PLOVDIV UNIVERSITY
„PAISII HILENDARSKI“

FACULTY OF PEDAGOGY
DEPARTMENT OF PSYCHOLOGY

Antonia Traykova

AGGRESSION AND ANXIETY IN ADOLESCENT CHILDREN WITH PROBLEMATIC INTERNET USE

ABSTRACT

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The dissertation comprises a total of 185 pages, of which 151 pages constitute the main text. The bibliography spans 12 pages and includes 117 sources – 39 in Cyrillic, 67 in Latin script, and 11 online references. There are three appendices totalling 20 pages. The main body contains six figures and seventeen tables. The structure of the dissertation includes an introduction, three chapters, a bibliography, and appendices. Chapter One presents a theoretical review and conceptual framework. Chapter Two discusses the design of the empirical study, including the methods, tools, and procedures. Chapter Three focuses on the analysis and interpretation of the research findings. The doctoral studies were carried out at the Faculty of Pedagogy of the University of Plovdiv “Paisii Hilendarski", Department of Psychology.

The dissertation has been reviewed and approved for defense at a meeting of the Department of Psychology of the Faculty of Education at Plovdiv University “Paisii Hilendarski” on June 3, 2025, based on Protocol No. 15 of the Departmental Council of the Department of Psychology. The defense of the dissertation will take place at a public session scheduled for September 23, 2025, at 11:00 a.m. in the conference hall of the New Building of Plovdiv University “Paisii Hilendarski” before the following academic committee: Prof. Dr. Yuriy Pavlov Yanakiev, Assoc. Prof. Dr. Ps.Sc. Manol Nikolov Manolov, Prof. Dr. Ps.Sc. Krasimira Petrova Koleva-Mineva, Prof. Dr. Velislava Atanasova Chavdarova, Assoc. Prof. Dr. Ps.Sc. Stoil Lyubenov Mavrodiev.

The defense materials are available at the library of the University of Plovdiv "Paisii Hilendarski".

INTRODUCTION

This dissertation is dedicated to the topics of aggression, anxiety, and internet use among adolescents. The subject matter is both important and timely. In today's context, aggression and anxiety in school-aged children are increasingly discussed phenomena, as they are directly related to the mental health and well-being of children.

Numerous scholars in the fields of psychology and pedagogy have sought explanations and causes for the manifestations of aggressive behavior in school-age children. Various publications examine the social and psychological roots of aggression, including the roles of family environment, upbringing, and parenting styles, which may contribute to the social learning of aggressive behavior patterns.

Anxiety, in the modern sense, is a constant companion of human life due to rapid technological advancement, stress, and the mismatch between swiftly evolving life demands—especially when coupled with family problems, overburdening, fast-paced lifestyles, and uncertainty about the future. Anxiety states in students who spend significant time in front of computers may be symptomatic of emerging internet addiction, or reflect a syndrome, a clinical manifestation of a mental disorder, an emotional response to a somatic illness, and more.

Aggressiveness and anxiety in adolescents are influenced by the social environment and, in particular, by children's access to digital content. This creates conditions for uncontrolled internet use and exposure to inappropriate content, which may include aggression, violence, pornography, and cyberbullying. Excessive time spent in the digital realm can negatively affect adolescent development.

The issue of internet use among schoolchildren, especially adolescents, is particularly relevant today because the so-called "Alpha Generation" was born during a time of widespread availability and access to computers and digital technologies. This turns technology into a basic living condition and predisposes prolonged exposure to screens and the internet. Children use social networks to study, create, play, and communicate. Alongside these benefits, they are also exposed to risks that can make them victims of violence, manipulation, intimidation, aggression, and more. The combined effect of these factors reveals the potential for the internet and digital technologies to become sources of behavioral problems—ranging from behavioral addiction to anxiety symptoms and aggressive behavior. Modern society and the children within it will inevitably continue to live, learn, and function within an information society, as information and communication technologies are employed in nearly all areas of social, economic, and political life.

The relevance of this dissertation is also driven by the growing number of cases of anxiety disorders or manifestations of aggression among adolescents, which are increasingly linked to problematic internet use (Obeid et al., 2019, et al.).

Subjects of the study are the interrelations between aggression, anxiety, and internet behavior in adolescents.

The Objective of the study is To identify and analyze the connections between anxiety, aggression, and various aspects of internet behavior in adolescents; to identify key psychological factors that determine problematic internet behavior; and to distinguish groups with different profiles through cluster analysis.

Central research question: What are the interrelations between aggression, anxiety, and the various aspects of internet behavior among adolescents, including problematic internet behavior that may be associated with behavioral addiction? How can these interrelations inform the formation of individual behavioral profiles.

Main hypothesis: It is assumed that there are significant relationships between aggression, anxiety, and various aspects of internet behavior, including problematic internet behavior that may be linked to behavioral addiction. Some Sub-hypotheses were raised:

- Higher levels of anxiety are associated with greater social and behavioral engagement online, as well as with higher levels of problematic internet behavior.
- Higher levels of aggression are positively related to behavioral engagement in the internet and to problematic internet behavior.
- Participants can be divided into distinct profiles (clusters) based on their levels of anxiety, aggression, and internet behavior, with each cluster exhibiting different characteristics in terms of social engagement, self-regulation, and problematic internet behavior.

STRUCTURE AND CONTENT OF THE DISSERTATION

Chapter One examines theoretical frameworks concerning aggression and anxiety, including their nature, manifestations, symptoms, and related theories. It also discusses internet usage among children and the characteristics of problematic involvement.

Chapter Two outlines the methodological framework, including the operationalization of key concepts, research design, objectives and tasks, the tools used, and hypotheses.

Chapter Three presents the analysis of the collected data, practical and theoretical contributions, conclusions, and final remarks.

CHAPTER ONE

THEORETICAL OVERVIEW OF THE STUDIED PROBLEM

I.I. AGGRESSION

I.I.1. Nature and Definition of Aggression

Aggression is commonly considered a necessary adaptive tool or emergency mechanism, without which humanity could not have survived. In this broad sense, any active behavior by a person toward others, objects, or nature in general could be labeled as aggression. In general terms, aggression is defined as an act of aggressive behavior (Concise Oxford English Dictionary, 2002). The study of human behavior has been a topic of exploration for millennia. After psychology was established as a science, it began seeking explanations for behavior, including aggression. I.P. Pavlov (2023) explains human behavior through conditional and unconditional reflexes and their role. According to Gŭrbacheva and Karagyozov (1997), behavior is the activity or action stemming from the unity of the organism and the psyche. In objective psychology, as presented by A. Piéron, the human psyche and behavior are studied as an inseparable unit (Bijkov, 2003). Behaviorism posits that human behavior is influenced by the social environment.

In contrast to socially acceptable behavior, aggressive behavior is considered socially dangerous, undesirable, and destructive.

Aggression, as a feeling, arises from the experience of primary emotions, particularly fear, which then triggers anger. Depending on one's personality structure, this can result in either aggressive or self-aggressive behavior. As behavior, aggression may inflict intentional harm—physical injury, insult, humiliation, threat, destruction of property, or social exclusion through relational aggression. Actions that result in harm due to incompetence, negligence, or ignorance are not considered aggression.

The damage caused by aggressive behavior can trigger a variety of emotions: sadness, depression, self-pity, helplessness, anger, a desire for revenge, and low self-esteem.

The primary goal of aggression is to establish dominance or gain an advantage, such as affirming one's power. Aggression may also serve as a means of protecting self-esteem.

A specific form of aggression is bullying, which is aimed at acquiring social status and is tied to social relationships and learning processes. Bullying can manifest in early childhood, with children often assuming the role of passive observers to maintain their own sense of safety.

I.I.2. Factors Contributing to the Development of Aggression

Individual Factors

These include hereditary predispositions to aggression. Such tendencies manifest within the family setting, where various forms of antisocial and problematic behaviors may be learned. A link is often observed between antisocial personality disorders in parents and behavioral disorders in children. The family environment plays a significant role in shaping both aggressive and prosocial behavior.

The Role of Needs as a Factor

According to Dollard (1939), aggression arises from frustration. A child becomes aggressive when they are unable to achieve their goals or satisfy their needs, leading to a state of frustration.

Temperament as a Trigger for Aggression

Children with difficult temperaments are more susceptible to developing behavioral and social issues related to aggression.

Impulsivity as a Factor in Aggression

Impulsivity manifests in forms such as cognitive impulsivity—where an individual struggles to complete a cognitive task or analyze a situation thoroughly—and behavioral impulsivity, characterized by an uncontrolled interpersonal style. Impulsivity is also associated with emotional instability and inconsistent actions.

Self-Concept as a Factor in Aggressive Behavior

Aggression is sometimes provoked by the need to maintain a stable self-image and to overcome inner insecurity, functioning as a form of self-affirming behavior.

Character Traits, Styles, and Aggressiveness

Certain personality traits, such as low empathy, feelings of guilt or shame, irritability, temper, and poor behavioral control, increase the predisposition to aggression.

I.I.3. Theoretical Approaches to the Study of Aggression

Psychoanalytic Approach

According to Sigmund Freud, aggression is instinctual and innate in humans but is also learned through experience. It is linked to libido and the death drive (Thanatos). Anxiety motivates self-defense. Destructive impulses that are not socially sublimated can manifest in aggressive behavior or even mental illness.

Evolutionary Approach

Konrad Lorenz (1966) posits that aggression stems from the instinct for self-preservation found in all living beings. In animals, aggression is spontaneous and part of an auto-dynamic system.

Biological Approach

This perspective explores biological, biochemical, and genetic factors as determinants of aggression, as well as the role of the nervous system. Hormones, particularly testosterone, influence aggressive behavior. Diets low in vitamin B and the use of alcohol are also cited as contributing factors.

Cognitive and Cognitive-Behavioral Theory.

Cognitive theories claim humans are not innately aggressive; instead, aggression can be controlled. H. Konrad's motivational theory suggests that how a person cognitively interprets a situation determines their aggressive response (P. Miteva, 2008).

Behaviorist Theory

Behaviorist theorists like Bandura (1986) and Dollard et al. (1939) conceptualize aggression as learned behavior. Bandura’s social learning theory emphasizes the role of observed behavior and imitation.

Frustration–Aggression Theory

The theory of "frustration-aggression" is associated with the names of J. Dollard, N. Miller (Dollard, J., Miller 1939). Initial studies follow the hypothesis that aggressive behavior implies the

presence of frustration and vice versa, the existence of frustration always leads to some form of aggression. In case of negative consequences, aggression can be restrained, and if there are obstacles to the realization of aggression towards frustration, it can be directed at other objects. Frustrations can be physical – a wall, biological – a disease, sociocultural – norms. They can be associated with lower needs – then frustration has a pathogenic character.

Social Learning Theories

D. Dollard and N. Miller laid the foundations of modern social learning theory by examining the principles of incentive, reward, and reinforcement to explain imitation (Dollard, J., Miller 1939). A. Bandura expanded the theory by considering that the source of information is the behavior of the other, who is a "model".

Sociobiological Theory

According to this theory, social behavior has a biological basis. Aggression is a mechanism that ensures the species' ability to survive. Animals have aggressive behavior patterns in competition, but they lack anger as an experienced emotion. Man is an aggressive animal that has developed the technology of destruction. Human aggression can be provoked by thoughts about the past, present, and future.

Attribution Theory

It consists of attributing aggressive intentions to the partner as a determinant of one's own aggressive behavior. Social attribution operates together with the cognitive balance between the attributed motives for the harmful behavior and the standard norms of fairness in society..

Ecological Approach to Aggression

This approach highlights how a child's interaction with their environment affects their aggression. Bronfenbrenner (1994) describes layers of influence. The first layer is the microsystem – parents, teachers, friends, as the circle of interactions expands with age. The next layer is the mesosystem with its social relationships, many of which have a frustrating effect. The exosystem refers to the social environment that affects the child without including it. The macrosystem contains factors such as culture, norms and laws (U. Bronfenbrenner, 1994).

I.I.4. Types of Aggression

Aggression can take various forms and be provoked by different factors. Distinguishing between types of aggression is essential for better understanding its nature and for developing effective intervention strategies. The most frequently studied and used bimodal classifications for types of aggression in the specialized literature are the reactive/proactive typology of aggression (Dodge & Coie, 1987) and the impulsive/premeditated aggression model (Barratt et al., 1991; 1997; 1999; Berkowitz, 2008).

Constructive vs. Destructive Aggression

There is one distinction that should be addressed within the dissertation, and that is the difference between constructive and destructive aggression.

Constructive or so-called "good aggression" aims to unleash the potential of the individual towards achieving personal goals, although it contains a destructive element.

Destructive aggression occurs within human interactions and, unlike constructive aggression, does not aim for a positive end. It is typically driven by unmet needs and negative emotions, such as the desire for dominance. In such interactions, one party becomes the aggressor, and the other the victim. The aggressor may face punishment from an authority figure, while the victim accumulates negative emotions due to damaged dignity, fear, or a desire for revenge.

Relational Aggression as a Hidden Type

In recent years, there has been a noticeable rise in physical and verbal aggression among school-aged students, often expressed through mass fights, serious injuries, and physical attacks. However, less attention is paid to relational aggression, which can severely impact a victim's psychological well-being through indirect forms such as slander, humiliation, and exclusion.

Manifestations of relational aggression are very difficult to assess, given the subjectivity and differences in the perception of this type of aggressive behavior by students and their teachers (R. Stamatov, 2009). The difficulties in assessing relational aggression arise from the differences in the psychological perception on the one hand of teachers, who must identify it, and on the other hand of students, who too often experience it painfully.

I.I.5. Nature and Causes of Childhood Aggression

In early school age, children's aggressive acts are often physical—biting, pushing, hitting, or kicking. Those with more advanced verbal abilities may resort to verbal aggression through insults and offensive language. The manner in which children manage aggression, guided by educational interventions, can be broadly classified as constructive or destructive.

According to I. Boncheva (2015), the causes of a child's aggression lie in their social environment—a situation or event involving individuals or groups. The motivation for an aggressive act comes from within the individual and is driven by feelings of anger or rage, often coupled with a sense of threat, injustice, or a desire for revenge.

I.I.6. Psychosocial Problems of Aggressive Children

Children who exhibit bullying behavior often face several psychosocial challenges:

- School-related issues: They may dislike school, have a limited understanding of rules, and underachieve academically;
- insecure at school, with low academic achievement;
- with emotional attachment problems – prone to self-blame, prone to attributing much more hostile intentions to others. Many of them have been found to have a psychotic and extroverted personality style;
- with limited social competence – much more aggressive, prone to dominance, prone to Machiavellianism (a person who deceives and manipulates other people for personal gain);
- non-empathetic, depressive impulsive;
- experienced violence in early childhood, deprived of parental care or when parents are tolerant of aggression.

Children who are victims may be either passive and submissive or aggressive and provocative. Both types display helplessness and a loss of self-esteem and are generally rejected by their peers.

I.I.7. Recognizing the Causes of Aggression in Children and the Role of Teachers

To ensure effective intervention by psychologists and educators, it is necessary to identify the underlying causes of child aggression through:

- listening to both sides of the story without judgment;
- in cases where children were present at the aggressive act, the opinions of the perpetrator and the victim are not sought;
- participants in the aggressive act can express their experiences that led to the conflict;
- working within the context of the conflict and offering both sides alternative behaviors.

Aggression can manifest in one of four areas: physical body, activities, social contact, or life concepts. Teachers and psychologists must tailor their responses based on the domain of expression.

I.I.8. Developmental Crises as Roots of Aggression and Educational Models

A child's ability to manage aggressive impulses depends to some extent on the relational models established with parents. The development of emotional attachment is crucial in this context. The close adult—usually the mother—teaches the child how to give and receive love, warmth, and affection. She serves as the first significant role model. A caregiver's response to a baby's crying teaches the child emotional self-regulation. The father, in many cases, introduces norms and rules that help the child understand how to assert themselves without violating others' needs. The absence of such close adult figures may result in the formation of immature coping mechanisms for managing aggressive impulses.

I.II. ANXIETY

I.II.1. The Nature of Anxiety

Anxiety is a phenomenon that accompanies an individual throughout their entire life. The increase in anxiety and depressive states in modern times is often attributed to the rapidly changing demands of life and the pervasive influence of technology.

Experiencing anxiety is one of the primary issues confronting the modern individual, and it has been the subject of research by numerous authors (Mau, 1967; Sullivan, 1954; Epstein, 1972; Philips, Martin, Meyers, 1972, among others).

Global statistical data show that approximately 1/4 TO 1/3 of visits to general practitioners are related to anxiety symptoms. Anxiety may present as:

- A symptom, syndrome, or clinical expression of a mental disorder;
- Accompanying a physical illness (comorbidity);
- An emotional response to somatic disease and/or disability;
- A burden on caregivers and family members of the affected individual (Carter & Golant, 2002).

In childhood, fears and anxiety are among the most commonly reported forms of psychological distress (Schroeder, Gordon, 2002; Myers, Winters, 2002; Kalchev, 2005; 2006 etc.). They are usually viewed as transient manifestations that occur in the context of the normal developmental process, but in certain cases they become more severe and interfere with the normal functioning of the personality..

I.II.2 The Nature of Anxiety Disorders

Anxiety disorders differ from everyday anxiety in that they are more intense and persistent, involving panic attacks, phobias, and disruptions to normal functioning.

As a phenomenon, anxiety is an emotional reaction. Phenomenologically, it exists on a continuum between normality and pathology, and it is not always easy to distinguish between the two.

Anxiety disorders typically include three components:

- Somatic component – Physical symptoms such as palpitations, trembling, sweating, shortness of breath, nausea, abdominal pain, dizziness, tingling limbs, hot flashes, etc;
- Cognitive component – Recurrent intrusive thoughts, mental imagery, or persistent worry;

- Behavioral component – Avoidance of situations that produce physiological or emotional distress (Lang, P.J., Bradley, M.M. and Cuthbert, B.N., 1997).

I.II.2.1. Etiology of Anxiety Disorders

Some causes of anxiety disorders originate in early childhood and predispose individuals to panic or anxiety in later stages. Others are short-term triggers, including specific life circumstances. Most anxiety disorders emerge during childhood, adolescence, or early adulthood.

In childhood, the sources of anxiety are diverse. Anxiety can be due to fear of abandonment, misunderstanding between parents, feelings of guilt, etc. (H. Ginott, 1988).

I.II.2.2. Theories of the origin of anxiety disorders

Psychodynamic theories. Psychoanalytic theory of Z. Freud considers anxiety as the release of a certain amount of affect. Affects can appear in a psychic and somatic way. According to Freud, anxiety is a response of the Ego to the threat of helplessness (Z. Freud, 1999).

The humanistic model of anxiety – anxiety disorders arise from a perceived lack of meaning or fulfillment.

Existential Theory – Rooted in fear of death and the impermanence of life.

Cognitive Theory – According to Lazarus and Averill (1972; 1984), anxiety stems from an individual's cognitive assessment of threat. Rogers (1980) posits that anxiety is experienced when one perceives a threat to their self-concept. Beck and colleagues highlight the interaction of predisposing and triggering factors (Beck, 1975; Beck, Emery, Greenberg, 1985).

Biological/neurophysiological theories – at the level of the thalamus and limbic system, neuronal activity leads to the actual feeling of anxiety. H. Eysenck (1982) developed a biological theory of anxiety based on different levels of cortical arousal.

Behavioral theories – According to proponents of this approach, fears and anxiety are created through classical conditioning. An unconditioned stimulus that elicits an unconditioned fear response is followed shortly by a conditioned stimulus that does not initially elicit such fear. D. Spence and D. Taylor (Spence, 1951; 1953; Taylor, 1962; 1973) believe that neutral stimuli can, through reinforcement and learning, become emotive and acquire anxiety-provoking qualities.

Classical Conditioning Theory – Anxiety may be established through conditioning, modeling, or verbal instruction.

Two-Factor Theory – Combines classical and instrumental conditioning as the foundation of anxiety.

Approach-Avoidance Theory – Anxiety develops from the interaction of a conditioned stimulus with an unconditioned one.

Wolfe's Etiological Model of Self-Wounds – Anxiety disorders stem from ongoing struggles with subjective experiences, generating expectations of catastrophe, anger, and despair.

I.II.2.3. Types of Anxiety Disorders According to DSM-V and ICD-10

Generalized anxiety disorder is a common mental illness characterized by long-term anxiety, fear, worry, chronic worry, irritability, sleep disturbances, concentration problems, and muscle tension.

Social anxiety disorder is characterized by intense fear and avoidance of negative social scrutiny, humiliation, or social interaction. The fear is manifested by public speaking and social interactions. Specific physical symptoms include blushing, sweating, and trembling of the voice.

Panic disorder – (F41.0) – characterized by recurrent unexpected panic attacks, with symptoms of trembling, confusion, dizziness, nausea, difficulty breathing.

Agoraphobia-(F 40.0)- characterized by a strong panic fear of being in a public place from which escape would be difficult or impossible.

Post-traumatic stress disorder-(F 43.1)- occurs as a result of a traumatic experience – natural disaster, rape, kidnapping, catastrophe, often occurs in soldiers. Symptoms are anxiety, anger, depression, avoidance, hypervigilance.

Obsessive Compulsive Disorder (OCD)(F 42) – characterized by obsessions – intrusive thoughts and images, and compulsions – repeated performance of specific actions or rituals. A person with obsessive compulsive disorder knows that the symptoms are unreasonable and struggles with them, but to no avail.

I.III. INTERNET DEVELOPMENT

I.III.1. Nature and Historical Roots of the Internet in the Context of Digital Technology Development

To understand the essence of the Internet, one must first grasp the concept of a network. A network is a group of computers interconnected to exchange information. The Internet is, by its nature, a network of networks, consisting of numerous systems belonging to organizations such as companies, universities, and institutions. Often referred to as the "information superhighway," the Internet is one of the greatest achievements of the Information Age. Its essence lies not merely in its hardware, computers, or telephone lines, but rather in the interactions and communication enabled by these components.

The Internet possesses a strong socializing effect, due to several factors:

- It simplifies social life;
- It provides cheap, fast, and efficient communication with friends via a screen;
- Communication can be terminated at any moment;
- Various online forums facilitate information sharing and social interaction, reducing interpersonal distance.

I.III.2. The Impact of Digital Technologies on Children Globally

In contemporary society, the digital world is increasingly reshaping childhood and the way children grow up. Adolescents are becoming more actively involved in social networks, engaging with peers and family members alike. Globally, the number of children who are active Internet users continues to grow.

According to studies, one in three Internet users worldwide is a child or adolescent under the age of 18. There is increasing evidence that children are gaining access to the Internet at earlier ages. In some countries, children under the age of 15 use the Internet just as much as, or even more than, adults over 25.

Technology is fostering what is referred to as a “bedroom culture”—a more intimate, personal, and less supervised online environment for children.

I.III.2.2. Problematic Internet Behavior and Behavioral Addiction

Addiction is generally understood as a process that creates psychological or physical dependency on a substance or activity. It usually develops gradually and leads to compulsive engagement in a specific behavior.

In the context of Internet use, several types of addictions have been discussed in the literature:

- прекаляване с уебсърфинга в търсене на забавления и информация;
- Addiction to virtual communication via chats, forums, messaging apps (e.g., ICQ, Skype, Facebook, Viber;
- Addiction to online gaming;

- Compulsive online shopping;
- Frequent participation in online auctions;
- Obsessive consumption of pornography or cybersex.

The modern term "Internet addiction" is increasingly recognized as a psychological and physical health issue. For example, the so-called "mouse syndrome" (Repetitive Strain Injury – RSI) is now considered a professional illness, especially among individuals who spend extended hours at a computer. It leads to impaired function in the hands, shoulders, and neck due to repetitive motion.

I.III.2.3. Research Approaches and Theoretical Models of Harmful Internet Use

The classification of Internet addiction as a diagnostic entity remains a significant challenge in psychology and psychiatry. Addiction to the virtual space often results in social withdrawal, depression, and other serious consequences for mental and physical health.

Modern scientific research focuses on research approaches, the creation of conceptual and explanatory models, and the discussion of guidelines for therapy and prevention of problematic use. Several intervention approaches are known in practice.

Clinically Oriented Approach – Focuses on substance and behavioral addictions. Researchers using this approach use terms such as abuse and addiction. They link substance addiction and suggest similar symptoms:

- Repetitive behavioral patterns;
- Reduced behavioral control;
- Urge or craving before engaging in behavior;
- Pleasure during the activity;
- Repeated unsuccessful attempts to reduce or stop;
- Increased tolerance and withdrawal symptoms indicating neurobiological adaptation.

In support of the clinical approach is a study in which brain mapping was performed during online gaming and data on dopaminergic system activation and subjective experience of euphoria were obtained. Children with problematic Internet use are predisposed to developing attention deficit hyperactivity disorder (ADHD), which in turn is a risk factor for drug addiction in adulthood (Enev, 2014).

The second approach looks for similarities with disorders described in the DSM as impulse control disorders not otherwise specified (NOS). These are behavioral disorders whose main characteristic is the inability to resist an internal impulse, drive, or temptation to perform an action that is harmful to the person or to others.

The third approach is being promoted by researchers who support the idea of placing specific symptoms within the diagnostic framework of known mental disorders, taking into account both substance addiction and behavioral addictions.

The fourth approach aimed at describing the phenomenon is to consider it not as a disease, but rather as a group of deficits in mental self-regulation, which are located on a continuum of transition from norm to pathology.

There are some theoretical models of problematic Internet use in the literature.

Davis's Cognitive-Behavioral Model (Davis, S.,1999) – the model is based on the assumption that problematic use is the result of maladaptive cognitions that, in unison with various stimuli, maintain or reinforce dysfunctional behavioral responses. The author uses the predisposition-stress framework and places the causal factors of problematic use in this field.

Kimberly Young's theoretical model. After conducting a scientific study among 496 individuals, Young made a presentation to the American Psychological Association in 1996, in which she announced her results and reviewed the concept of Internet addiction, raising the question of its separation as a new clinical disorder. In her study, she borrowed the diagnostic criteria from

the DSM-IV for psychoactive substance addiction and transformed them to make them applicable to identifying Internet addiction. Later, the author pointed out that Internet addiction does not include an intoxicant in its etiology, as in addictions.

Neuropsychological model. The model presents an explanation of Internet addiction based on neurotransmitter modulation of behavior. It is known that substance abuse and impulse control disorders manifest themselves in changes in the amount of certain brain neurotransmitters (dopamine, serotonin, and endogenous opioids).

Compensation model. According to this model, people seek "spiritual compensation" in online activities. This finding is supported by a study finding higher levels of loneliness among students identified as problematic Internet users (Koepp, 1998).

Situational model. Situational factors play a role in the development of problematic Internet use. People who feel overwhelmed, have personal problems, or are experiencing life-changing events such as a recent divorce, move, or death of a loved one may become absorbed in a virtual world filled with fantasy and mystery.

Suller's factor theoretical model. Suller's factor analysis is based on Maslow's hierarchy of needs theory as an explanatory model of Internet addiction. The author suggests that the distinction between healthy and problematic Internet use can be made by examining 8 factors.

Theoretical model of Grohol, J. (1999 https://www.researchgate.net/publication /23958373_Too_Much_Time_Online_Internet_Addiction_or_Healthy_Social_Interactions).
Grohl suggests that Internet use develops in three stages. In the first, the user is delighted by the possibilities of the Internet and becomes fixated on it to the point of overuse, which continues until entering the second stage. In this stage, the user becomes disillusioned with the Internet and avoids it, considering it boring. This continues until the third stage, in which the user finds balance and begins to use the technology at a "normal" level that does not interfere with other areas of his functioning.

I.III.4. Scientific Research on Problematic Internet Use, Aggression, and Anxiety

Problematic Internet Use (PIU) has significant consequences for individuals' mental and physical health, as well as for their social functioning. On the psychological level, PIU is associated with various mental disorders, including depression, anxiety, and behavioral issues. It can exacerbate pre-existing conditions or lead to the development of new ones, highlighting the importance of early intervention and prevention (Asam et al., 2019; Piqueras et al., 2024). In addition, PIU has a serious impact on sleep quality and quantity, often leading to insomnia and other related issues. The connection between PIU and sleep disturbances is influenced by factors such as family structure and parental education, underscoring the role of social context (Kokka et al., 2021).

Social anxiety is significantly correlated with PIU. Studies show a positive relationship between the two. Adolescents and young adults with high levels of social anxiety are more prone to excessive and problematic internet use. This may be due to the fact that the Internet is often used as a means to avoid direct social interaction, reducing immediate anxiety but increasing dependence on virtual communication (Ding et al., 2023; Arinda et al., 2024).

Psychiatric comorbidities are one of the strongest predictors of IPD. Adolescents with disorders such as attention deficit hyperactivity disorder (ADHD) or depressive disorders are more likely to engage in excessive Internet behavior than children without these disorders. Specific online activities, such as social networking and video games, are particularly risky for these groups, as they offer an environment to avoid real-world challenges and compensate for social deficits (Demirtas et al., 2020).

General Internet use did not show a significant association with depression, but may play a role in reducing anxiety in adolescents with high levels of baseline anxiety (Thom et al., 2018).

Gender also plays a role in this manifestation, with boys being more likely to exhibit such behavior than girls. The differences are expressed not only in the frequency of manifestation, but

also in the ways in which problematic Internet behavior affects externalizing behaviors, such as aggression or antisocial behavior (Asam et al., 2019; Zhu et al., 2023). Boys generally show higher levels of problematic Internet behavior. Girls in the PIU groups tend to experience higher levels of depression, anxiety, and stress, suggesting that although the prevalence of PIU is higher among boys, the psychological consequences are more severe for girls (Xue et al., 2023).

Research further shows that Internet addiction and certain online activities are associated with elevated levels of aggressive behavior in adolescents. This connection is particularly strong in younger teens and those in the early stages of adolescence, such as students in middle or early high school (Ko et al., 2009; Lim et al., 2015).

Adolescents who have problematic Internet behavior are significantly more likely to exhibit aggressive behaviors. This relationship can be explained by various psychological mechanisms. First, problematic Internet use is often accompanied by other psychological problems, such as anxiety, depression, and impulsivity. These conditions can reduce an individual's ability to regulate their emotions and behaviors, which in turn increases the likelihood of aggressive behavior (Lim et al., 2015; Obeid et al., 2019).

Problematic online use is not only a cause of aggressive behavior, but also a consequence of psychological difficulties that increase the risk of aggression. For example, the impulsivity that is often characteristic of these adolescents makes it difficult to regulate momentary emotional reactions. Anxiety and depression, which are also characteristic, can lead to more aggressive responses, especially when adolescents are faced with stressful situations or social conflicts (Lim et al., 2015; Obeid et al., 2019).

However, certain types of online activities are strongly associated with higher levels of aggression in adolescents, highlighting the diverse influences of the Internet on behavior. Among these activities, online chatting, viewing adult content, online gaming, and gambling stand out, which research has shown to increase the risk of aggressive behavior (Ko et al., 2009).

Research shows that impulsivity, previous experience with aggression, and experiences of cyber-victimization are significant predictors of the manifestation of cyberaggression (Álvarez-García et al., 2018; Werner et al., 2010; Chen & Chen, 2024).

Social networks and instant messaging platforms offer anonymity and distance that make it easier to engage in aggressive behavior without experiencing immediate social consequences (Piko et al., 2017; Appel et al., 2014).

CHAPTER TWO
DESIGN OF THE EMPIRICAL STUDY

II.I. Conducting the Study

II.I.1. Stages of the Study

Planning and Preparation

- Selection of methodological instruments: Standardized and validated questionnaires were selected to assess aggression, anxiety, and internet behavior. The tools were adapted to the Bulgarian school context.
- Training on how to use the tools. Questionnaires standardized for Bulgaria have been selected, purchased and training has been provided.
- Four high schools in Plovdiv were selected to ensure representation from various social and cultural backgrounds.

Ethics of the Study

- Permission: Preliminary meetings were held with school principals and guidance counselors to discuss the goals and conditions of the research.

- Informed consent: All participants provided informed consent. For minors, parental or guardian consent was also obtained, in compliance with ethical standards.

Study Organization

- Planning the implementation. Suitable dates and times for conducting the study have been agreed, taking into account the school schedule.
- Providing an environment. The questionnaires were distributed and completed during a class period, in the presence of the researcher, to ensure correct completion and to answer any questions.

Implementation

- Data collection. Participants complete the questionnaires in a controlled environment where confidentiality and comfort are ensured.
- Data cleaning. Participants who declared that they did not use digital technologies were excluded from the analysis to maintain the relevance of the study.

Post-Study Activities

- Debriefing with participants. After completing the survey, a discussion was held with the participants to explain the purpose of the study and how the collected data would be used. This included answering any questions the students might have.
- Acknowledgements. All participants and schools have received thanks for their cooperation.

Data Analysis

- Data processing. The collected responses were coded and entered into statistical software for analysis.
- Analytical procedures. Descriptive, correlation and regression analyses were performed, as well as cluster analysis to identify profiles among the sample.

II.I.2. Study Sample and Implementation

The study sample comprised 399 high school students, aged 14 to 18. Among them, 224 (66.07%) were boys and 175 (51.62%) were girls. Participants were selected from four high schools in Plovdiv, chosen to reflect a diversity of social and cultural contexts. This helped ensure a broad range of influencing factors and greater representativeness of the results.

A completed informed consent form was provided for the inclusion of each participant. For students under 18 years of age, this consent was also provided by parents or legal guardians, in accordance with the ethical standards of scientific research. The questionnaires were completed during school hours, and discussions were held beforehand with the high school principals and pedagogical advisors. These discussions aimed to negotiate the conditions for conducting the study and to ensure the appropriate organization in the school environment.

II.II. Methodological Instruments and Operationalization of Concepts

II.II.1. Measurement of Anxiety

Anxiety was conceptualized as a multidimensional construct encompassing physiological, cognitive, and social aspects. The data was collected using the Revised Children's Manifest Anxiety Scale (RCMAS), originally developed by Reynolds & Richmond (1978) and adapted for Bulgaria by Kalchev (2006).

This scale is a standardized self-report instrument containing 37 questions designed to assess the level and nature of anxiety in adolescents. The scale is binary (“Yes” or “No”), with an affirmative response indicating that an item reflects the individual’s feelings or behavior. The total anxiety score is calculated based on 28 questions, divided into three subscales:

- Physiological Reactions – 8 items
- Nervousness – 6 items

- Worry/Anxiety – 8 items
- Social Concerns – 6 items
- Lie Scale – 9 items (used for response validity)

II.II.2. Measurement of Aggression

In the study, aggression is viewed as a multi-layered construct, including various forms of expression – from physical and verbal manifestations to hidden and emotional components. Calculating the results on each of the scales allows for a detailed assessment of aggressive behavior in its various aspects. This provides a basis for investigating the relationships between aggression, anxiety and Internet behavior.

The Multidimensional Scale of Aggression for Adolescents (MSA), developed by P. Kalchev (2005), was used. This scale is a self-report instrument designed to assess various aspects of aggressive behavior. Participants rate their agreement with statements on a five-point Likert scale: "completely false," "somewhat false," "hard to say," "somewhat true," and "completely true."

The MSA includes the following subscales:
Physical Aggression – 8 items
Verbal Aggression – 8 items
Indirect Aggression – 10 items
Anger – 10 items
Hostility – 10 items
Moral Skepticism – 8 items
Distrust – 5 items

II.II.3. Measurement of Internet Behavior

The measurement of Internet behavior was conducted using a self-administered questionnaire. The formulation of the questions in the problematic Internet behavior questionnaire is based on a thorough familiarity with existing theoretical models and empirical research that examine the complexity of Internet behavior in adolescents. The included statements are inspired by concepts of behavioral addiction, which emphasize the difficulties in stopping excessive Internet use and the negative emotional reactions that occur when there is no access to it. In addition, the questionnaire integrates socio-psychological models, emphasizing the role of the Internet as a space for social compensation, building a virtual identity and obtaining emotional support, which is of particular importance in adolescence. Some of the questions reflect the ideas of cognitive-behavioral theories, which consider the importance of self-regulation and awareness of the negative consequences of excessive Internet use. The questionnaire also draws inspiration from research that establishes links between Internet behavior and mental conditions such as anxiety, depression and social isolation, and takes into account real-life observations of the behavior of adolescents, who often use the Internet as a means of escape from reality or to compensate for deficits in social contacts. Furthermore, the structure of the questions is also influenced by the main components of Internet addiction identified by Young (1998) – compulsive use, social isolation and emotional dysregulation. All these aspects contribute to the creation of a questionnaire that allows the investigation of the different dimensions of problematic Internet behavior through an integrated and multidisciplinary approach.

The questionnaire includes 25 statements, to which participants respond using a four-point scale of agreement: " Strongly disagree" (1), " Somewhat disagree" (2), " Somewhat agree" (3), " Strongly agree" (4). High scores on certain groups of questions indicate more pronounced problematic Internet-related behavior..

CHAPTER THREE
ANALYSIS AND INTERPRETATION OF THE RESULTS FROM THE EMPIRICAL STUDY

III.I. Study Results

The results of the reliability analysis for the different scales included in the aggression study show varying degrees of internal consistency, measured by Cronbach's alpha coefficient. The overall aggression scale demonstrates high reliability with a value of 0.865, confirming that it is well-constructed and provides stable measurements of overall aggressiveness. The physical aggression scale shows moderate reliability with a value of 0.626, suggesting relatively good consistency among the items. The verbal aggression scale, with an alpha coefficient of 0.479, indicates weaker internal consistency. The indirect aggression scale shows good reliability with a coefficient of 0.717, making it a reliable instrument for measuring this type of aggressiveness. The anger scale demonstrates moderate internal consistency with a value of 0.512. The hostility scale has a similar reliability value of 0.569.

The lowest Cronbach's alpha value was recorded for the moral skepticism scale (0.391), indicating significant problems with internal consistency among the items.

An analysis was conducted to examine differences between boys and girls and by age within the scale. The results of the t-test for the aggression scale by gender are presented in Table 1.

Table 1: T-Test for aggression scale by gender

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Total raw score	EVA	0.764	0.383	0.283	397	0.777	0.66536
	EVnA			0.281	362.999	0.779	0.66536
Physical aggression – raw score	EVA	0.186	0.667	0.134	397	0.893	0.06821
	EVnA			0.133	365.321	0.894	0.06821
Verbal aggression – raw score	EVA	0.545	0.461	-0.843	397	0.400	-0.35750
	EVnA			-0.836	360.356	0.404	-0.35750
Indirect aggression – raw score	EVA	0.720	0.397	0.616	397	0.538	0.40607
	EVnA			0.611	359.616	0.542	0.40607
Anger – raw score	EVA	0.317	0.574	-0.132	397	0.895	-0.06625
	EVnA			-0.132	377.002	0.895	-0.06625
Hostility – raw score	EVA	0.076	0.782	0.292	397	0.770	0.15714
	EVnA			0.293	379.494	0.769	0.15714
Moral skepticism – raw score	EVA	0.405	0.525	0.651	397	0.515	0.25589
	EVnA			0.648	365.995	0.517	0.25589
Distrust – raw score	EVA	2.671	0.103	0.623	397	0.533	0.20179
	EVnA			0.630	386.650	0.529	0.20179

The group statistics show that there are no significant gender differences across all aggression scales. The mean values for boys and girls are nearly identical both in the overall score

and in the individual subscales (physical, verbal, indirect aggression, anger, hostility, moral skepticism, and distrust). The variations in the results are moderate and similar between the sexes, indicating a relative homogeneity in aggressive behavior within the studied sample.

Table 2 presents the data related to age distribution.

Table 2: T-Test for Age Differences

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Total raw score	EVA	36.945	0.000	-4.002	397	0.000	-9.14458
	EVnA			-4.017	327.590	0.000	-9.14458
Physical aggression – raw score	EVA	12.953	0.000	-4.927	397	0.000	-2.41309
	EVnA			-4.938	366.016	0.000	-2.41309
Verbal aggression – raw score	EVA	14.320	0.000	-2.736	397	0.006	-1.14156
	EVnA			-2.743	367.010	0.006	-1.14156
Indirect aggression – raw score	EVA	36.061	0.000	-4.207	397	0.000	-2.69184
	EVnA			-4.221	334.882	0.000	-2.69184
Anger – raw score	EVA	14.850	0.000	-2.757	397	0.006	-1.36032
	EVnA			-2.763	368.014	0.006	-1.36032
Hostility – raw score	EVA	27.675	0.000	-2.378	397	0.018	-1.26112
	EVnA			-2.385	349.030	0.018	-1.26112
Moral skepticism – raw score	EVA	2.062	0.152	-1.311	397	0.191	-0.51040
	EVnA			-1.313	390.015	0.190	-0.51040
Distrust – raw score	EVA	1.490	0.223	0.728	397	0.467	0.23376
	EVnA			0.728	395.533	0.467	0.23376

The T-test revealed statistically significant age differences in aggression.

Students aged 16–18 demonstrated higher levels of overall, physical, verbal, and indirect aggression, as well as anger and hostility, compared to the 14–15 age group ($p < 0.01$). No significant differences were found in the scales for moral skepticism and distrust, suggesting that these components are not substantially influenced by age within the studied sample.

Anxiety scales

The gender-based data related to anxiety are presented in Table 3.

The ANOVA analysis revealed significant gender differences across most anxiety scales. Boys showed higher scores on the total anxiety score, worry, social concerns, physiological reactions, and the lie scale ($p < 0.001$). Only on the nervousness scale did girls score higher ($p = 0.009$), which may reflect differences in emotional sensitivity. The data confirm that gender is a significant factor in the manifestations of anxiety during adolescence.

Age-related differences in the anxiety scales are presented in **Table 4.**

Table 3: Differences by gender

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Total score	Between Groups	1533.570	1	1533.570	101.194	0.000
	Within Groups	6016.460	397	15.155		
	Total	7550.030	398			
Worry score	Between Groups	518.590	1	518.590	220.223	0.000
	Within Groups	934.874	397	2.355		
	Total	1453.464	398			
Social concerns score	Between Groups	90.375	1	90.375	64.392	0.000
	Within Groups	557.194	397	1.404		
	Total	647.569	398			
Physiological reactions score	Between Groups	80.943	1	80.943	44.575	0.000
	Within Groups	720.897	397	1.816		
	Total	801.840	398			
Nervousness score	Between Groups	11.477	1	11.477	6.820	0.009
	Within Groups	668.102	397	1.683		
	Total	679.579	398			
Lie scale score	Between Groups	58.764	1	58.764	22.500	0.000
	Within Groups	1036.880	397	2.612		
	Total	1095.644	398			

Table 4: Age differences in anxiety scales

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Total score	Between Groups	27.979	1	27.979	1.477	0.225
	Within Groups	7522.052	397	18.947		
	Total	7550.030	398			
Worry score	Between Groups	34.271	1	34.271	9.587	0.002
	Within Groups	1419.193	397	3.575		
	Total	1453.464	398			
Social concerns score	Between Groups	19.093	1	19.093	12.060	0.001
	Within Groups	628.476	397	1.583		
	Total	647.569	398			
Physiological reactions score	Between Groups	2.887	1	2.887	1.435	0.232
	Within Groups	798.952	397	2.012		
	Total	801.840	398			
Nervousness score	Between Groups	16.724	1	16.724	10.016	0.002
	Within Groups	662.855	397	1.670		
	Total	679.579	398			
Lie scale score	Between Groups	4.218	1	4.218	1.534	0.216
	Within Groups	1091.426	397	2.749		
	Total	1095.644	398			

The analysis of age differences in anxiety reveals selective effects. Significant differences were found in worry, social concerns, and nervousness ($p < 0.01$), with students aged 16–18 demonstrating higher scores. No significant differences were observed in the total score, physiological reactions, or the lie scale. This indicates that certain components of anxiety increase with age, likely due to greater social awareness and pressures in later adolescence.

Factor Analysis of the Questionnaire on Harmful Internet Behavior

An original questionnaire on harmful internet behavior was developed, aimed at identifying signs of addiction and loss of control among teenagers. The goal was to capture key behavioral manifestations with negative consequences in personal, social, and academic contexts. To validate the tool, a factor analysis was conducted, which revealed the questionnaire's structure and confirmed its measurement validity. This analysis is essential for assessing construct validity and identifying subscales that reflect the main aspects of problematic internet use.

The results of the factor analysis are presented in **Table 7.**

Table 7: Factor Analysis.

Rotated Component Matrix[a]

	Component		
	1	2	3
15. The Internet makes me stop worrying about everything around me.	.853		
6. Communicating online gives me the freedom to get to know people more easily.	.824		
7. My friends and acquaintances online treat me better than those I interact with in person.	.787		
5. When I'm on the Internet, I feel uplifted.	.741		
12. There is much more entertainment on the Internet than with acquaintances or friends in real life.	.717		
3. I feel safer when I'm online than when I communicate face-to-face.	.707		
2. I feel more liked when I interact online than during face-to-face contact.	.704		
16. I feel lonelier during real-life communication than when I'm having fun online.	.698		
14. My reality is on the Internet.	.677		
21. If I don't go online, I feel bored and don't know how to entertain myself.	.565		
13. It's hard to convince my loved ones that I'm more appreciated by my online friends than in real life.	.370		
18. I feel nervous and anxious if I forget my phone at home and can't access the Internet.		.672	
9. My parents and loved ones criticize me for spending too much time online.		.627	
8. I spend a lot of time on the Internet.		.617	
4. After being online for a long time, I often want to go back again.		.599	
11. I often feel like using the Internet again, even if I just logged off moments ago.		.590	
20. Often, when I'm online, I can say or write something to someone that I wouldn't be able to say face-to-face.		.586	
22. I prefer being online rather than doing things my loved ones have asked me to do.		.565	
17. Sometimes, even if I wake up during the night, I go online.		.521	
19. I live in an online world and don't want to stop using the Internet constantly.		.469	
1. I feel most comfortable when I log into the Internet from any device.		.299	
23. I don't want to spend so much time on the Internet—I think it's harmful for me.			.833
25. Sometimes I feel that the Internet really harms me when I spend too much time on it.			.823
24. I feel anxious that I can't quit constantly going online.			.599
10. I set a goal for how much time to spend online and try not to exceed it.			.193

A concise academic summary of the factor structure analysis is as follows:

- The factor analysis of the original questionnaire on harmful internet behavior revealed three main factors:
- Social-emotional significance of the internet, reflecting the role of the online environment as a means of alleviating anxiety, fostering social connection, and providing a sense of security. The highest factor loadings were observed in items related to psychological relief and social freedom.
- Behavioral engagement with the internet, associated with excessive use, difficulty in limiting usage, and ritualized habits. The items reflect behavioral patterns characteristic of dependency and impaired self-regulation.
- Critical thinking and self-regulation, capturing awareness of the harmful effects of excessive use and efforts at self-control. Items with high loadings indicated pronounced self-reflection.

The results confirm good construct validity of the instrument, as the factor structure encompasses key dimensions of problematic internet use. This validates the questionnaire as a suitable tool for assessing digital behavior in adolescents.

The average values across the different scales are presented below in Table 8.

Table 8: Mean Values of the Scales

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Social and Emotional Internet-Related Behavior	399	1.27	4.00	3.0633	.57713
Behavioral engagement with the internet	399	1.20	4.00	3.8243	.23508
Critical Thinking and Self-Regulation in Internet Use	399	1.00	2.25	1.1679	.29281
Valid N (listwise)	399				

The mean values across the three factors of the questionnaire reveal significant behavioral trends. The highest mean score was for behavioral engagement with the internet (M = 3.32), indicating strong and intensive daily use of the internet. The social-emotional significance of the internet also showed a clearly expressed value (M = 3.06), suggesting that participants use the internet for emotional regulation and social interactions. In sharp contrast, self-regulation and critical thinking regarding internet use had the lowest score (M = 1.17), indicating low awareness of the negative effects and a lack of control. This discrepancy between high engagement and low self-reflection underscores the risk of problematic internet use. No significant differences were found across gender or age groups.

Interaction Between the Scales

Correlational Analysis

The results of the correlations between the questionnaire's internet use factors and the other two are presented in **Table 9**.

Table 9: Correlations Between Internet Behavior and Other Scales

Correlations

		Social and Emotional Internet-Related Behavior	Behavioral engagement with the internet	Critical Thinking and Self-Regulation in Internet Use
Physical aggression – mean value	R		.209**	-.180**
	Sig.		0.000	0.000
Verbal aggression – mean value	R	-.161**		
	Sig.	0.001		
Indirect aggression – mean value	R	-.104*	.163**	-.129*
	Sig.	0.037	0.001	0.010
Anger – mean value	R	-.110*		-.104*
	Sig.	0.029		0.039
Hostility – mean value	R			
	Sig.			
Moral skepticism – mean value	R			
	Sig.			
Distrust – mean value	R	-.155**	-.142**	
	Sig.	0.002	0.004	
Worry – mean values	R	.106*	.173**	
	Sig.	0.034	0.001	
Social concerns – mean values	R	.121*	.171**	
	Sig.	0.016	0.001	
Physiological reactions – mean values	R	.138**	.196**	
	Sig.	0.006	0.000	
Nervousness – mean values	R	-.148**		
	Sig.	0.003		

Social-emotional engagement on the internet is negatively correlated with verbal and indirect aggression, anger, distrust, and nervousness ($p < 0.05$). This suggests that higher levels of aggression and anxiety hinder quality social interaction online.

Behavioral engagement shows positive correlations with physical and indirect aggression, as well as worry, social concerns, and physiological reactions ($p < 0.01$). This indicates a tendency toward intense and impulsive online activity in individuals with elevated aggression and anxiety.

Critical thinking and self-regulation regarding internet use are negatively associated with aggression (physical, indirect, anger, distrust) and nervousness ($p < 0.05$). This shows that individuals with lower aggression and anxiety demonstrate greater awareness of risks and better control over their digital behavior.

Aggressive and anxious individuals display higher behavioral engagement, but weaker self-regulation and less social connectedness online. These data lay the foundation for further regression and mediation analyses.

Regression Models

Table 10 presents the influence of anxiety scales on the social and emotional aspects of internet behavior.

Table 10: Social and Emotional Aspect in Relation to Anxiety

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.401	.150		22.634	<.001
	Worry – mean values	.062	.057	.060	1.099	.272
	Physiological reactions – mean values	.147	.069	.117	2.143	.033
	Physical aggression – mean value	.069	.023	.184	3.044	.002
	Verbal aggression – mean value	-.032	.026	-.072	-1.252	.211
	Indirect aggression – mean value	.034	.022	.095	1.548	.122
	Distrust – mean value	-.058	.019	-.159	-3.129	.002

a. Dependent Variable: Behavioral engagement with the internet

The regression model explains 11% of the variance in behavioral engagement with the internet, identifying three significant predictors. Physical aggression ($\beta = 0.184$, $p = 0.002$) and physiological anxiety reactions ($\beta = 0.117$, $p = 0.033$) predicted higher engagement, while distrust ($\beta = –0.159$, $p = 0.002$) had the opposite effect. This suggests that aggression and anxiety enhance digital engagement, while distrust limits it. The models for the remaining factors did not explain enough variance and were not interpreted.

Differences in Means Based on Internet Use Levels

To categorize participants based on their scores on the three factors related to Internet behavior – " Social and emotional connectedness", " Behavioral engagement", and " Critical thinking and self-regulation", the visual binning method was used.

Analysis of variance

The ANOVA provides insight into which groups differ the most and helps clarify the interconnections between psychological traits and different categories of internet behavior. Results regarding the social and emotional scale are presented in **Table 11**.

Table 11: ANOVA of the Social and Emotional Behavior Scale

Multiple Comparisons

Tukey HSD

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Worry – mean values	High Value	Low Value	0.09320	0.03645	0.053	-0.0009	0.1873
		Lower Norm	.09273*	0.03503	0.042	0.0023	0.1831
Social concerns – mean values	Low Value	High Value	-.08469*	0.02927	0.021	-0.1602	-0.0092
Physiological reactions – mean values	Low Value	High Value	-.09881*	0.02982	0.006	-0.1757	-0.0219
Nervousness – mean values	Low Value	Upper Norm	.12153*	0.03865	0.010	0.0218	0.2212
	Lower Norm	Upper Norm	.11905*	0.03653	0.007	0.0248	0.2133
Verbal aggression – mean value	Low Value	Upper Norm	.19010*	0.07163	0.041	0.0053	0.3749
Indirect aggression – mean value	Low Value	Upper Norm	.25813*	0.08888	0.020	0.0288	0.4874
Anger – mean value	Lower Norm	Upper Norm	.17224*	0.06395	0.037	0.0072	0.3372
Hostility – mean value	Low Value	Upper Norm	.22063*	0.07236	0.013	0.0339	0.4073

Analysis of variance showed that participants with high levels of socially and emotionally engaged internet behavior demonstrated significantly higher scores on the anxiety and aggression scales. Specifically, anxiety, social concerns, physiological reactions, and nervousness were statistically more pronounced in these participants ($p < 0.05$), suggesting increased emotional vulnerability.

Significantly higher verbal and indirect aggression, as well as increased levels of anger and hostility, were also reported in individuals with high online social engagement ($p < 0.05$). These results indicate that socio-emotional connectedness in the online environment can be accompanied by emotional and behavioral stress, which highlights the need for interventions aimed at building sustainable digital practices and psycho-emotional regulation in adolescents.

The section concludes with the presentation of a scale that considers internet behavior as a function of behavioral necessity only. The results are presented in Table 12.

Table 12: Relationship Between Internet Behavior and Anxiety/Aggression Scales

Multiple Comparisons

Tukey HSD

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Worry – mean values	Low Value	Lower Norm	-.11274*	0.03924	0.012	-0.2051	-0.0204
		Upper Norm	-.14919*	0.03615	0.000	-0.2342	-0.0641
Social concerns – mean values	Low Value	Lower Norm	-.08644*	0.03129	0.016	-0.1601	-0.0128
		Upper Norm	-.13283*	0.02883	0.000	-0.2006	-0.0650
Physiological reactions – mean values	Low Value	Lower Norm	-.10806*	0.03165	0.002	-0.1825	-0.0336
		Upper Norm	-.15943*	0.02916	0.000	-0.2280	-0.0908
	Lower Norm	Upper Norm	-.05137*	0.02047	0.033	-0.0995	-0.0032
Physical aggression – mean value	Low Value	Upper Norm	-.32967*	0.10094	0.003	-0.5671	-0.0922
Indirect aggression – mean value	Low Value	Lower Norm	-.29727*	0.11336	0.025	-0.5640	-0.0306
		Upper Norm	-.38264*	0.10444	0.001	-0.6283	-0.1369
Distrust – mean value	Low Value	Upper Norm	.26991*	0.10350	0.026	0.0264	0.5134

The ANOVA analysis reveals that behavioral engagement with the internet is significantly associated with various emotional and behavioral indicators. Participants with high engagement demonstrate elevated levels of worry, social concerns, physiological reactions, as well as physical and indirect aggression ($p < 0.05$). Conversely, they show lower levels of distrust, which may reflect a greater tendency toward social openness in the online environment.

Respondents with low engagement are characterized by lower levels of anxiety and aggressiveness, but higher levels of distrust, suggesting a tendency toward social detachment. These results underscore the dual nature of internet engagement—on the one hand, it is linked to more active social integration, but on the other, it is associated with increased emotional and behavioral risk.

Another factor considered is critical thinking and the ability to plan behavior on the internet. The results are presented in Table 13.

The analysis of the scale for critical thinking and self-regulation in relation to internet behavior reveals significant differences across several emotional and behavioral indicators. Participants with high critical awareness demonstrate higher levels of social concerns and physiological reactions ($p < 0.05$), suggesting increased emotional discomfort associated with awareness of their online behavior.

At the same time, higher levels of physical and indirect aggression, anger, and hostility are reported among critically aware participants ($p < 0.01$), indicating that awareness of risk is not necessarily a protective factor but may be accompanied by heightened emotional and behavioral

reactivity. These findings highlight the ambivalent nature of critical thinking—it implies awareness and regulation, but is also associated with increased internal conflict and tension, which can manifest in aggressive attitudes.

Table 13: Dispersion of critical thinking and scales for aggression and anxiety

Multiple Comparisons

Tukey HSD

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Social concerns – mean values	Lower Norm	Upper Norm	.07063*	0.02775	0.030	0.0054	0.1359
Physiological reactions – mean values	Lower Norm	Upper Norm	.07781*	0.02835	0.017	0.0111	0.1445
Physical aggression – mean value	Lower Norm	Upper Norm	.51974*	0.09298	0.000	0.3010	0.7385
		High Value	.24025*	0.07762	0.006	0.0576	0.4229
	Upper Norm	High Value	-.27949*	0.10944	0.030	-0.5370	-0.0220
Indirect aggression – mean value	Lower Norm	Upper Norm	.45851*	0.09783	0.000	0.2284	0.6887
	Upper Norm	High Value	-.29497*	0.11515	0.029	-0.5659	-0.0241
Anger – mean value	Lower Norm	Upper Norm	.27894*	0.07532	0.001	0.1018	0.4561
Hostility – mean value	Lower Norm	Upper Norm	.35929*	0.08013	0.000	0.1708	0.5478
	Upper Norm	High Value	-.25544*	0.09432	0.019	-0.4773	-0.0336

A K-Means cluster analysis was applied in the study to identify homogeneous groups of participants based on their levels of anxiety, aggression, and internet behavior. Standardized scores (z-values) and aggregated means were used to ensure comparability across different variables and more accurate cluster formation. The method allows for segmentation of the sample into distinct psychological profiles reflecting complex patterns of emotional and behavioral online engagement. The resulting clusters provide a basis for deeper understanding of the interactions between anxiety, aggression, and digital behavior and lay the groundwork for targeted intervention strategies. The results of the analysis are shown in Table 14.

Table 14: K-Means Cluster Analysis for the Studied Groups

Final Cluster Centers

	Cluster	
	1	2
Zscore: Worry	.16909	-.23533
Zscore: Social and emotionally connected behavior on the internet	.62193	-.84170
Zscore: Behavioral engagement with the internet	.51718	-.64853
Zscore: Criticality and self-regulation of internet use	-.44411	.61774
Zscore: Mean Raw Score AGGRESSION	.01412	-.02334

Number of Cases in each Cluster

Cluster	1	231.000
	2	167.000
Valid		398.000
Missing		.000

The cluster analysis identified two participant profiles based on anxiety, aggression, and internet behavior.

Cluster 1 includes individuals with high social and behavioral engagement online and low self-regulation. These participants exhibit moderate levels of anxiety and average levels of aggression. They tend to use the internet as an emotional resource but show deficits in critical awareness and behavioral control.

Cluster 2 is characterized by low anxiety, low internet activity, and high self-regulation, suggesting more controlled and goal-directed online behavior, yet with limited social engagement in the digital environment.

The comparison between the two clusters highlights the role of self-regulation as a key protective factor against problematic internet behavior. High engagement combined with low self-control (Cluster 1) increases the risk of emotional dependence and difficulties in disengaging from online activities. Conversely, participants with stronger regulatory mechanisms (Cluster 2) appear to use the internet more moderately, although with more restricted social activity.

To further verify the differences between the two clusters, an independent samples t-test was conducted. The test assessed the significance of differences across key variables—anxiety, aggression, and aspects of internet behavior—between the identified groups. The results confirmed statistically significant differences, validating the profiles formed through the cluster analysis and providing a deeper understanding of the psychological characteristics of each group. The findings contribute to the formulation of targeted recommendations regarding intervention and prevention of problematic internet use. The results are presented in Table 15.

Table 15: T-Test Results

Group Statistics

	Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Physical aggression – mean value	1	231	3.5135	.55648	.03661
	2	167	3.3263	.70295	.05440
Verbal aggression – mean value	1	231	3.3983	.48894	.03217
	2	167	3.5120	.56658	.04384
Indirect aggression – mean value	1	231	3.3827	.54266	.03570
	2	167	3.2665	.77705	.06013
Anger – mean value	1	231	3.5381	.47008	.03093
	2	167	3.4737	.53088	.04108
Hostility – mean value	1	231	3.4199	.48575	.03196
	2	167	3.3353	.58896	.04558
Moral skepticism – mean value	1	231	3.5509	.46022	.03028
	2	167	3.6070	.51962	.04021
Distrust – mean value	1	231	3.4130	.63575	.04183
	2	167	3.5940	.63376	.04904
Worry – mean values	1	231	1.8256	.19067	.01255
	2	167	1.7297	.26005	.02012
Social concerns – mean values	1	231	1.8893	.15827	.01041
	2	167	1.8041	.20111	.01556
Physiological reactions – mean values	1	231	1.9098	.15672	.01031
	2	167	1.8174	.20957	.01622
Nervousness – mean values	1	231	1.6883	.28786	.01894
	2	167	1.7081	.28339	.02193

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Physical aggression – mean value	EVA	4.301	.039	2.962	396	.002	.003	.18718	.06319	.06296	.31141
	EVnA			2.855	305.265	.002	.005	.18718	.06557	.05815	.31621
Verbal aggression – mean value	EVA	5.485	.020	-2.141	396	.016	.033	-.11371	.05311	-.21812	-.00929
	EVnA			-2.091	324.891	.019	.037	-.11371	.05438	-.22069	-.00673
Indirect aggression – mean value	EVA	14.929	<.001	1.757	396	.040	.080	.11622	.06615	-.01383	.24627
	EVnA			1.662	278.689	.049	.098	.11622	.06993	-.02144	.25388
Anger – mean value	EVA	2.193	.139	1.278	396	.101	.202	.06444	.05043	-.03470	.16358
	EVnA			1.253	330.813	.106	.211	.06444	.05142	-.03671	.16560
Hostility – mean value	EVA	2.840	.093	1.567	396	.059	.118	.08458	.05398	-.02154	.19071
	EVnA			1.520	314.512	.065	.130	.08458	.05566	-.02494	.19411
Moral skepticism – mean value	EVA	1.007	.316	-1.138	396	.128	.256	-.05617	.04936	-.15322	.04088
	EVnA			-1.116	330.866	.133	.265	-.05617	.05034	-.15519	.04285
Distrust – mean value	EVA	.310	.578	-2.807	396	.003	.005	-.18102	.06449	-.30781	-.05424
	EVnA			-2.808	358.459	.003	.005	-.18102	.06446	-.30779	-.05426
Worry – mean values	EVA	14.964	<.001	4.246	396	<.001	<.001	.09592	.02259	.05151	.14033
	EVnA			4.045	288.645	<.001	<.001	.09592	.02371	.04925	.14259
Social concerns – mean values	EVA	16.706	<.001	4.726	396	<.001	<.001	.08520	.01803	.04975	.12064
	EVnA			4.550	303.947	<.001	<.001	.08520	.01872	.04835	.12204
Physiological reactions – mean values	EVA	16.719	<.001	5.035	396	<.001	<.001	.09245	.01836	.05635	.12854
	EVnA			4.811	292.810	<.001	<.001	.09245	.01922	.05462	.13027
Nervousness – mean values	EVA	.355	.552	-.681	396	.248	.496	-.01977	.02905	-.07688	.03734
	EVnA			-.682	361.028	.248	.495	-.01977	.02898	-.07676	.03721

The independent samples t-test confirms statistically significant differences between the two clusters across several key indicators. Participants in Cluster 1 exhibit higher levels of anxiety, including worry, social concerns, and physiological responses ($p < 0.001$), as well as elevated physical aggression ($p = 0.003$). They also display lower self-regulation, which is accompanied by stronger social and behavioral engagement in internet use. These characteristics delineate a profile of emotionally reactive and impulsive users who are likely to utilize the internet as a means of coping with stress and social insecurity.

Cluster 2, in contrast, is marked by lower levels of anxiety and aggression, and by higher levels of critical thinking and self-regulation ($p < 0.01$). Participants in this group approach internet use with greater control and awareness, demonstrating lower engagement in social online contexts but higher levels of distrust, reflecting a protective social distance.

The comparison between the two clusters underscores the role of self-regulation as a psychological buffer against problematic internet behavior. While Cluster 1 appears more vulnerable to dependency and emotionally driven online activity, Cluster 2 exhibits a profile of more controlled, though socially more reserved, internet users.

III. II. CONCLUSIONS

The present study analyzes the interrelations between anxiety, aggression, and internet behavior among adolescents by combining psychometric data and multistep statistical analyses. The results confirm that high levels of anxiety and aggressiveness are associated with increased social and behavioral engagement on the internet, which, however, is often accompanied by low self-regulation and critical thinking, and consequently — a higher risk of problematic digital behavior.

Gender and age-based analysis confirms the existence of socially modeled and age-related differences. Boys demonstrate higher levels of externally expressed aggression (physical aggression, anger, hostility), while girls exhibit more internally directed anxiety (social concerns, physiological reactions). Younger adolescents show greater emotional vulnerability and social engagement online, whereas older adolescents demonstrate better self-regulation, likely reflecting cognitive maturation and social experience.

Correlation and regression analyses confirm that aggressiveness and anxiety are key predictors of behavioral internet engagement, while also showing an inverse relationship with critical thinking and self-reflection. Higher levels of anxiety, social worries, and physiological reactions are linked to compensatory use of the internet, while high distrust and self-reflection limit engagement but also reduce online social connectedness.

Cluster analysis identified two distinct psychological profiles:

- Cluster 1: Emotionally reactive, with high anxiety, physical aggression, and internet engagement, but low self-regulation — a profile vulnerable to problematic digital behavior.
- Cluster 2: Self-regulated and critical, with low anxiety and aggression, high awareness and control over internet use, but limited social activity online.

The differences between these profiles highlight the central role of emotional regulation and self-control skills as protective mechanisms against risky internet behavior. It was confirmed that the internet often serves a compensatory function for adolescents with elevated anxiety and aggressiveness, underscoring the need for psychological interventions aimed at developing regulatory skills.

Factor analysis validated the author-developed instrument for measuring harmful internet behavior, identifying three stable factors: socio-emotional significance, behavioral engagement, and self-regulation, providing a foundation for future research and applied interventions.

The hypotheses of the study are confirmed. The research fulfills its objectives by offering a reliable empirical model for understanding the interactions between personality traits and internet behavior in adolescents. The results have direct practical applications, emphasizing the need for targeted educational and psycho-preventive programs focused on emotional regulation and digital self-reflection.

III.III. CONTRIBUTIONS

III.III.1. THEORETICAL CONTRIBUTIONS

This study contributes to the expansion of theoretical and scientific knowledge in the field of adolescent psychology, problematic internet behavior, and its interrelations with aggression and anxiety. The theoretical and scientific contributions can be summarized in the following aspects:

1. Examination of the complex interrelations between anxiety, aggression, and internet behavior.

The study provides an in-depth analysis of how different aspects of aggression (physical, verbal, indirect) and anxiety (physiological, social concerns) influence socio-emotional connectedness, behavioral engagement, and self-regulation in a digital environment. This enriches existing theories of internet behavior as a multifaceted phenomenon.

2. Identification of specific profiles of digital behavior through cluster analysis.

For the first time, two main adolescent profiles are defined — socially engaged with low self-regulation, and anxious with strong self-reflection. These profiles contribute to a better understanding of the different ways personality traits influence internet behavior.

3. Validation of an original questionnaire on internet behavior.

The development and implementation of an original tool for assessing problematic internet behavior provides a new methodological approach for studying the phenomenon. Factor analysis confirms the structure of the questionnaire, with the three identified factors (socio-emotional engagement, behavioral engagement, and critical thinking/self-reflection) offering a clear theoretical framework for studying internet behavior.

4. Inclusion of gender and age differences as significant factors.

The study expands understanding of how gender and age moderate the influence of aggression and anxiety on internet behavior. The data show that boys and girls exhibit different behavioral and emotional patterns that affect how they interact with the internet.

5. Application of an integrated approach to the study of problematic internet behavior.

The research combines various theoretical perspectives, including social-psychological and cognitive-behavioral theories, offering new opportunities for integration between different scientific domains. This enables the study of internet behavior as part of a broader context that includes personality, social, and emotional factors.

III.III.2. PRACTICAL CONTRIBUTIONS

The study offers significant practical contributions that can support the development of effective interventions, educational programs, and policies for managing problematic internet behavior in adolescents. These contributions include:

1. Development of an assessment tool for problematic internet behavior.

The original questionnaire provides a reliable instrument for measuring various aspects of internet behavior, such as socio-emotional engagement, behavioral dependence, and critical thinking/self-reflection. This tool can be used in school, clinical, and research settings to identify at-risk groups and monitor adolescents' digital behavior.

2. Identification of risk profiles through cluster analysis. The study outlines two main adolescent profiles — socially engaged with low self-regulation and anxious with strong critical thinking. This provides a foundation for targeted interventions tailored to the specific needs of each group. For example, programs aimed at improving self-regulation can be developed for the first profile, while the second may benefit from initiatives that promote social engagement.

3. Prevention of problematic internet behavior. The study's findings can be used to develop preventive programs to be integrated into the school environment. These programs may include training on mindful internet use, time management online, building emotional resilience, and coping with stress.

4. Improvement of emotional regulation skills. Identifying the relationship between aggression, anxiety, and internet behavior provides guidance for developing emotion-focused interventions. Programs may include cognitive-behavioral techniques for managing anxiety and anger, which could reduce the risk of problematic internet behavior.

5. Support for parents and teachers. The results can serve as a foundation for training and seminars for parents and educators, informing them about the signs of problematic internet behavior and ways to support adolescents. This includes developing effective communication skills, encouraging offline family activities, and building trusting relationships.

6. Policies for digital literacy. The study highlights the importance of digital literacy as a means of prevention. It can support the creation of educational initiatives that promote critical thinking, conscious consumption of online content, and the provision of a safe digital environment.

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