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ANXIETY AND DIVING SPORTS

KAYGI VE DALIŞ SPORLARI

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ABSTRACT

Anxiety, which has been accepted since the existence of human beings, has a general purpose. In the past, this purpose was an instinct to protect people against environmental dangers. But now, anxiety is experienced as a necessity of being alive, struggling with life, discovering new things, doing more positive things in a competitive environment and being accepted. As can be understood, anxiety is a reaction of the individual to various destructive and disruptive situations towards his existence. In addition to this positive feature of anxiety, it also has harmful aspects, reaching pathological levels. Another area where anxiety is actively felt is sports. Anxiety in sports has been the subject of many studies and studies have been conducted on the effect of anxiety on the athlete and his performance. When sports types were divided into individual and team, studies were examined on more groups. Many studies have shown that not only does the sport or activity increase anxiety, but when it is done amateurishly and without a focus on results, anxiety decreases. It has been discussed by many sports scientists and healthcare professionals that doing sports on a professional level can be a supporter for not only increasing anxiety but also increasing self-confidence and, as a result, success. Scientists continue to conduct research on the personal and environmental factors that lead to this state of anxiety that affects athletes.

Keywords: Anxiety, Diving, Sport, Recreation

ÖZET

İnsanoğlunun varoluşundan bu yana varlığı kabul edilen kaygının genel bir amacı vardır. Geçmiş zamanlarda bu amaç insanı çevresinden gelecek tehlikelere karşı korumaya yönelik bir içgüdüydü. Ama artık kaygı canlılığın, yaşamla mücadele etmenin, yeni şeyler keşfetmenin, rekabet ortamında daha olumlu işler yapabilmenin ve kendini kabul ettirebilmenin bir gereği olarak yaşanmaktadır. Anlaşılacağı üzere kaygı; bireyin kendi varlığına yönelik çeşitli yıkıcı, bozucu durumlara karşı bir tepkisidir. Kaygının bu olumlu özelliği yanında patolojik boyutlara varmasıyla zararlı tarafları da vardır Kaygının aktif olarak hissedildiği bir diğer alan ise spordur. Sporda kaygı birçok araştırmaya konu olmuş ve kaygının sporcuya ve performansı etkisi üzerine çalışmalar yapılmıştır. Sporlar türleri bireysel ve takım olarak ayrıldıklarında ise çalışmalar daha fazla gruplar üzerinde incelenmiştir. Yapılan sporun veya aktivitenin kaygı durumunu arttırmasının yanında, amatör ve sonuç odağı olmaksızın yapıldığında kaygının düştüğü de birçok araştırmaya sonuç olmuştur. Sporun profesyonel boyutta yapılması da kaygının artışının yanında özgüven artışı ve sonucunda başarı için bir destekleyici olabileceği pek çok spor bilimci ve sağlıkçı tarafından tartışılagelmiştir. Bilim insanları sporcuları etkileyen bu kaygı durumuna yol açan kişisel ve çevresel faktörler üzerine araştırmalar yapmaya devam etmektedirler.

Anahtar Kelimeler: Dalış, Kaygı, Rekreasyon, Spor

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INTRODUCTION

The word anxiety derives its origin from the ancient Greek word "anxietas", which is tried to be explained in the Turkish language with words such as distress, worry, and anxiety. It is simply an uncomfortable feeling of anxiety and fear that is life-threatening or perceived as a threat. Danger or the possibility of danger from the internal or external world: It is an emotional state experienced in response to any situation perceived and interpreted by the person as dangerous. The concept of anxiety first appeared in the Gilgamesh epic, written around 3000 BC(Şahin, 2019). In this epic, Gilgamesh expresses his concerns about his immortality. In the 17th century, scientists used different terms for axiomatic states, such as intense restlessness, restlessness, and anxiety(Horwitz, 2013). Otto Domrich was the first person to talk about "anxiety attacks" in the field of medical psychology in the mid-17th century. After the French Revolution, this concept was defined as neuro-circulatory neurasthenia, soldier's heart, and hyperventilation syndrome. In 1847, Feuchtersleben observed the symptoms of anxiety caused by organic diseases for the first time. In 1866, Morel mentioned that changes in the autonomic nervous system caused emotional symptoms(Berrios, 1996). In 1894, Freud first defined "anxiety neurosis" by bringing together the physical and psychological symptoms of anxiety. During this period, Freud stated in his research that neuroses such as hysteria and hypochondriasis were of psychological origin, whereas anxiety neurosis was based on organic roots(Nutt, Argyropoulos, & Forshall, 2001).

Anxiety can cause both psychological and psychological changes(Dogru Huzmeli, Yilmaz, Yucekaya, Oskay, & Okuyucu, 2018). It has been emphasized in various studies; these symptoms are physiological symptoms that occur together with states of affect and enthusiasm, which are essential factors in the structure and development of personality(Uysal et al., 2021; Vu & Conant-Norville, 2021). When a person perceives or anticipates a specific danger, the brain sends a message to the autonomic nervous system part of the nervous system. The autonomic nervous system is divided into two: parasympathetic and sympathetic nervous system. While the sympathetic nervous system is responsible for the flight-fight response that increases the body's energy and prepares it for action, the parasympathetic nervous system is the nervous system that returns the body to its normal state and puts it into a state of rest, with the stimulation of the autonomic nervous system, blood pressure, heart rate and respiratory rate increase and gastrointestinal movements accelerate. Saliva secretion decreases, and dry mouth develops. Blood glucose rises, pupils dilate, the tension of striated muscles increases, tremors and sweating occur, teeth and fists are clenched, and the skin's resistance increases. All these changes show that the blood level of adrenaline and other similar chemical transmitters in the central nervous system increases. Feeling these changes creates anxiety in a person(Kaleta & Mróz, 2023; Oz, Yucekeya, Huzmeli, & Yilmaz, 2023; Wester, Rubel, Hall, Schwartz, & Lutz, 2023).

Biological theories about anxiety have developed with animal studies of anxiety, patient studies investigating biological factors, the growing knowledge of basic neurological sciences, and the effects of psychotropic drugs. One side of thought holds that the measurable biological changes of the patient with anxiety disorder reflect the outcome of his psychological conflicts. Opposite views accept that biological events lead to psychological conflicts(Banushi et al., 2023; Noyes, Roth, & Burrows, 1988).

NORMAL-PATHOLOGICAL ANXIETY AND ANXIETY CLASSIFICATION

Normal anxiety generally indicates taking necessary precautions in situations that pose a danger or threat. In anxiety occurring at normal levels, the size of the perceived threat and the degree of precaution to be taken against this situation are considered compatible with the situation. Examples that can be given include the student who is worried about failing the exam and using this situation functionally to prepare more efficiently to eliminate this anxiety. However, in anxiety that reaches a pathological level, there is an incorrect and excessive evaluation of the threat or danger in question. Exaggeration of the threat and protective measures to be taken against the threat are disproportionate to the size of the threat. The characteristics of pathological and normal anxiety under specific criteria are summarized by Starevic (KAYA, 2021; Starcevic, 2009) (Table 1).

Table 1. Pathological Anxiety vs. Normal Anxiety (Starcevic, 2009)

Criteria for Differentiation	Pathological Anxiety	Normal Anxiety **%**
Intensity	Relatively high and/or out of proportion to the situation or circumstances	Relatively low and/or proportionate to the situation or circumstances
Duration	Generally longer lasting or recurrent	Generally shorter lasting
Preoccupation with anxiety	Yes	No
Quality of the experience	Distressing, overwhelming, incapacitating	Unpleasant, but not too distressing or not distressing for a long time
Effect on behavior and functioning	Causes long-standing changes in behavior, impairs functioning	Generally does not affect behavior more than temporarily, does not impair functioning

The category of "neurotic reactions" or definitions reminiscent of the concept of neurosis, which were first included in DSM-III and included anxiety disorders, were completely eliminated in DSM-IV and were replaced by the classification of "anxiety disorders". This diagnostic category is divided into six groups: panic disorder with or without agoraphobia, obsessive-compulsive disorder, social anxiety disorder, generalized anxiety disorder, specific phobia and PTSD. In another diagnostic classification system, ICD (International Classification of Diseases), which is the classification system of the World Health Organization, anxiety disorders are a diagnosis integrated with the concept of neurosis, starting from the 8th Edition (ICD-8). The classification of "anxiety neurosis" in ICD-8 was replaced by "anxiety disorders" in ICD-10, just like the change made in DSM-IV and revised in DSM-V. The categorization of anxiety disorders was subsequently divided into obsessive–compulsive, anxiety, and trauma- and stressor-related disorders in the fifth edition, DSM-5, published in 2013(Moreland-Capuia, Vahabzadeh, Gillespie, & Ressler, 2023; Tekin & Tekin, 2014) (Table 2).

Table 2. Categorization of anxiety, obsessive–compulsive, and trauma-related disorders in DSM-5.(Moreland, 2023

Anxiety disorders	**Obsessive–compulsive and related disorders**	**Trauma- and stressor-related disorders**
Separation anxiety disorder Selective mutism Specific phobia Social anxiety disorder (social phobia) Panic disorder Panic attack (specifier) Agoraphobia Generalized anxiety disorder Substance/medication-induced anxiety disorder Anxiety disorder due to another medical condition Other specified anxiety disorder Unspecified anxiety disorder	Obsessive–compulsive disorder Body dysmorphic disorder Hoarding disorder Trichotillomania (hair-pulling disorder) Excoriation (skin-picking) disorder Substance/medication-induced obsessive–compulsive and related disorder Obsessive–compulsive and related disorder due to another medical condition Other specified obsessive–compulsive and related disorder Unspecified obsessive–compulsive and related disorder	Reactive attachment disorder Disinhibited social engagement disorder Posttraumatic stress disorder Acute stress disorder Adjustment disorders Other specified trauma- and stressor-related disorder Unspecified trauma- and stressor-related disorder

THEORIES OF ANXIETY IN SPORTS

Some psychological factors determine performance in sports participation. One of these factors is the concept of anxiety, which is effective in evaluating performance. There are some theories to explain the relationship between the concept of anxiety and performance(Konter, 2006).

Inverted U Theory: According to Yarkes and Dodson's Inverted U Theory, as arousal increases in the organism, performance efficiency increases, and as arousal decreases, performance efficiency decreases. However, excessive arousal regarding performance reveals anxiety(Humara, 1999).

IZOF (individual zones of optimal functioning) Theory: Yuri Hanin argues in Izof Theory that the relationship between anxiety and performance can be explained by examining it in a particular region, not at a certain level, as in the Inverted U Theory. In short, while low, medium and high anxiety in the optimal functioning zone indicates potential performance, anxiety outside this zone is considered harmful and may indicate undesirable performance(Hanin, 2010; Tiryaki, 2000).

Contrast Theory: This theory, developed in 1975 with the contributions of Smith and Apter, was adapted to sports psychology through Kerr. For example, athletes preparing to win a medal for the Olympics are in a telic state. Since people in the telic state perform their performances for a purpose, low arousal in their organisms is perceived as pleasurable, while high arousal is perceived as anxious. In the para-telic situation, which is the opposite of the telic situation, performance is not tied to a goal but is performed based on pleasure. An example of this is that a scuba diving person enjoys this activity(Özerkan, 2004).

State and Trait Anxiety Theory: State and Trait Anxiety Theory, developed by Spielberger et al., clarifies two different anxiety situations. These two different anxiety states are distinguished from each other by some parameters, such as intensity and duration. While state anxiety is related to the anxiety state specific to the event that the person will experience, trait anxiety is related to the person's future anxiety state and predisposition to anxiety. Moreover, although state anxiety has a short-term and intense effect on the person, in trait anxiety, the person feels these effects for a longer time and less intensely. For example, while a person's participation in scuba diving and the level of anxiety related to this participation are related to his State anxiety, the place of anxiety in the person's life and how it shapes his life is related to trait anxiety(Karasar, 2011).

DEFINITION AND HISTORY OF DIVING

Diving means "the sport or activity of swimming or moving around underwater, usually using special breathing equipment". It is not known precisely when the first dive was made in history. B.C. Archaeological evidence shows that people free-dived to collect sponges, corals and food between 4500 and 3200 BC. B.C. It is known that free divers were used in the Trojan wars between 1194 and 1184. Although free diving is the oldest known type of diving, people who do this type of diving can only stay underwater for a few minutes due to their physiological structure. Since these short periods were not enough for people's curiosity about underwater and their sense of adventure, they searched for methods to stay underwater for longer and move more comfortably and faster(Acott, 1999; Aygün & Güllü, 2019).

There are sportive and non-sports diving types. Diving itself is divided into two basic disciplines. The first is the type of diving called "Free Diving", performed by the person without taking any underwater breathing apparatus. In this type of diving, the diver dives by holding his breath. Free Diving, the first primary type of diving, is divided into two main headings: static and dynamic. The other essential diving discipline is "Scuba Diving" or "Equipped Diving," performed with auxiliary materials that enable underwater breathing. In the international literature, it appears as "Scuba", that is, "Self Contained Underwater Breathing Apparatus"(Başkanlığı, 2008). Diving is an activity that is carried out in various ways for need, research or entertainment in the seas of the world. In our country, to perform a test dive in a sportive manner and accompanied by an instructor, the participant must be over 14 years of age and not have any health disability. This age group does not change into girls or boys. The fact that a person enters an early physical development phase is not a determining factor in this process. It is not "essential" to know how to swim to do a test dive, but it is required to know how to swim for certificate programs(Federasyonu, 2013).

AREAS WHERE DIVING IS USED

Commercial Diving (Industrial Diving): This type of diving includes working on oil platforms in the deep sea, laying underwater drainage lines, maintaining and repairing underwater pipelines, repairing ships in the water without being towed ashore, professional wreck removal works and similar professional underwater works and is carried out by industrial divers. Today, industrial (commercial) diving is a sector in high demand and need of employment. The Undersecretariat of Maritime Affairs determines the standards and rules of this type of diving in our country(Oktay, 2017).

Recreational (Entertainment / Hobby) Diving: Diving with a depth not exceeding 40 meters (Turkey limit is 30 meters except for training dives) with air or air enriched up to 40%. It has a simple structure, and the materials used in this type of diving are a single tube, a single regulator set, etc. The option of reaching the water surface relatively quickly in an emergency, the need for less complex equipment and training, and the evaluation of people with different physical conditions who can practice this type of diving are some of the advantages of sportive diving. In other words, recreational diving, amateur diving equipment, breathing air or nitrox at a maximum depth of 40 meters. The governments determine the standards and rules of these recreational and touristic dives performed to depth(Oktay, 2017).

Technical/Scientific Diving: In this type of technical diving, divers aim to carry out operations such as port construction, ship salvage, historical artefact research, underwater sunken city excavations, and exploration dives to great depths using mixed gas(Oktay, 2017).

DIVING AND HEALTH

The ease of obtaining accessibility and diving training has led to the health aspect of diving becoming more critical. As diving has become so widespread, the ground has been laid for the effects of diving on human physiology and the health problems that may arise due to this sport to be further scientifically researched and addressed(Kahraman, Aşiret, Devrez, Özdemir, & Akdemir, 2012). Two relevant laws of physics explain health problems experienced during diving activities. First is 'Boyle's Law', which scientifically explains the increasing pressure as you dive underwater (1 additional atm of pressure for every 10 meters) to the depth level. This law scientifically clarifies the causes of tissue damage in air-containing spaces related to the pressure difference during diving. The second is; 'Henry's Law', which clarifies the causes of 'Decompression Sickness' and 'Nitrogen Narcosis'. According to this scientific law, gases compressed under pressure become liquid and dissolve in body fluids. The pressure, which increases as going deeper, causes significant physiological changes and has some effects on the body underwater. A proportionally large part of our body consists of liquids, which may not cause a problem when pressure changes come into play, but the same cannot be said for the air spaces in our body(Russi, 1998). Generally, four potentially fatal pathologies have been encountered during diving. These Barotraumas in the body's air spaces (Lung Expansion is the most lethal), type 2 decompression sickness (DCS), and pulmonary oedema in the lungs are pharmacological and toxic effects that occur with the increased partial pressure of gases(Cetin, Sevil, Karaoglu, & Yucekaya, 2011; Kahraman et al., 2012).

Gases that remain closed in body cavities such as the lungs, ears and sinuses are compressed due to the increasing environmental pressure during descent during dives and undergo expansion due to the decreasing environmental pressure during ascent. This situation affects the body as ascending and descending barotraumas (compression and expansion)(Banushi et al., 2023; Kahraman et al., 2012). Other essential health problems besides barotrauma do not occur in shallow and short-term dives, which we call recreational trial diving. However, middle ear compression is the most common health problem among diving individuals (30% of divers in their first diving experience)(Aktaş, 2005; Robinson & Byers, 2005). Middle ear barotrauma, which has symptoms such as tinnitus, severe dizziness, nausea and temporary hearing loss, can also cause severe conditions due to vertigo (dizziness) and disorientation caused by the difference between the cold sea water entering the middle ear and the inner ear temperature(Lynch & Bove, 2009). Studies have concluded that asthma poses the first risk regarding indications that may pose a risk related to diving. It should not be forgotten that just as physiological disorders can hinder diving, some psychological disorders can also hinder diving. Even if some diseases do not cause symptoms before diving, they may develop later (decompression sickness). In this field, studies based on physiological and psychological diseases are insufficient and new studies are needed(Neuman, Bove, O'Connor, & Kelsen, 1994).

It is crucial for the health of individuals who will dive that they have a history of illness and ongoing chronic diseases. Due to chronic diseases, the person is more exposed to pressure changes during diving, and the safety of the individual's diving conditions is endangered(Salahuddin, James, & Bass, 2011). It is essential that the diving instructors and experts know these situations and anatomy in advance and can take the relevant precautions. Heart attack, heart diseases (circulatory system disorders), uncontrolled high blood pressure (hypertension), epilepsy (potential for epileptic seizures underwater), asthma and lung diseases, ear and Sinus diseases, pregnancy, diabetes (hypoglycemia - hyperglycemia), panic attacks, using a medication with side effects, having received treatment for drug or alcohol addiction in the last five years are some of the primary diseases that may require medical check-ups and may prevent diving(Duman, Huzmeli, Yucekaya, Hallaceli, & Gunes, 2017; Günal, Başkurt, Başkurt, Parpucu, & Yücekaya, 2012; Katayıfcı, Hüzmeli, Dikmen, & Yucekaya, 2022; Oktay, 2017).

DIVING SPORT AND ANXIETY

In the last decades, diving has become more attractive, and scuba diving has become a popular recreational activity worldwide among young, old, and even disabled people, although it is perceived as a high-risk sports activity(Pedersen, 1997; Roos, 1989). However, seem to differ scuba divers non-divers from in reactions and emotions such as anxiety, which is indicated by lower trait anxiety scores of experienced as well as beginning scuba divers as compared to non-divers(Thomas J Griffiths, Steel, & Vaccaro, 1979; T. J. Griffiths, Steel, & Vaccaro, 1978; Heyman & Rose, 1980; Morgan, 1995; Morgan, Raglin, & O'Connor, 2004). This situation is supported by higher trait anxiety scores of individuals who withdrew from scuba diving training in comparison to those who completed the training(Thomas J Griffiths et al., 1979). However, those studies have implicated that personal anxiety levels have practical effects on scuba diving performance as well as on the experience of panic behaviour. Since panic behaviour in scuba diving has been suggested to be attractive for diving accidents, it is of particular interest to reveal a possible relationship between scuba diving performance, panic behaviour, and state and trait anxiety(Steinberg & Doppelmayr, 2015).

Exemplarily state anxiety has been found to be conversely related to standardized underwater skills such as buddy breathing or bail-out tasks(Thomas J Griffiths et al., 1979; T. J. Griffiths, Steel, Vaccaro, & Karpman, 1981; Mears & Cleary, 1980; Terry, Mayer, & Howe, 1998). Griffiths, et al . (1979) found that trait anxiety (A-trait), as well as state anxiety (A-state), was negatively correlated with a typical scuba diving skill (bail-out test; r s = –.32 for Atrait and –.46 for A-state) performed in a swimming pool. In contrast, they also found that A-state (r = –.32), but not A-trait, was related to a scuba diving skill in open water. High trait and state anxiety are also known to be associated with panic behaviour(Bachrach & Egstrom, 1987; Morgan, 1995), and trait anxiety is a good predictor of panic behaviour in beginning scuba students(Morgan et al., 2004). In this study, panic behaviour occurred more often in participants with a trait score above 39 (effect size d = 1.54). This is an essential point since panic is viewed as a significant factor in diving injuries, including fatalities(Edmonds & Walker, 1989; Morgan, 1995). Notably, according to a dive death statistic (for the years between 1999 and 2008) published by a leading diving association, the highest fatality rate (1.14 per 100,000 dives) among all other advanced training programs occurred in the introductory dive activity(Richardson, 2010), although, it has not been reported whether anxiety or panic might have contributed to those accidents.

Considering that young people perceive risks differently than adults(Alexander et al., 1990), one could speculate that the relationship between anxiety and scuba diving performance is not valid for young individuals in their first scuba diving experience. However, it should be noted that performance decrements in sports are not always related to high anxiety and do not necessarily follow a linear relationship since, in some sports, low, medium, or high anxiety was related to best performance(Kleine, 1990; Raglin, 1992). Such an assumption could be further analyzed by testing the theory of an individual zone of optimal functioning(Hanin, 2010). Terry, Mayer and Howe's study titled "Effectiveness of A Mental Training Program For Novice Scuba Divers" aims to investigate the effect of a mental training program on the state anxiety, breathing rates and performance of inexperienced scuba divers. A total of 44 inexperienced scuba divers participated in open water diving courses. In order to reduce anxiety and improve diving performance, the experimental group of 15 people was given a mental training program with audio recording in addition to scuba diving training. The same procedure was applied to the other group of 15 placebo-controlled people, but only general information was given in the audio recording.

The control group of 14 people was given only diving training. As a result of the research, it was determined that the mental training given reduced anxiety and increased performance. Pre-dive state anxiety levels of domestic tourists doing sportive scuba diving were lower than their trait anxiety levels. In this context, it can be argued that the briefings given before diving have the same effect in reducing anxiety(Terry et al., 1998).

CONCLUSION

Increasing accessibility and popularity in sports that require training and equipment, such as diving, increases people's demand day by day. Because underwater sports are risky, individuals experience anxiety. The notion of anxiety intertwined with sports which should not be ignored in more extreme diving sports. There are very few studies on this topic, and more multidisciplinary research is needed in the literature.

Conflict of Interest

There is no conflict of interest.

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