Elfenbein & Ambady, 2003). Therefore, we may assume that familiar disgusted faces are more recognizable than other faces so that they are reacted faster than others. Also, one of our

findings concluded that disgusted faces were confused with angry ones by alcohol dependent inpatients. Specifically, alcohol dependent inpatients reacted faster towards disgusted expressions which were perceived as angry because of their high familiarity and high exposure levels of disgusted faces from the faces looking at them. This misperception may cause such interpersonal conflicts and also social isolation. This inference should be clarified by further research.

4. 6. Misinterpretations of Emotional Facial Expressions

In the current study, it was observed that both alcohol dependent individuals and non-dependent individuals tended to respond all expressions almost similarly. Specifically, only the group difference was obtained in the recognition of disgusted faces. Then, we decided to find out their misinterpretation of responses towards all facial expressions. Even though the total scores of inaccurate responses were less than accurate ones for both groups, unfortunately accurate scores of control group were not high as expected.

Results indicated that alcohol dependent individuals and non-dependent individuals displayed similar misjudgments toward fearful, angry, surprised, and neutral expressions except sad and disgusted. Happy expressions were not considered in this context because of their obtaining of highest recognition scores for both groups. In addition, the causes of misinterpretation of disgusted expression in alcohol dependent individuals had already been discussed. Interestingly, it was observed that non-dependent individuals perceived disgusted faces as surprised faces.

Differently from other emotional expressions, it was found that non-dependent individuals perceived sad as neutral expression. On the other hand, alcohol dependent individuals tended to misjudge sad faces as surprised faces.

Generally, the findings suggested that alcohol dependent individuals and non-dependent individuals displayed similar tendencies toward neutral faces. Both groups misjudged neutral faces as sad faces. Likewise, both groups failed to interpret angry expression correctly and they assumed them as surprised expression.

Additionally, the most confusion between emotional expressions was observed in the responses of surprised and fearful expressions for both groups. Both groups misinterpreted fearful faces as surprised faces. The lowest scores belonged to fear expressions for both groups. They exhibited a tendency to perceive surprised faces as fearful faces. However, this error rate was less than the errors of fear expressions. In other words, all participants were better in reading of surprised faces rather than fearful faces.

The misinterpretations of facial expressions of both groups and unexpected poor performance of non-dependent individuals may be explained by cultural differences. Recently, substantial cross-cultural studies have pointed out the role of culture in the identification of emotional expressions. Previous studies in which Japanese and Caucasian Facial Expressions of Emotion (JACFEE) photo set were used showed that especially Japanese individuals were different from Americans in terms of recognition of fearful faces. These studies exhibited that Japanese individuals mistook fearful faces for surprised ones same as our findings (Russell et al., 1993; Shioiri et al., 1999). Komaki et al. (2006) found that Japanese participants were not able to discriminate fearful faces properly from surprised faces. Additionally these individuals could not perceive fearful faces as a threatening stimulus. On the other hand, non-Japanese individuals easily recognized fearful expressions. In conclusion, Komaki et al. (2006) discussed their findings and explained their doubts about the universality of facial expressions. Likewise, Shioiri et al. (1999) postulated that Japanese participants had lower scores than American participants in the recognition of all universally accepted expressions that are anger, contempt, disgust, fear, happiness, sadness, and surprise. In addition, they did more errors in the expressions of anger, disgust, fear, and sadness. Surprised and happy are the easiest expressions to recognize similar to our findings. Authors explained the distinctions that Japanese people tend to mask their negative emotional expressions when the presence of an authority figures than Americans do. In this context, Japanese and Turkish cultures may share common characteristics such as collectivism. Collective cultures emphasize group cohesion, solidarity, and harmony unlike individualistic cultures, which foster autonomy, separateness, and individuality (Matsumoto et al.,

2002). People in individualistic cultures are more likely to show their emotions and they feel more freely to express their emotions than people of collectivistic cultures. This may help to explain the recognition differences between American and Japanese people who display similarities with our culture.

On the other hand, the commonality of alcohol dependent individuals and non-dependent individuals may be explained by familiarity issue. As it is known, people have more positive beliefs and attribute more positive traits toward the members of their own group. This in-group bias effect or in-group advantage or in other words, ethnic bias can be responsible for these discrepant results. Most of the studies about culture-specific recognition of facial expressions have proved that participants are more accurate in the judgment of emotional expressions in which they have greater familiarity (Elfenbein & Ambady, 2003; Beaupre & Hess, 2003). Gallegos & Tranel (2005) demonstrated that personally familiar faces were recognized both accurately and faster even they were neutral than other faces. In this respect, unfamiliar facial expressions that were used in this study might have affected the accuracy of interpretations.

Furthermore, these observed culture specific rules of decoding may be resulted from morphological characteristics of pose of faces. Namely, disgusted may be more recognizable expression than others because of its salient nose wrinkle pose. However, fearful and surprised expressions may be more difficult to categorize because of their shared pose characteristics of a face. According to Gosselin and Larocque (2000) the reason of misinterpretations are that, the more similarities one emotion shares with another, the more likely to be perceived inaccurately and to be confused with each other. This explanation can be conceivable in order to explain the confusion of fearful and surprised faces, such as raising the eyebrows together; however, this approach does not explain the confusion of sad and neutral expressions.

One of the interesting findings in our study was the confusion of the facial expressions of neutral and sadness. Specifically, both alcohol dependent and non-dependent healthy group misidentified neutral faces as sad faces. One possible explanation of this finding includes the negative perceptual bias of depression. Cognitive theories of depression proposed that depressed individuals tend to interpret

ambiguous information in a negative manner. Hence, these patients are usually expected to judge facial stimuli more negative than do controls. Mogg et al. (2006) suggested that depressed patients made more negative interpretations and they showed more negative recall than non-depressed patients did. Similarly, Leppanen et al. (2004) found that depressed individuals attributed neutral faces to sad faces and recognized neutral expressions both more slowly and less accurately than healthy participants did. However, even though we obtained that, alcohol dependent individuals scored higher in Beck Depression Scale, non-dependent individuals were not counted as depressed. Then we interpret this common point as also cultural. An alternative explanation for this outcome can be found in the literature about socio-economic status of participants. Herba & Phillips (2004) exhibited that in their study, which preschool children were used; deprived socio-economic groups were significantly at more risk for emotional difficulties. Their findings indicated that socio-economically disadvantaged children were more accurate on fearful expression. The authors suggested that exposure of high stress living conditions may cause an improvement of a bias which has a survival value. Perhaps, high stress, low income, low life standards, and decreased expectations might have caused our sample to attribute neutral stimuli to sadness. Future studies should take into account such factors.

4.7. The Roles of BDI, STAI-S, SCL-90, Recognition of Disgust and Fear Emotional Expressions in the Prediction of Alcoholism

Eventhough, we do not have enough number of participants, we examined whether alcohol dependence based on CAGE scores would be predicted by demographical variables such as age and education; by psychological symptoms scores obtained from Beck Depression Inventory, State-Trait Anxiety Inventory, and Symptom Checlikst (SCL-90) and its nine subscales-anxiety, depression, phobic anxiety, hostility, interpersonal sensitivity, obsessive-compulsion, somatization, psychotizm, and paranoid ideation; by recognition scores from each seven emotional facial expressions; and by reaction time scores toward accurately recognized facial expressions. As a result stepwise regression analyses, whereas obsessive-compulsive subscale of SCL-90,

depression level obtained from Beck Depression Inventory, and recognition accuracy scores of fearful facial expressions positively associated with the level of alcohol consumption, recognition accuracy scores of disgusted facial expression and scores from STAI- State Anxiety Form negatively associated with the presence of alcohol dependence.

These findings are in agreement with previous studies. Several studies have reported that individuals who are dependent on psychoactive substances have a higher prevalence of anxiety disorders (e.g. Gratzner et al., 2004; Ceylan & Turkcan, 2003, p.59-63; Nolen-Hoeksema, 2004; Hoes, 1997; Merikangas et al., 1998; Wetterling and Junghanns, 2000; Preisig et al., 2001; Devanand, 2002; Tedstone & Coyle, 2004; Terra et al., 2006). There is a hypothesis, which includes that alcoholism is a result of self-medication or anxiety management technique. Specifically, this hypothesis suggests that alcohol is used to reduce the anxiety levels of individuals. Although it has not been proved, previous studies revealed that there was a prevalence of 30.6% was for specific phobia, 24.7% for social phobia, 19.3% for generalized anxiety disorder, 5% for obsessive-compulsive disorder, 4.6% for posttraumatic stress disorder, and 2% for panic disorder with agoraphobia among alcohol dependent patients (Terra et al., 2006). However, none of the studies up to now has established a direct relationship between obsessive-compulsive disorder and alcoholism. Among anxiety disorders, social phobia plays a remarkable role than obsessive-compulsive disorder. Nevertheless, it is also noteworthy that alcoholism has some similarities between some aspects of obsessive-compulsive disorder in terms of *craving* features in alcoholism. The concept *craving* can be defined as “a compelling urge” intruding into thoughts and changing both mood, and behavior of an addicted individual (Janiri et al., 2004). It concerns drinking intention, and feelings in the event of conflict between desire and abstinence. The symptom checklist (SCL-90) that was given to participants has totally 10 items for measuring obsessive-compulsive characteristics of an individual. These items generally focus on the difficulty on performing daily chores and making decisions, concentration problems, and distress of unwanted and uncontrollable thoughts and behaviors (compulsions). Therefore, alcohol dependent individuals might have filled these items

while considering their severity of withdrawal, problems in the performance of daily duties during alcohol intake. The present findings highlight the need for further studies to determine the relationship between OCD and alcoholism.

Another finding of our regression analysis was that state anxiety played a negative role in the prediction of the existence of alcoholism. Most of the studies have pointed out the relationship between alcoholism and self-medication hypothesis, which is mentioned above. Briefly, this hypothesis includes that the reason of using alcohol is to decrease the tension of individual (Kushner et al., 2001). However, in our study we found an opposite direction in the relationship between alcoholism and state anxiety level of an individual. In our study, it was also found that alcohol dependent individuals did not get higher scores from STAI-S significantly from non-dependent individuals. These both findings can be resulted from medicational treatment of our alcohol dependent inpatients, since anxiolytic drugs helps to diminish situational anxiety of patients. However, since there are studies, which failed to find such a relationship between decreased State Anxiety level and increased alcohol consumption (vice versa) should be replicated by other researchers.

One of the findings in stepwise regression analysis was that depression scores predicted positively the presence of alcoholism. This result is consistent with several lines of previous work. Devanad et al. (2002) suggested that in depressed individuals, the prevalence of alcohol use/abuse is three to four times greater than in non-depressed individuals. Similarly, in a study of Gratzner et al. (2004), their findings revealed that there was a significantly higher rate of alcohol abuse or dependence in the co-morbid depression and anxiety group than in the pure anxiety disorder group. In this respect, the co-morbid depression and anxiety group seem to have the greatest risk of alcohol abuse or dependence in both females and males. Of these participants, 45% reported anxiety as the first disorder, 30% reported alcohol dependence as the first disorder, while 10% reported depression as the first disorder, and rest of 15% reported all three begun simultaneously. Briefly, depression seems to have a stronger association with alcohol misuse or alcoholism than anxiety disorders especially for females and all age groups.

However, it remains unclear whether alcoholism occurs secondary to mood and anxiety disorders or is a primary cause of these disturbances.

Fourth step in our regression analysis revealed that impaired recognition of disgusted faces predicted significant but modest ($R^2=.30$) the existence of alcoholism. Over the past decades, there has been a growing interest of in the role of disgusted facial expression in psychopathology. Kornreich et al. (2001) indicated that alcoholic patients had significantly less accuracy scores than obsessive-compulsive patients and normal individuals. Alcohol dependent individuals had impaired recognition especially towards the expressions of happiness, anger, disgust, sadness, but not fear. In another study of Kornreich et al. (2003) their results revealed that accuracy scores were significantly lower in alcohol dependent individuals than normal individuals. In line to previous studies, Townshend et al. (2003) found that alcohol dependent individuals exhibited inappropriate responses in the identification of angry and disgusted facial expressions. Accordant with the existing findings, our study confirms that alcohol dependent individuals tend to show a deficit in the recognition of disgusted expression. And inaccurate identification of disgusted facial expression seems to be contributed significantly to the explanation of alcoholism.

Final step of the regression analysis revealed that accurate recognition of fearful faces significantly predicted the presence of alcoholism. In this study, other analyses had revealed that alcohol dependent inpatients had responses that were more accurate in the identification of toward fearful expressions when compared to other expressions and non-dependent individuals. However, this difference was not statistically significant. Indeed, this finding seems to be parallel only to the findings of Townshend and Duka (2003). Their study manifested that alcohol dependent inpatients showed an enhanced intensity of fear recognition. The authors interpreted this increased fear perception may be the result of a hyperactivity of the amygdala, since neuro-psychological data suggests that fearful expressions activate amygdala (Blair et al., 2004). That interpretation may highlight the efficacy of detoxification and medical treatment on the amygdala, which had become damaged due to long-term alcohol dependence. Surely, further studies are

required to clarify the association of the dysfunction of amygdala with increased fear recognition.

To sum up, this regression analysis provided further evidences in the explanation of alcoholism. More or less, these findings can highlight new treatment models and can imply further research issues.

4. 8. General Discussion and Conclusions

The current study examined the presence of any impairment in the recognition of emotional facial expressions in alcohol dependence. It was also investigated the existence of attentional and evaluative bias of state-trait anxiety and depression by measuring the reaction times of facial expressions. At the end of study, we concentrated on what kind of variables would predict an existence of alcoholism.

To begin with, our findings have confirmed the existing literature that alcohol dependence co-morbid to anxiety disorders and depression. We found that alcohol dependent individuals obtained higher scores on both State-Trait Anxiety Inventory and Beck Depression Inventory.

On the other hand, the general results did not support our hypothesis that alcohol dependent group would have less accurate scores than non-dependent group in the recognition of all emotional expressions. However, it was found that alcohol dependent group differed significantly from non-dependent group only in the identification of disgusted expression. Specifically, alcohol dependent group did more errors in decoding of disgusted faces, which were confused with angry ones. This misinterpretation is consistent with several studies (e.g. Townshend & Duka, 2003; Philippot et al., 1999). These authors interpreted this confusion as the damage or a reduction in the functioning of orbitofrontal cortex, which plays the major role in discriminating of these emotions because of long-term alcohol misuse. The misjudgment of anger expression may suggest that alcohol dependent individuals feel more sensitive to threat from faces looking at them and they are more likely to judge facial expressions as hostile rather than disgusted or angry faces. Thus, inaccurate decoding of these expressions may cause

alcohol dependent individuals to misunderstand their friends or relatives' intentions and feelings, which interrupt the flow of conversation and may result more social-isolation.

Interestingly, findings revealed that both alcohol dependent and non-dependent individuals discriminated fearful faces less than other emotional expressions. Both groups had the minimum scores toward fearful faces when compared to other expressions. Instead, they misinterpret fearful faces as surprised faces. However, it is difficult to explain why non-dependent individuals showed a similar tendency. Additional to this confusion, both groups had similar misjudgments toward anger and neutral expressions except sadness and disgust. As predicted, happy expressions were the most recognizable expression for both groups. This finding is in agreement with previous studies.

On the other hand, our regression analysis demonstrated that correct recognition of fearful faces was one of the predictors in the presence of alcohol dependence. One possible explanation depends on a neuro-psychological approach, which is that the increased fear perception is a kind of overcompensation of the amygdala (Townshend & Duka, 2003; Blair et al., 2004). This interpretation may highlight the efficacy of detoxification and medical treatment of the amygdala. An alternative explanation for this finding includes socio-economic status of alcohol dependent inpatients. According to Herba & Phillips (2004) deprived socio-economic level significantly causes greater risk for emotional difficulties. The authors stated that exposure of high stress, low income, low life standards, and decreased expectations may play a role in the improvement of the perception of fearful expressions. Further studies may focus on the socio-economic status of participants in terms of emotional perception.

Furthermore, we tested the impacts of depression, state-trait anxiety levels, and nine psychopathological symptoms (Somatization, Obsessive-Compulsions, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Psychotism, Paranoid Ideation, and Phobic Anxiety) on the recognition of facial expressions and reaction times toward these facial expressions to point out the presence of attentional or evaluative bias of depression and state-trait anxiety. Surprisingly, our findings manifested that alcohol dependent group differed only in the identification of disgusted faces. And they reacted

towards disgusted faces more rapidly than non-dependent groups. In other words, alcohol dependent individuals recognized less but responded faster towards disgusted expression than non-dependent individuals did when depression, state-trait anxiety levels were controlled. Therefore, our findings have suggested that there has an impact of depression and state-trait anxiety levels on the identification of facial expressions.

The literature up to now has contained discrepant findings about selective attention or misinterpretation of depression and state-trait anxiety in the recognition of facial expressions. Whereas, it has been difficult to infer stable conclusions from both our study and previous studies, the impairment and rapid reactions to disgusted faces in alcohol dependence should be reconsidered.

To conclude, this study has provided further evidences for impaired recognition of emotional facial expressions in the alcohol dependent group when compared to the control group. In addition, it implies the roles of depression and state-trait anxiety in information processing system.

4. 9. Limitations of the Present Study

Surely, some limitations need to be acknowledged in our study.

For both alcohol dependent and non-dependent samples, besides using self-reported measures, a use of a computerized Emotional Recognition Test might constitute one of the methodological limitations. Because, computerized material was novel and its psychometric properties were not documented. Also, it may need more sophistication than just filling in the self-report inventories. Therefore, some of the participants may not feel familiar to computerized material, which may affect the performances.

One of the important limitations may be that all data were collected during business hours for the control group, even though interruptions were prevented, this factor may cause a decline in their performances. This might have restricted the validity of our findings.

The selection of the control group may constitute a weakness of our study. They were chosen mostly from courthouses, from different positions; nevertheless, they may not be a representative of a population.

Additionally, the control group of this study represented non-clinical individuals. Thus, they should have been asked whether they were in treatment for any psychological disorder, if so they should have been excluded from the study. Only potential alcohol dependent individuals and psychotics were excluded.

One of the important shortcomings of our study may be a low number of all participants, even though experimental studies require low number of participants when compared to general studies, this situation inevitably may reduce the ecological validity.

Another potential problem is related to medication of alcohol dependent inpatients. All of the patients were under treatment when they were administered to all measures. The impact of medication (anxiolytics or antidepressants) could reduce particularly the state anxiety levels of patients and affect the reaction time scores. As a result, this might have affected their ratings of their feelings of anxiety on both State Anxiety Inventory and the accuracy level on recognition of facial expressions. It could have been better to study the first time alcohol dependent patients who were not under medication. However, as this condition was rare, the patients under medication were conveniently included to the study.

One of the limitations is related with the time of administration of all measures to alcoholic inpatients. Indeed, it could have been better to test them after their hospitalization process is over. Because, their anxiety levels resulting from withdrawal of alcohol abuse could have affected their scores on State –Trait Anxiety Inventory and Symptom Checklist. Nevertheless, it would be more difficult to reach the individuals after their hospitalization are ended because of their settlements out of İstanbul.

Finally, one of the critical weaknesses of our study is about gender issue. Hence, in almost all societies to reach female alcohol dependent individuals is very difficult, therefore we decided to use only male individuals. The present study should have rather included a mixed-gender sample of both groups. A large body of evidences has shown that females are more skilled in emotion processing because of their empathy, emotional understanding abilities (e.g. Herba & Phillips, 2004; Thayer & Johnsen, 2000). Therefore, in order to test this assumption and to determine whether there would be

accuracy differences in the identification of facial expressions and their pattern of errors, it is prominent to carry out a study in which females will participate.

4. 10. Clinical Implications

Emotion identification is very critical for social interaction and daily functioning. The ability to recognize facial expressions is an important component of social interaction in order to interpret the intentions, goals, opinions and attitudes of people (Erickson & Schulkin, 2003; Batty & Taylor, 2003). It is very important to know how people experience emotions in terms of the quality of relationship. However, any small impairment in the recognition of facial expressions may interrupt the flow of conversation and hence may cause interpersonal conflicts.

Alcoholism is characterized by multiple neuropsychological dysfunctions and by profound interpersonal relationship problems and social isolation (Kornreich, et al., 2001). As predicted, alcohol dependent participants were found as less accurate in identifying seven emotional expressions (happiness, sadness, fear, anger, surprise, disgust, and neutral) although we failed to reach statistical significance. Specifically, alcohol dependent individuals showed a significant error rate in decoding of disgusted expression. Instead, they misjudge disgusted faces as angry ones. This can be a toxic result of heavy alcohol consumption. The misjudgment may suggest that alcohol dependent individuals are more sensitive to the feelings of threat on faces looking at them and they are more likely to interpret facial expressions as hostile rather than disgusted or angry. Also, the number of fear recognition in alcohol dependents was much more than non-dependents, this issue should be replicated.

Furthermore, stepwise multiple regression analysis indicated that obsessive-compulsive subscale of symptom checklist, Beck Depression Inventory, STAI-State Form, and the recognition of fearful as well as disgusted expressions were associated with alcoholism. Briefly, this analysis highlight that the increased fear recognition, decreased disgust recognition and the existence of depression and obsessive-compulsive features, and reduced state anxiety levels are related with the alcohol dependence. In order to find out most appropriate treatment model of alcoholism, it is also important to

understand the nature of alcoholism. Thereby, the implications of regression analysis may be considered.

Similar findings were obtained when state-trait anxiety levels, depression, and other psychopathological symptoms were taken as covariates. In other words, alcohol dependent individuals recognized less but responded faster toward disgusted expressions than non-dependent individuals when covariates were considered. Surely, it has been well established that anxious individuals exhibit an attentional bias toward threat cues. This bias may play an important role in the development and maintenance of anxiety. If these biases provoke anxiety states, then removal of biases can be a target of treatment. However, when we consider our findings that failed to indicate the existence of any bias, then treatment can be regenerated through this novel finding.

Specifically, our general findings provide more information to the clinicians in order to realize the co-morbid disorders, cognitive impairments, and social isolation of long-term alcohol abuse in a more comprehensive manner. Consequently, new treatment techniques can be produced through decreased inaccurate decoding and reduced functioning of brain areas that are responsible for the process of disgusted expression.

As conclusion, most of the literature up to now has focused on cognitive deficiencies of long-term alcohol abuse. In the current study, the main objective was to determine whether the alcohol dependence would decrease the ability of emotional facial expressions. In terms of the design and objectives, this is the first study in Turkey on the identification of emotional facial expressions in alcohol dependent individuals.

4. 11. Directions for Future Research

The results of the present study in general did not support our hypothesis, which was that alcohol dependent individuals would show inaccurate identification of facial expressions. Additional studies are needed to clarify the nature of this relationship. Future research should examine the presence of any impairment both in a larger sample and with a mixed-gender sample. Because considerable amount of evidences have proved that females are better in detecting and decoding facial expressions. They have been also found as more emotionally expressive than males (e.g. Herba & Phillips, 2004;

Thayer & Johnsen, 2000). Moreover, it may be advisable for future studies to use instrument, which are as ecologically valid as possible.

In order to find out the relationship between interpersonal problems and impairments in the recognition of facial expressions properly, it will be better to use a measure such as Inventory of Interpersonal Problems. Thus, if interpersonal difficulties are reported, these difficulties can be correlated with facial decoding problems. Then, it will be proved that non-verbal emotional cues play an important role in maintenance of interpersonal communication.

Furthermore, common identifications of facial expressions of both groups let us consider some cultural elements. The confusion of fearful and surprised faces, the misjudgment of neutral faces as sad ones can be counted as the examples of the commonalities. Perhaps, environmental conditions and socio-economic status may take role in these misinterpretations. Definitely, concept of the universality of facial expressions and their recognitions may need to be reconsidered. Similarly, our findings yielded that there was an increased recognition in fearful expression in alcohol dependent individuals, eventhough this difference did not reach a statistical significance. Therefore, further research is needed to resolve these issues.

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APPENDICES

Appendix A

DEMOGRAPHICAL INFORMATION

1. ID No:
2. Tarih:
3. Ad ve Soyadınız:
4. Yaşınız:
5. Oturduğunuz şehir:
6. Mesleğiniz:
 - a. İşçi
 - b. Memur
 - c. Serbest Meslek
 - d. Emekli
 - e. Sanatçı
 - f. Ev hanımı
 - g. İşsiz
 - h. Diğer
7. Eğitiminiz:
 - a. Okuma yazma biliyorum
 - b. İlkokul mezunu
 - c. Ortaokul mezunu
 - d. Lise mezunu
 - e. Üniversite mezunu
 - f. Yüksek lisans ya da doktora
8. Hayatınızda en uzun süre oturduğunuz yer:
 - a. Büyükşehir
 - b. Şehir
 - c. Kasaba
 - d. Köy
9. Medeni Durumunuz:
 - a. Bekar
 - b. Evli
 - c.Boşanmış
 - d. Ayrı Yaşıyor
10. Çocuğunuz var mı?
 - a. Vartane
 - b. Yok
11. Ailenizde sizden başka alkol kullanan var mı? Var ise kaç yıldır devam ediyor?
.....
12. Alkol sorununuz kaç yıldır devam ediyor?
.....
13. Alkol sorunu nedeniyle kaç kez hastaneye yattınız?
.....
14. Sizce alkol sorununuzun nedeni nedir?
.....

Appendix B

CAGE ALCOHOL USE INVENTORY

1. Şimdiye kadar içmeyi kesmeniz ya da azaltmanız gerektiğini hissettiniz mi?
a. Evet b. Hayır
2. İçmenizle ilgili olarak başkalarının eleştirilerinden sıkıldığınız oldu mu?
a. Evet b. Hayır
3. Hiç şimdiye kadar içmenizden dolayı kendinizi kötü ya da suçlu hissettiniz mi?
a. Evet b. Hayır
4. Hiç şimdiye kadar sınırlerinizi yatıştırmak ya da akşamdan kalma halinizi gidermek amacıyla sabah ilk iş olarak içtiniz mi?
a. Evet b. Hayır

Appendix C

BECK DEPRESSION INVENTORY (BDI)

YÖNERGE: Her gruptaki cümleleri dikkatle okuyunuz ve BUGÜN Dahil, GEÇEN HAFTA içinde kendinizi nasıl hissettiğinizi en iyi anlatan cümleyi seçiniz. Seçmiş olduğunuz cümlenin yanındaki numarayı daire içine alınız.

1. 0 Kendimi üzüntülü ve sıkıntılı hissetmiyorum.
1 Kendimi üzüntülü ve sıkıntılı hissediyorum.
2 Hep üzüntülü ve sıkıntılıyım. Bundan kurtulamıyorum.
3 O kadar üzüntülü ve sıkıntılıyım ki artık dayanamıyorum.
2. 0 Gelecek hakkında umutsuz ve karamsar değilim.
1 Gelecek hakkında karamsarım.
2 Gelecekte beklediğim hiçbir şey yok.
3 Geleceğim hakkında umutsuzum ve sanki hiç bir şey düzelmeyecekmiş gibi geliyor.
3. 0 Kendimi başarısız bir insan olarak görmüyorum.
1 Çevremdeki bir çok kişiden daha çok başarısızlıklarım olmuş gibi hissediyorum.
2 Geçmişime baktığımda başarısızlıklarla dolu olduğumu görüyorum.
3 Kendimi tümüyle başarısız bir kişi olarak görüyorum.
4. 0 Birçok şeyden eskisi kadar zevk alıyorum.
1 Eskiden olduğu gibi her şeyden hoşlanmıyorum.
2 Artık hiçbir şey bana tam anlamıyla zevk vermiyor.
3 Her şeyden sıkılıyorum.
5. 0 Kendimi herhangi bir şekilde suçlu hissetmiyorum.
1 Kendimi zaman zaman suçlu hissediyorum
2 Çoğu zaman kendimi suçlu hissediyorum.
3 Kendimi her zaman suçlu hissediyorum.
6. 0 Kendimden memnunum.
1 Kendimden pek memnun değilim.
2 Kendime çok kızıyorum.
3 Kendimden nefret ediyorum.
7. 0 Başkalarından daha kötü olduğumu sanmıyorum.
1 Zayıf yanlarım ya da hatalarım için kendi kendimi eleştiririm.
2 Hatalarımdan dolayı her zaman kendimi kabahatli bulurum.
3 Her aksilik karşısında kendimi kabahatli bulurum.

8. 0 Kendimi öldürmek gibi düşüncelerim yok
1 Zaman zaman kendimi öldürmeyi düşündüğüm oluyor fakat yapmıyorum
2 Kendimi öldürmek isterdim.
3 Fırsatını bulsam kendimi öldürürüm.
9. 0 Her zamankinden fazla içimden ağlamak gelmiyor.
1 Zaman zaman içimden ağlamak geliyor.
2 Çoğu zaman ağlıyorum.
3 Eskiden ağlayabilirdim şimdi istesem de ağlayamıyorum.
10. 0 Şimdi her zaman olduğumdan daha sinirli değilim.
1 Eskisine kıyasla daha kızıyor ya da sinirleniyorum.
2 Şimdi hep sinirliyim.
3 Bir zamanlar beni sinirlendiren şeyler şimdi hiç sinirlendirmiyor.
11. 0 Başkaları ile görüşmek, konuşmak isteğimi kaybetmedim.
1 Başkaları ile eskisinden daha az konuşmak, görüşmek istiyorum.
2 Başkaları ile konuşma ve görüşme isteğimi kaybettim.
3 Hiç kimseyle görüşüp, konuşmak istemiyorum.
12. 0 Eskiden olduğu kadar kolay karar verebiliyorum.
1 Eskiden olduğu kadar kolay karar veremiyorum.
2 Karar verirken eskisine kıyasla çok güçlük çekiyorum.
3 Artık hiç karar veremiyorum.
13. 0 Aynada kendime baktığımda bir değişiklik görmüyorum.
1 Daha yaşlanmışım ve çirkinleşmişim gibi geliyor
2 Görünüşümün çok değiştiğini ve daha çirkinleştiğimi hissediyorum.
3 Kendimi çok çirkin buluyorum.
14. 0 Eskisi kadar iyi çalışabiliyorum
1 Bir şeyler yapabilmek için gayret göstermek gerekiyor.
2 Herhangi bir şeyi yapabilmek için kendimi çok zorlamam gerekiyor.
3 Hiçbir şey yapamıyorum.
15. 0 Her zamanki gibi iyi uyuyabiliyorum
1 Eskiden olduğu gibi iyi uyuyabiliyorum.
2 Her zamankinden 1-2 saat daha erken uyanıyorum ve tekrar uyuyamıyorum.
3 Her zamankinden çok daha erken uyanıyorum ve tekrar uyuyamıyorum.
16. 0 Her zamankinden daha çabuk yorulmuyorum.
1 Her zamankinden daha çabuk yoruluyorum.
2 Yaptığım hemen herşey beni yoruyor.
3 Kendimi hiçbir şey yapamayacak kadar yorgun hissediyorum

17. 0 İřtahım her zamanki gibi
1 İřtahım eskisi kadar iyi deęil.
2 İřtahım ok azaldı
3 Artık hi iřtahım yok

18. 0 Son zamanlarda kilo vermedim
1 İki kilodan fazla verdim
2 Dört kilodan fazla kilo verdim
3 Altı kilodan fazla kilo verdim.

Daha az yiyerek kilo vermeye alıřıyorum.

Evet

Hayır.....

19. 0 Saęlıęım beni fazla endiřelendirmiyor.
1 Aęrı, sancı, mide bozukluęu veya kabızlık gibi rahatsızlıklar beni endiřelendiriyor.
2 Saęlıęım beni endiřelendirdięi iin bařka Őeyler dūřünmek zorlařıyor.
3 Saęlıęım hakkında o kadar endiřeliyim ki bařka hibir Őey dūřünemiyorum.

20. 0 Son zamanlarda cinsel konulara olan ilęimde bir deęiřme fark etmedim.
1 Cinsel konularla eskisinden daha az ilęiliyim.
2 Cinsel konularla Őimdi ok daha az ilęiliyim
3 Cinsel konulara olan ilęimi tamamen kaybettim

21. 0 Bana cezalandırılmıřım gibi gelmiyor.
1 Cezalandırılabilceęimi seziyorum
2 Cezalandırılmayı bekliyorum
3 Cezalandırıldıęımı hissediyorum.

Appendix D

STATE-TRAIT ANXIETY INVENTORY (STAI)

Yönerge: Aşağıdaki kişilerin kendilerine ait duygularını anlatmakta kullandıkları bir takım ifadeler verilmiştir. Her ifadeyi okuyun, sonra da on anda nasıl hissettiğinizi ifadelerin sağ tarafındaki seçeneklerden uygun olanını daire içine alın. Doğru ya da yanlış yanıt yoktur. Herhangi bir ifadenin üzerinde fazla zaman harcamadan anında nasıl hissettiğinizi gösteren yanıtı işaretleyin.

	Hiç	Biraz	Çok	Tamamıyla
1. Şu an sakinim	1	2	3	4
2. Kendimi emniyette hissediyorum.	1	2	3	4
3. Şu an sinirlerim gergin.	1	2	3	4
4. Pişmanlık duygusu içindeyim	1	2	3	4
5. Şu anda huzur içindeyim	1	2	3	4
6. Şu anda hiç keyfim yok	1	2	3	4
7. Başıma geleceklerden endişe ediyorum.	1	2	3	4
8. Kendimi dinlenmiş hissediyorum.	1	2	3	4
9. Şu anda kaygılıyım.	1	2	3	4
10. Kendimi rahat hissediyorum.	1	2	3	4
11. Kendime güvenim var	1	2	3	4
12. Şu anda asabım bozuk.	1	2	3	4
13. Çok sinirliyim	1	2	3	4
14. Sinirlerimin çok gergin olduğunu hissediyorum.	1	2	3	4
15. Kendimi rahatlamış hissediyorum	1	2	3	4
16. Şu anda halimden memnunum	1	2	3	4

	Hiç	Biraz	Çok	Tamamıyla
17. Şu anda endişeliyim.	1	2	3	4
18. Heyecandan endimi şaşkına dönmüş hissediyorum.	1	2	3	4
19. Şu anda sevinçliyim	1	2	3	4
20. Şu anda keyfim yerinde	1	2	3	4

Yönerge: Aşağıdaki kişilerin kendilerine ait duygularını anlatmakta kullandıkları bir takım ifadeler verilmiştir. Her ifadeyi fazla zaman harcamadan okuyun, sonra da genelde nasıl hissettiğinizi ifadelerin sağ tarafındaki seçeneklerin uygun olanını daire içine alın. Doğru ya da yanlış yanıt yoktur.

	Hiçbir zaman	Bazen	Çoğu zaman	Her zaman
21. Genellikle keyfim yerindedir.	1	2	3	4
22. Genellikle çabuk yorulurum.	1	2	3	4
23. Genellikle kolay ağlarım.	1	2	3	4
24. Başkaları kadar mutlu olmak isterim.	1	2	3	4
25. Çabuk karar veremediğim için fırsatları kaçıyorum.	1	2	3	4
26. Kendimi dinlenmiş hissedirim	1	2	3	4
27. Genellikle sakın, kendime hakim ve soğukkanlıyım	1	2	3	4
28. Güçlüklerin yenemeyeceğim kadar biriktiğini hissedirim.	1	2	3	4
29. Önemsiz şeyler hakkında kaygılanırım.	1	2	3	4
30. Genellikle mutluyum.	1	2	3	4
31. Herşeyi ciddiye alır ve etkilenirim.	1	2	3	4
32. Genellikle kendime güvenim yoktur.	1	2	3	4
33. Genellikle kendimi emniyette hissedirim.	1	2	3	4
34. Sıkıntılı ve güç durumlarla karşılaşmaktan çekinirim.	1	2	3	4
35. Genellikle kendimi hüznü hissedirim.	1	2	3	4
36. Genellikle hayatımdan memnunum.	1	2	3	4

	Hiçbir zaman	Bazen	Çoğu zaman	Her zaman
37. Olur olmaz düşünceler beni rahatsız eder.	1	2	3	4
38. Hayal kırıklıklarımı öylesine ciddiye alırım ki hiç unutamam.	1	2	3	4
39. Aklı başında ve kararlı bir insanım.	1	2	3	4
40. Son zamanlarda kafama takılan konular beni tedirgin eder.	1	2	3	4

Appendix E

THE SYMPTOM CHECKLIST (SCL-90-R)

Yönerge: Aşağıda zaman zaman herkeste rastlanılabilecek şikayetlerden oluşan bir liste verilmiştir. Her soruyu dikkatle okuyunuz. Sözü geçen problemlerin son 1 Hafta içinde sizi ne ölçüde rahatsız ettiğini göz önünde tutarak, yandaki sütundaki rakamlardan birini işaretleyiniz. Hiçbir soruyu atlamayınız.

0 Hayır hiç

1 Biraz

2 Orta Derecede

3 Fazla

4 Çok Fazla

1. Baş Ağrıları	0	1	2	3	4
2. Sinirlilik veya içinizin titrediği hissi	0	1	2	3	4
3. Kafanızdan atamadığınız, tekrarlayan, hoşça gitmeyen düşünce ve sözcükleri	0	1	2	3	4
4. Baygınlık hissi veya baş dönmesi	0	1	2	3	4
5. Cinsel ilgi, istek ya da hazda azalma	0	1	2	3	4
6. Başkalarını eleştirmeye yatkınlık	0	1	2	3	4
7. Herhangi birinin düşüncelerini yönetebileceğiniz hissi	0	1	2	3	4
8. Zorluk ve sıkıntılarınızdan başkalarından sorumlu olduğunuz duygusu	0	1	2	3	4
9. Hafıza zayıflığı, hatırlamada güçlük	0	1	2	3	4
10. Sakarlık, dikkatsizlik veya ihmallerin sizi rahatsız etmesi	0	1	2	3	4
11. Kolayca sinirlenme veya huzursuz olma	0	1	2	3	4
12. Kalp veya göğüs üzerinde ağrı	0	1	2	3	4
13. Cadde veya açık alanlarda korku duyma	0	1	2	3	4
14. Enerji, güç azalması, hareket ve düşüncede yavaşlama	0	1	2	3	4
15. Yaşamınıza kendi elinizle son verme düşüncesi	0	1	2	3	4
16. Başkalarının duymadığı sesler işitme	0	1	2	3	4
17. Titreme	0	1	2	3	4
18. İnsanların çoğuna güvenilemeyeceği duygusu	0	1	2	3	4

19. İştahsızlık	0	1	2	3	4
20. Ağlamaya yatkınlık	0	1	2	3	4
21. Karşı cinsle ilişkilerde çekingenlik, çaresizlik	0	1	2	3	4
22. Tuzağa düşürülme, kapana kısıtılma duygusu	0	1	2	3	4
23. Nedensiz ani korkular	0	1	2	3	4
24. Kontrol edemeyeceğiniz öfke nöbeti ve duygusal patlamalar	0	1	2	3	4
25. Yalnız olarak evden çıkmaktan korku duyma	0	1	2	3	4
26. Bazı konularda kendini suçlama eğilimi	0	1	2	3	4
27. Bel ağrıları	0	1	2	3	4
28. Herhangi bir işe başlamada ve sürdürmede zolanma hissi	0	1	2	3	4
29. Yalnızlık hissi	0	1	2	3	4
30. Hüzün, iç sıkıntısı	0	1	2	3	4
31. Gereğinden çok tasalanma ve endişelenme	0	1	2	3	4
32. Hiçbir şeye ilgi duymama	0	1	2	3	4
33. Ürkeklik, korku duyma	0	1	2	3	4
34. Duygularınızın kolayca incinebilmesi ve alınganlık	0	1	2	3	4
35. Özel ve gizli düşüncelerinizin başkaları tarafından bilindiği hissi	0	1	2	3	4
36. Başkalarının sizi anlamadığı ve size ilgisiz olduğu duygusu	0	1	2	3	4
37. Başkalarının size dostça davranmadığı, sizden hoşlanmadığı duygusu	0	1	2	3	4
38. Doğru ve eksiksiz olmasını garantilemek için herşeyi çok yavaş yapma gereksinimi	0	1	2	3	4
39. Kalbinizin çok hızlı atması veya çarpması	0	1	2	3	4
40. Midede nahoş duygular ya da bulantı	0	1	2	3	4
41. Başkaları karşısında aşağılık duygusu	0	1	2	3	4
42. Kas ağrı ve sızıları	0	1	2	3	4
43. Başkalarının sizi gözlediği veya hakkınızda konuştuğu duygusu	0	1	2	3	4
44. Uykuya dalmakta güçlük çekme	0	1	2	3	4
45. Yaptığınız işleri tekrar tekrar kontrol etme zorunluluğu hissetme	0	1	2	3	4

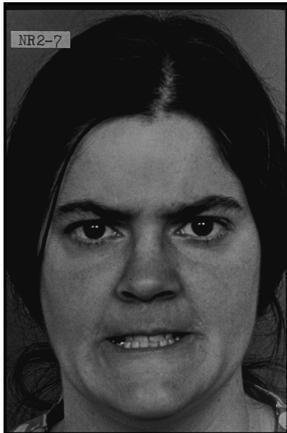
46. Karar vermede güçlük çekme	0	1	2	3	4
47. Otobüs, trende yolculuk etmekten korkma	0	1	2	3	4
48. Nefes almada güçlük çekme	0	1	2	3	4
49. Nöbetler şeklinde ateş basması veya buz kesmesi	0	1	2	3	4
50. Sizi korkuttuğu için belirli olay, yer ve nesnelere uzak durma	0	1	2	3	4
51. Zihinde boşluk duygusu	0	1	2	3	4
52. Bedeninizin çeşitli yerlerinde hissizlik, uyuşma veya karıncalanma	0	1	2	3	4
53. Boğazınızda yumru tıkanıp hissi	0	1	2	3	4
54. Gelecekle ilgili umutsuzluk	0	1	2	3	4
55. Dikkatinizi toplamada güçlük çekme	0	1	2	3	4
56. Bedeninizin bazı kısımlarında güçsüzlük	0	1	2	3	4
57. Gerginlik veya tedirginlik hissi	0	1	2	3	4
58. Kol ve bacaklarda ağırlık hissi	0	1	2	3	4
59. Ölüm veya ölmekle ilgili düşünceler	0	1	2	3	4
60. Aşırı yemek yeme	0	1	2	3	4
61. Başkaları size bakarken, hakkınızda konuşurken huzursuzluk ve rahatsızlık duyma	0	1	2	3	4
62. Aklınıza size ait olmayan düşüncelerin gelmesi	0	1	2	3	4
63. Birisine zarar ve acı verme, dövme, yaralama isteği	0	1	2	3	4
64. Sabahları erken uyanma	0	1	2	3	4
65. Dokunma, sayma ve yıkama gibi davranışları zorunluluk hissederek tekrarlama	0	1	2	3	4
66. Huzursuz, rahatsız uyku veya uykunuzun bölünmesi	0	1	2	3	4
67. Birşeyleri kırmak veya parçalamak için dayanılmaz istek duyma	0	1	2	3	4
68. Başkalarının paylaşmadığı düşünce, görüş ve inançlarının olması	0	1	2	3	4
69. Başkaları ile birlikteyken konuşma ve davranışlarınıza dikkat etme zorunluluğu hissetme	0	1	2	3	4
70. Sinema ve alışverişte olduğu gibi kalabalıktan huzursuzluk duyma ve kaçınma	0	1	2	3	4
71. Herşeyin çok zor ve yorucu olduğu duygusu	0	1	2	3	4

72. Dehşet ve paniğe kapılma nöbetleri	0	1	2	3	4
73. Topluluk içinde yiyip içerken husursuzluk duyma	0	1	2	3	4
74. Sık sık tartışmalara girme ya da iddialaşma	0	1	2	3	4
75. Yalnız kaldığımızda sinirlilik veya huzursuzluk hissi	0	1	2	3	4
76. Başarılarınızın başkaları tarafından yeterince takdir edilmediği hissi	0	1	2	3	4
77. İnsanlarla birlikteyken bile yalnızlık duyma	0	1	2	3	4
78. Yerinizde duramayacak ölçüde huzursuzluk hissi	0	1	2	3	4
79. Değersizlik duyguları	0	1	2	3	4
80. Başınıza kötü birşey geleceği hissi	0	1	2	3	4
81. Yüksek sesle bağırma veya birşeyler fırlatma hissi	0	1	2	3	4
82. Topluluk içinde bayılmaktan korkma	0	1	2	3	4
83. Eğer fırsat verirsiniz insanların sizi kullanacağı duygusu	0	1	2	3	4
84. Cinsellikle ilgili oldukça rahatsız edici hayal, düşünce ve duygularınızın olması	0	1	2	3	4
85. Suç ve günahlarınızdan dolayı cezalandırılmanız gerektiği düşüncesi	0	1	2	3	4
86. Dehşet veya korku uyandıran düşünce ve hayaller	0	1	2	3	4
87. Bedeninizde ciddi bir bozukluk olduğu düşüncesi	0	1	2	3	4
88. Başka birine karşı gerçek bir yakınlık duymama hissi	0	1	2	3	4
89. Suçluluk duygusu	0	1	2	3	4
90. Aklınızda herhangi bir bozukluk olduğu düşüncesi	0	1	2	3	4

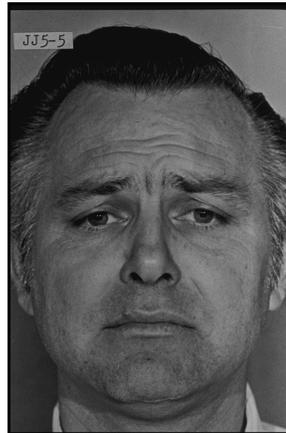
Appendix F

SAMPLE of BASIC EMOTIONAL FACIAL EXPRESSIONS

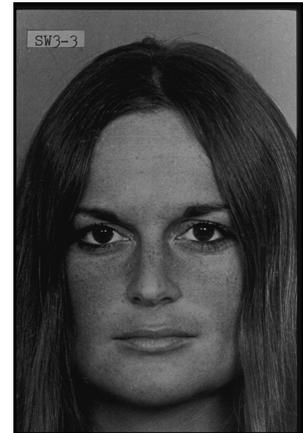
ANGRY



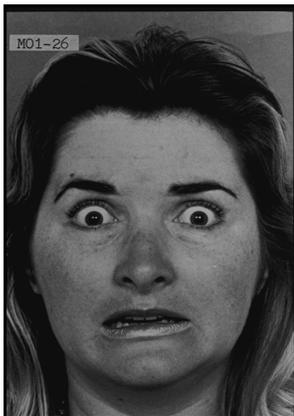
SAD



NEUTRAL



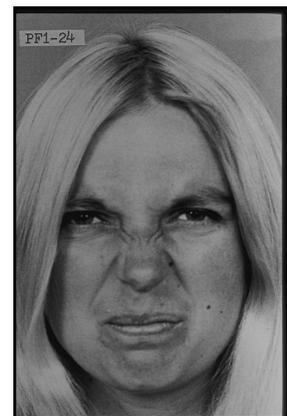
FEARFUL



HAPPY



DISGUSTED



SURPRISED

