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Determinants of Autobiographical Memory

Izzah Ahmad

University of Bucharest

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University of Bucharest, Department of Psychology, 90 Panduri Av, Bucharest, RO.
Tel.: +40 (0) 31-425.34.45
E-mail address: ahmad.j.izzah.l19@s.fpse.unibuc.ro

ABSTRACT

Social anxiety represents a concerning problem for the general public today. It also has an important impact on human memory. The present study analyses the level of social anxiety on a non-clinical group of people. The study involved 102 people aged between 19 and 70 years, M = 25.28, SD = 9.02. Of these, 16 are male (16%) and 86 are female (84%). We focus on characteristics such as the specificity and vividness of a memory. We also consider negative emotionality a moderating variable in this relationship. Results show that almost half of the memories people described can be considered not specific (M = 7.76, SD = 3.82). Furthermore, regression analysis shows that only one of the two types of anxiety, respectively performance anxiety is negatively associated with autobiographical memory. The present research could assist in further developing the process of cognitive restructuring by providing more clarity on how social anxiety affects autobiographical memory.

Keywords: *social anxiety, performance anxiety, autobiographical memory, negative emotionality*

1. INTRODUCTION

Memory can be defined as “the means by which we use our past experiences to use this information in the present” (Sternberg, 1999). This definition emphasizes the importance of the moments in each individual’s life and how they are used in their present and future. Memory helps to build the narrative thread of each person's life, it metaphorically represents "a novel" - encoded, stored, and remembered as needed in the human mind.

Thus, researchers have categorized memory over time into several types and subtypes, with different contents, uses, and characteristics. For example, researchers Camina and Güell (2017) reiterate the three major classifications of memory that the scientific community is working with today: “sensory memory, short-term memory, and long-term memory. Information from the world around us begins to be stored by sensory memory, making it possible for this information to be accessible in the future. Short-term

memory refers to information processed by the individual in a short period of time. Working memory performs this processing. Long-term memory allows us to store information for long periods of time. This information can be retrieved consciously (explicit memory) or unconsciously (implicit memory)".

In this paper, we focus on autobiographical memory, a subtype of long-term memory, differing from episodic memory in that not all memories stored in episodic memory contained autobiographical content (Fivush, 2013). Autobiographical memory is more than the memory of specific episodes; rather, autobiographical memory is the memory of a coherent and continuous identity over time (Greenwald & Pratkanis, 1984).

The roles of autobiographical memory

To clarify the purpose of the study, it is important to understand that from an evolutionary point of view, autobiographical memory appeared in the context of human survival (Donald, 2012). Recent studies have attempted to understand and explain its role and functions in the life of modern people.

Chae, Goodman, and Edelstein (2011) propose the theory that there is a possibility that early autobiographical memories may refer to emotionally charged events; in particular, negative experiences that may play a critical role in the development of autobiographical memory for adaptive reasons. In this study, the authors present the role of autobiographical memory and negative experiences in developing the type of attachment, because children learn to look at their parents both for protection from negative events and for ways of understanding them.

A theory of socio-cultural development presented by Nelson and Fivush (2004) is also a major contribution to our understanding of the development of autobiographical memory. remembered from the unique perspective of the self in relation to others ". For Nelson and Fivush, autobiographical memory develops from the interaction of social, cognitive, and communicative domains to help them function and understand.

The role of autobiographical memory in serving social and cultural functions can be considered one of the most impactful. Thus, the present study examines how social anxiety, which can be defined as a reaction manifested by fear, isolation as well as deep and debilitating self-awareness in a social context, affects the specificity of people's autobiographical memory. We focus on analyzing the characteristics of self-memories and the personal lives of individuals with average and high scores of social anxiety. The effect of negative emotionality is also included in this analysis. As mentioned earlier, there are authors who place significant importance on negative experiences and focus on them from childhood. At the same time, in adulthood, there is a tendency to faster recall and observe events with a negative connotation and also a negative evaluation of events that could take place in the future.

Hence, another function of autobiographical memory is exercised - the directive function. This autobiographical memory feature describes the use of past experiences to direct or guide current and future actions, thoughts, and behaviors. To date, studies have highlighted many ways in which the directive nature of autobiographical memory is evident (Bluck et al., 2005).

The characteristics of memory

Autobiographical memories are a complex mixture of many forms of memories and knowledge integrated into a coherent self-story that is based on memories, experiences, and moments that we have learned about ourselves from others around us and from which amount we abstracted our experiences, filtered through evaluation frameworks offered by participating in social activities, activities that favor ways of understanding said experience.

Autobiographical memory has the same set of characteristics as any other type of human memory, such as: volume (amount of information retained), speed of imprinting memories, the durability of storage, memory mobility, fidelity or specificity of updating, and prompt recall.

Over time, autobiographical memory has been the subject of empirical research on its characteristics by renowned researchers such as Francis Galton, Willem Wagenaar, Steen Larsen, Dorthe Berntsen, Alan Baddeley, and Richard White. These authors assessed their ability to recall their personal past through procedures and experimental materials such as journals, letters, or free remembering exercises. The methods implemented so far have allowed researchers in the field of memory to obtain relevant findings on a number of issues that are at the heart of the contemporary debate on autobiographical memory such as forgetting, memory specificity, phenomenology, memory content, and memory organization.

Over the last few decades, research has paid close attention to the specificity of memory. Memory specificity is usually operationalized as the ability to find specific personal memories following emotionally charged words. For a memory to be considered specific, it must consist of a certain event that took place at a certain time and place and did not last more than 1 day (Williams and Broadbent, 1986). Studies on the specificity of autobiographical memory focus on its relationship with psychopathologists such as depression or post-traumatic stress disorder (Moradi et al., 2008; Peeters et al., 2002). One of the first studies to focus on the link between depression and the specificity of autobiographical memory was conducted by JMG Williams and J. Scott (1988). Starting with studies on the biases of autobiographical memories in patients with suicidal tendencies, this paper examines whether the same phenomenon can be observed in patients diagnosed with

major primary depressive disorder. Twenty depressed patients and twenty clinically healthy participants were tested using positive and negative stimulus words and asked to relate specific personal memories. The results showed that people diagnosed with major depressive disorder were less specific in their memories, especially in response to the words positive stimulus. However, few studies reflect the relationship of autobiographical memory with several types of anxiety disorders.

As mentioned earlier, the present study focuses on how social anxiety affects the specificity of autobiographical memory and other characteristics of it, but also on how this relationship is moderated by negative emotionality. Research in the current literature pays special attention to information processing biases, such as the negativity of autobiographical memories in relation to distinct types of anxiety (Morgan, 2010; Krans et al., 2014; Romano et al., 2020).

Recent studies such as the one conducted by Hallford et al., 2019, that proved a significant decreases in the specificity of autobiographical memory for anxious people, in comparison to participants in the control group, and, show a clear effect of anxiety on memory. The literature is still in constant need of information on this subject. Given that anxiety is a condition where subjective suffering is at the forefront and negative emotions prevail, the effect of negative emotionality on this relationship is deductible but requires more complex analysis.

It is important to note that more additional studies are needed to determine the factors that influence autobiographical memory to have a more complex and in-depth understanding of the variables that affect its quality as well as the overall well-being of the individual.

Autobiographical memory

Memory is the higher cognitive psychic process that ensures the imprinting, storage, and updating of information, of experience in the form of memories. The content of the memory is diverse, including images, emotions, words and inferences. Memory is in interaction and interdependence with all other psychic phenomena and processes (Zlate, 2009).

Memory is today defined in psychology as the ability to encode, store, and retrieve information in the mind (Squire, 2009). Psychologists have found that memory includes three important categories: sensory, short-term, and long-term. Each of these types of memory has different attributes, for example, sensory memory is not consciously controlled, short-term memory can hold only limited information, and long-term memory can store an indefinite amount of information.

Memory can be broadly conceptualized as consisting of two major systems, declarative and non-declarative memory. Non-declarative memory includes multiple systems, including procedural knowledge, such as knowledge of skills and actions that are well practiced and performed automatically or unconsciously (Schacter et al. 2000).

Declarative memory, on the other hand, is explicit and available to the conscience. Included here are explicit representations of past experiences that we focus on in this paper. In 1972, Tulving made a distinction between semantic and episodic declarative memory. Thus, semantic memory is the explicit knowledge of the world. For example, we know the capital of the country where we live or its president, but we don't remember exactly when and where we found it. Episodic memories, on the other hand, are specific memories of space and time (for example, when we visited the Arc de Triomphe).

The difference between autobiographical memory and semantic memory

Similar to episodic memory, autobiographical memory "receives and stores information about temporally dated episodes or events and about the temporal-spatial relationship between them" (Tulving, 1983) This type of memory requires a complex process of recalling stored data: the person who remembers the memory must be aware of the previous conscious experience, a self-reflective mental state that Tulving calls autonomic consciousness (Tulving, 1985).

Autobiographical memory is a unique human system that integrates memories of past experiences into a global narrative of life, autobiographical memory develops in specific social and cultural contexts that refer to individual, gender, and cultural differences in the autobiographical memories of adults (Fivush, 2011).

Episodic memory is a system that allows the conscious recollection of an event and the context in which it took place. This definition implies that autobiographical memory is synonymous with episodic memory (Gardiner, 2001; Tulving, 1972). It is made up of several components, one of which involves self-awareness as an experimenter of the past event and reminiscent of the present event, which in turn involves awareness of a personal past, a timeline on which the individual can place past events in sequence, creating a sense of personal history (Roberts, 2002).

The difference between the two types of memory is that episodic memory does not necessarily include autobiographical content (Fivush, 2013). Functional neuroimaging studies of episodic memory have provided extensive evidence to suggest that prefrontal cortex regions play a role in episodic memory retrieval. A review of prefrontal cortex activations reported in autobiographical imaging studies and a subset of episodic memory studies using the list learning method reveals similarities but also substantial differences. Episodic memory studies often report activations in the right middle-dorsolateral prefrontal

cortex, but such activations are absent in autobiographical memory studies. Studies suggest that it is important for researchers to proceed with great care when conclusions from how we remember “events” from a list learned in the lab to how we remember the events in our lives (Gilboa, 2004).

Several authors, such as Conway (2001), consider it useful to restructure the perspective on declarative memory as consisting of three systems: semantic memory, episodic memory, and self or autobiographical memory.

The brain and memory

Following a great deal of research, it is now known that three areas of the brain play a significant role in the processing and storage of different types of memories: the cerebellum, hippocampus, and amygdala. The task of the cerebellum is to process procedural memories; the hippocampus is where new memories are encoded; the amygdala helps determine the memories to be stored and plays a role in determining where the memories are stored, depending on the intensity of the emotional response to an event (Simor et al., 2019; Eichenbaum et al., 2007; McGaugh et al., 1996).

There are other parts of the brain that are involved in the mental process of memory. The frontal lobes are thought to be responsible for searching for and inhibiting irrelevant information (Wheeler et al., 1997). This is how the brain differentiates information according to neceesity and gets involved in the recall process.

Autobiographical memories are made up of multimodal stimuli (meaning that it is made up of a unified package of multi-sensory sensations) that extend over time and are organized into narrative and emotional dimensions distributed throughout the brain. Evoking memories with autobiographical content involves constructing mental representations of past personal episodes by associating a series of details related to the event found. This construction process takes place flexibly with the help of the anterior and posterior parts of the hippocampus (Sekeres et al., 2018).

The affective component of autobiographical memory

The emotional content of an experience can influence how the event is remembered. Thus, it can be explained why the memories of traumatic holding a substantial emotional charge are affected in terms of quality. Stress and fear intensify amygdala activation (Calder et al., 2001) and this strengthens and intensifies traumatic memories while at the same time affecting the function of the hippocampus (Joseph, 1998), which is involved in episodic or explicit memory. Victims whose memories are not integrated into the hippocampus and cortical circuits have traces (or fragments) of implicit memory. This is why, after a stressful situation, people have difficulty remembering concrete details about that event. For example, in the case of sexual abuse, the effect of intense fear on memory may cause the memory to be intensified or may lead to fragmented or impaired memories (Wilson et al., 2020). The adrenal glands release adrenaline, which has been shown to help intensify encoding of memories in the hippocampus (McGaugh, 2013). Research shows that an adrenaline rush is thought to increase the ability to memorise a traumatic event or extremely stressful event. This strengthens the memory pathways and creates what are called "flash-bulb memories". (McGaugh, 2000). During a threatening event, the brain focuses on what is essential for survival, so as not to pay attention to insignificant and peripheral details, so it does not encode them. This argument can also be used in the case of people with high social anxiety, where people have a problem remembering positive social situations imagined (Romano & Moscovitch, 2020).

At the same time, the emotions experienced at the moment of updating the memories with autobiographical content can influence the mentioned information. In studies such as Bluck and Li (2001), using a modified repeated testing procedure for autobiographical events, participants provided narrative accounts of their memory to announce the verdict in a widely publicized murder trial. The aim of the study was to determine whether different factors would predict the initial performance over the final one. Assessments of the negative emotional reaction during the event predicted the initial amount recalled while frequency of exposure to the event predicted the final amount recalled.

Memory specificity and optimization

Memory coding is the initial learning of information. This is how the information coming from the sensory input is transformed so that it can be stored in the brain. Coding turns internal thoughts and external events into short-term and long-term memory. This is the process by which information is processed and classified for storage and retrieval. It is the first step in creating a new memory. Memory encoding converts the perceived element or event into a construct that can be stored and updated later in the brain. After this step, the determination of the specificity of that memory follows at the time of recall. Memory specificity is defined in experiments as the ability to find specific personal memories following stimulus words. For a personal memory to be considered specific, it must consist of a certain event that took place at a certain time and place and did not last more than 1 day (Williams and Broadbent, 1986). It can be seen that in the literature, studies highlight the existence of the phenomenon of Overgeneral Autobiographical Memory, which means that people tend to relate memories such as "I was on vacation at sea last month" and not a single and isolated event such as "The day I gave birth to my first child ”(Sumner et al., 2010).

Memory optimization refers to the optimal functional status of the mental process. It can be conditioned by factors: - subjective such as: the degree of involvement of the subject, interests, needs, aspirations, attitudes, the purpose of future activity, health, stress, fatigue, etc .; or factors - objectives, such as: the nature of the material, the degree of organization and systematization of the material, the volume of the material, the degree of novelty of the material.

In the present paper, we analyze the effect of the subjective factor that we assume has a negative effect on the optimal functioning of autobiographical memory - social anxiety.

Social anxiety

Social anxiety can be described as a continuum of anxiety symptoms, ranging from shyness and fear in social situations to clinically diagnosable social anxiety disorder. This concept is characterized by physiological symptoms (increased heart rate, profuse sweating, and redness of the face or neck), cognitive symptoms (fear of negative evaluation), and behavioral symptoms (withdrawal or avoidance) in social situations (Barrett & Cooper, 2014).

In the past, social anxiety has been labeled a "neglected disorder" (Liebowitz și colab., 1985), and is now an important issue of interest in the literature. Although many individuals experience social anxiety and shyness, they are usually differentiated from the clinically diagnosable form by their impact on an individual's functioning and the amount of suffering experienced. However, studies show that people with symptoms below the diagnostic threshold also reported significantly poorer life satisfaction and physical and mental health problems (Fehm et al., 2008; Aderka et al., 2012). The results of the studies clearly suggest that social anxiety below the diagnostic threshold may be associated with adverse outcomes.

According to DSM-5, the criteria for diagnosing social anxiety disorder are: persistent, intense fear or anxiety about specific social situations, because people feel that they can be judged negatively, embarrassed or humiliated, avoid social situations that cause anxiety, or endure with intense fear or anxiety (APA, 2013). The affected person tries to avoid any social situation in which he or she thinks he or she may be behaving in an embarrassing manner or in which he or she thinks he or she may be negatively assessed (for example, having a conversation, eating, or drinking in public). , to perform in front of other people).

Social anxiety disorder needs to be differentiated from other disorders, including neurodevelopmental disorders such as autism spectrum disorder, panic disorder and agoraphobia, depressive disorders, substance abuse, jand addiction disorders, body dysmorphic disorder and personality disorders, such as it would be schizoid personality disorder and avoidance personality disorder. As indicated in the DSM-5 criteria, in order to diagnose a social anxiety disorder, the individual's symptoms do not need to be better explained by the symptoms of another mental disorder. Other diagnoses that should be ruled out include hikikomori, an extreme form of social withdrawal that lasts more than 6 months, which occurs in 1.2% of adults in Japan, and schizophrenia (Yong and Nomura, 2019).

Social anxiety is a phenomenon with social and emotional impact that is shared by other primates (Suomi, Chaffin and Higley, 2011) and lower animals. Facial expressions, for example, provide important signs of social interaction in humans and other primates, including aggression and reassurance (Mogg & Bradley, 2002).

Difficulties created by social anxiety

Social anxiety disorder is the third most common mental health disorder after depression and substance abuse, with a lifetime prevalence rate of about 12% (Kessler et al. 2005).

This condition can create very serious problems in the life of the individual when it is not treated properly. For example, it is known that anxiety and depression disorders are significantly comorbid clinically (Beesdo et al., 2010; Adams et al., 2016). At the same time, people diagnosed with social anxiety disorder are susceptible to substance abuse problems to manage anxiety and physiological reactivity in social situations or to reduce the tension felt (Fallon et al., 2022; Single et al., 2022). Social isolation in the context of social anxiety disorder is a major risk factor for suicide. Studies in the field of social work show that social isolation, withdrawal from social contexts, and low perceptions of support can lead to risky behaviors such as suicide (Trout, 1980; House, 2001). One study (Katzelnick et al., 2001) found that people with a generalized social anxiety disorder had 10% lower wages than the non-clinical population.

At the same time, another part of the difficulties that people with social anxiety face in their daily life is cognitive distortions. In a study by Kuru et al. in 2018 (Kuru et al., 2018), based on cognitive models of social anxiety, they compared two groups: a control group and a clinical group with people diagnosed with social anxiety disorder. The study focused on distortions such as catastrophizing, overgeneration, personalization, or automatic and intrusive distorted thoughts, with the conclusion that people in the clinical group have more cognitive distortions than people in the clinical group.

There is a multitude of cognitive factors that contemporary theories of social anxiety consider factors that maintain the condition, such as negative perceptions of oneself, post-event ruminating, far too high perceptions of social standards, or negative emotionality (Hofmann, 2007).

Negative emotionality is the variable that we focus on in the next part of the paper and which we assume has a

moderating role in the relationship between the quality of autobiographical memory and social anxiety.

Negative emotionality

According to the American Psychological Association (APA), emotion is defined as "a complex pattern of reaction that involves experiential, behavioral, and physiological elements." Emotions, although considered “lower-level responses” because they first occur in the subcortical areas of the brain (Bennett and Hackerman, 2005), are the way in which individuals approach or manifest experiences and events in their personal lives. Emotional experiences have three components: a subjective experience, a physiological response, and a behavioral or expressive response (Heilman, 1997).

Over time, researchers in various fields have long explored the range of human emotions and their definitions, as well as how to observe and test them for clinical purposes. Emotions are physical and instinctive, instantly provoking bodily reactions to threats, rewards, and everything in between. Body reactions can be measured objectively by pupil dilation (eye-tracking), skin conductance (EDA / GSR), brain activity (EEG, fMRI), heart rate (ECG), and facial expressions. Emotions are analyzed in studies as independent variables because they are a construct that can only be manipulated indirectly, or is treated as dimensions that can be associated with changes in other variables. In the present study, we treat emotions as moderating variables in the relationship between social anxiety and autobiographical memory. In other studies, emotions are treated as dependent variables, as states whose quality or intensity can be influenced by other variables (Lin & Telzer, 2018; Komulainen et al., 2014).

Emotions influence thinking and are an essential part of cognitive processes. Thus, positive affect, for example, is thought to facilitate open or creative thinking (Isen, 2004; Filipowicz, 2006). When we experience negative emotions our mental vision becomes less flexible or irrational (Rezapour et al., 2022). At the same time, emotions have an impact on attention. The findings of the study by Strauss and Allen (2009) have important implications, as they suggest that the attentional system has a bias to detect emotional information that is most adaptable in specific circumstances.

Eckman (1999) identified six basic initial emotions: anger, disgust, fear, happiness, sadness and surprise. Negative emotions have an adaptive character, fear motivates us to fight or flee (fight or flight) in response to a threat or danger. Negative emotions motivate behavior. For example, the quality of romantic relationships and jealousy correlate significantly negatively (Newberry, 2010). Negative emotions such as embarrassment motivate others to forgive us if we did something wrong (Jordan et al., 2015). Sadness motivates sympathy and causes others to help us more (Keltner & Kring, 1998).

Individuals with high negative emotions tend to be upset and upset and have a negative outlook on themselves, while those with low size are relatively stable and self-satisfied (Watson and Clark, 1984). Negative emotionality is particularly closely linked to clinical conditions that include a prominent manifestation of subjective suffering. For example, the trait has extremely strong associations with major depression, generalized anxiety disorder, and borderline personality disorder (Watson, 2001). In support of this argument, recent evidence from twin studies strongly suggests that negative emotionality, generalized anxiety disorder, and major depression cannot be genetically distinguished; in other words, all can be traced to a single genetic diathesis that apparently reflects a vulnerability underlying subjective suffering and negative emotionality (Mineka et al. 1998).

Social anxiety and autobiographical memory

The connection between autobiographical memory and social anxiety is complex and based especially on the self-image of the individual. People with high social anxiety tend to pay close attention to how others perceive them (Winton et al., 2008; Bautista and Hope, 2015;), while autobiographical memory encodes these memories and self-images. The cognitive model of social anxiety, developed by Clark and Wells in 1995, emphasizes the importance of how people with social anxiety perceive themselves, explaining that they use "internal information made available through self-monitoring to deduce how it appears to others." people and what others think of them”(Clark, 2001). Moreover, Clark and Wells' cognitive model also argues that recent perceived social failures of the individual may be added to an extensive and internalized list of past social failures that are stored in memory, together serving to reinforce negative beliefs about social behavior. which also have the potential threats that social situations can bring.

Thus, the negative images about their own person that they find stored in the autobiographical memory influence to a great extent the way they behave. Studies show that images of one's self also affect the recollection of autobiographical memories. For example, Stopa and Jenkins (2007) conducted a study in which they used The Autobiographical Memory Task to observe the effect of self-image on memories and observed that socially anxious participants may have a natural tendency. to recall his negative autobiographical material more quickly.

Among the first studies to examine autobiographical recollection biases for threatening social events is the study by Rapee et al. (1994) in which researchers instructed individuals with social anxiety disorder and the non-anxiety control group to describe the first memory they have in mind after presenting words related to social situations (e.g., interview, party) and neutral words (e.g. river, dog). In this

section, group memories were assessed based on how much anxiety was associated with each memory. Although the memories mentioned on the basis of the words social stimulus were evaluated with greater anxiety than the memories mentioned in neutral words, the results did not indicate any difference between the anxious and non-anxious groups from a social point of view in recalling these memories.

Autobiographical memory biases have been studied and demonstrated in conditions such as depression and post-traumatic stress disorder (Dalgleish & Werner-Seidler, 2014; Schönfeld & Ehlers, 2017). However, in the field of anxiety disorders, the research examines whether such biases (Burke and Mathews, 1992; Levy and Mineka, 1998). In recent years, studies have focused on the existence of autobiographical memory biases that support and maintain social anxiety symptoms. For example, the link between early autobiographical memories and current self-images (Hackmann et al., 2000, Wild et al., 2008) and the effect of certain styles of cognitive processing on retrieving autobiographical memories (Stopa and Jenkins, 2007) together highlighted the role of autobiographical memory in the development and maintenance of social anxiety.

Clinical studies suggest that individuals with social anxiety disorder tend to be concerned about emotionally disturbing social events in the past, especially in relation to perceived social failures (Clark and Wells, 1995; Coles and Heimberg, 2002). Individuals with social anxiety disorder have a tendency to recall social situations from an observer's perspective due to detailed observation and self-monitoring during social situations that cause anxiety (Wells, Clark, & Ahmad, 1998).

Social anxiety and negative emotionality

Studies show that negative emotionality plays an important role in many forms of axis I and axis II psychopathologies. Patterns of general personality functioning usually contain a factor (for example, neuroticism or negative emotionality) that is a predisposition to feel negative emotions. More research suggests that negative emotionality is associated with a number of disorders such as depression (Wetter and Hankin, 2009; Kiosses et al., 2017), post-traumatic stress disorder (Miller et al., 2009; Meyer et al. et al., 2021), and social anxiety disorder (Valena & Szentagotai-Tatar, 2015; Sewart et al., 2020). According to a recent meta-analysis, people with high social anxiety have biases in processing and interpreting information (Chen et al., 2020). Thus, they make negative predictions about future social events (Vassilopoulos, 2005).

People with social anxiety have a hard time managing their emotions, especially during social interactions. A study (Farmer and Kashdan, 2012) conducted on 89 participants over 14 consecutive days who completed daily records in a journal of emotions, positive and negative social events, found that people with social anxiety relied more on the suppression of positive emotions and reported fewer positive social events. The findings of this study support these theories of the difficulties of regulating emotions associated with social anxiety and the constant presence of negative emotionality in their lives.

Patients interpret their performance in social situations much more critically than the control group and the independent evaluators who observed their behavior, and also underestimate their own social skills. They also have great difficulty in processing positive social feedback (Glazier & Alden, 2019). This focus on the negative aspects of the social situation and the relative inability to get something "good" from a social performance are likely to maintain the dysfunctional beliefs of social phobia that social situations are threatening and that their own performance is unlikely to be as good as it should be (Mobini, Reynolds & Mackintosh, 2013).

People with this disorder have a strong tendency to turn their attention to themselves and their own anxiety-specific reactions during a social performance - especially when they fear that they will be assessed negatively. This is known as self-centered attention and has the effect of causing socially anxious individuals to believe that they may appear as anxious as they feel inside. This prevents the objective processing of the social situation, causes them to engage in a critical self-assessment, and can negatively affect the real performance in the social situation of socially anxious individuals. Studies have shown that social phobias do show higher levels of reported self - centered attention than in nonclinical populations (Woody & Rodriguez, 2000) and that they remember their social memories more often from an observer's perspective than from a personal perspective (Spurr and Stopa, 2002).

Individuals with social anxiety disorder indulge in excessive post-event processing of social events, which includes critical self-assessment of performance and assessment of symptom severity. Such post-event rumination has the effect of maintaining negative performance evaluations over time and maintaining social anxiety. Studies have shown that post-event rumination increases anxiety and negative emotions over time (Brozovich & Heimberg, 2011).

Autobiographical memory and negative emotionality

Starting from the history of Ebbinghaus's first memory experiment, we can see the trajectory of research and the study of memories evoked by words without emotional connotation and incomprehensible to the current interest in the literature on examining memory for important experiences for each person through words with an affective load as rich as possible.

When individuals are asked to generate memories in response to reference words, retrieved memories are often assessed as meaningful personally and emotionally (e.g., Conway, 1990; Rubin and Kozin, 1984). Several studies in the literature focus on people's ability to recall memories with a negative emotional charge. It is believed that such events, which provoke physiological responses and the release of glucose and adrenal hormones into the bloodstream, often lead to an improved ability to retain information (McGaugh, 2004). The ability to recall public events with negative valences has also been studied, such as the assassination of the Swedish prime minister Olof Palme (Christianson, 1989), the terrorist attack on September 11 (Curci and Luminet, 2006) or the death of Princess Diana (Bohannon et al., 2007).

It is important to note that only some of the autobiographical information is available at any one time and the memories may be made more or less accessible by our current moods. A phenomenon often studied in cognitive research is that of memory congruent with mood. This phenomenon refers to the fact that information congruent with the current mood of the participants is more likely to be perceived, considered, stored snd retrieved at different times than information inconsistent with the mood (Miranda and Kihlstrom, 2005). Similarly, depressed patients preferentially remember aversive experiences and negative information (Direnfeld and Roberts, 2006).

Autobiographical memories have an effect on the development of negative emotions. One study (Philippe et al., 2011) examined the role of autobiographical memory networks on negative emotional experiences. The results of the study highlighted the active and discriminatory role of autobiographical memories and their networked memories of negative emotions. Autobiographical memories contribute to the negative emotional experience of people in specific situations. Representations of needs encoded in these autobiographical memories are associated with the negative emotions experienced when these memories are triggered by cues, and this mechanism can have both lasting consequences and general or situational emotional consequences.

Autobiographical memory, negative emotionality and social anxiety

According to the cognitive-behavioral models of social anxiety disorder developed by Clark and Wells, 1995, when socially anxious individuals find themselves in public, their attention is directed to “the self as seen by others. ” or “ the self as a social object”. Thus, they begin to see themselves as they seem to think they are seen by others. Clark and Wells suggest that this occurs when people get into social situations and automatically begin to see danger and threat around themselves. This tendency to see the social world as dangerous is not a response to what is actually happening in the social situation as it unfolds, but it may actually be based on the preconceived notions the socially anxious person has stored in their memory about the social world and its capacity. This is where autobiographical memory and negative emotionality come into play. The autobiographical memory stores all the information from the social situations perceived as threatening but also the image of one's own person in those moments. Negative emotionality is a supporting factor in anxiety symptoms.

However, this study focuses on the links between social anxiety and autobiographical memory. People with anxiety disorders, such as Generalized Anxiety Disorder (GAD), may suffer from memory loss. For example, research such as Balderston et al., 2017, supports the hypothesis that people with clinically severe GAD had greater difficulty remembering childhood attachment experiences than control group participants.

The present study

The main objective of this study is to analyse the moderating role of negative emotionality in the relationship between social anxiety and autobiographical memory, so we formulate the following hypotheses:

H1. *Anxiety is a significant negative predictor of autobiographical memory*.

H1a. *Performance anxiety is a significant negative predictor of autobiographical memory*.

H1b. *Social anxiety is a significant negative predictor of autobiographical memory*.

H2. *Negative emotionality moderates the relationship between anxiety and autobiographical memory*.

H2a. *Negative emotionality moderates the relationship between performance anxiety and autobiographical memory*.

H2b. *Negative emotionality moderates the relationship between social anxiety and autobiographical memory*.

2. METHODOLOGY

Participants and procedure

The study involved 102 people aged between 19 and 70 years, M = 25.28, AS = 9.02. Of these, 16 are male (16%) and 86 are female (84%). Regarding the residency, 83 participants come from urban areas (81%) and 19 from rural areas (19%), depending on their marital status, 65 people are married or in a relationship (65%) and 37 participants were not in a relationship (35%) at the time of the study. In terms of education, 62 of the 102 participants completed

higher education or are enrolled in a college (62%) and 40 of them graduated from high school alone (38%). Participants were contacted online through social networks (Facebook, WhatsApp, Instagram). Contacting participants online was a benefit for the present study, due to the fact that several types of participants of different ages and educational levels were able to complete the questionnaires. They were given a short presentation of the study in which it was explained the purpose of the study and what each questionnaire represents. They were informed of the average duration of completing the questionnaires (15-20 minutes) and were invited to participate. The first section of the online form contained informed consent. By marking the "yes" button, the respondents agreed to participate. Out of the total number of participants contacted, 102 responses were kept as complete (100%). The second section of the questionnaire included the stimulus word list. Participants did not have a certain amount of time to complete this part, they could spend as much time as they felt was necessary for each individual stimulus word. It is important to note that unlike other studies (Goddard et al., 2013), participants were not directed to provide as specific memories as possible in terms of specificity criteria. Following the completion of the first section, participants answered the five questions considered relevant in the "Autobiographical Memory Questionnaire" (Rubin et al., 2003). The questions included references to the emotions felt at the time of recall or the consistency and confidence in the memories described by the participants. The next two sections of the questionnaire contain the Leibowitz Social Anxiety Scale and PANAS-X to measure negative emotionality and the level of social anxiety for the participants in the study. The Social Anxiety Scale was used to measure the level of avoidance and anxiety of participants in certain situations. PANAS-X contains a series of words that the participants were asked to indicate to what extent they felt this way during the last week, in order to identify the association of the participants with one of the two affections: positive or negative.

Instruments

Autobiographical memory

The concept of autobiographical memory has been measured over time by several types of cognitive tasks such as: the stimulus word list method in which participants are asked to think about word-driven autobiographical memories (Tulving & Osler, 1968) or/and other stimuli (images - Schussler & Olzak, 2008; audio - Dua & Charlton, 2019); the narrative method of life (Fromholt et al., 2003), in which participants are asked to tell the experimenter about their life; the third is the journal method (Watson et al., 2013), in which subjects are no longer intentionally asked to recall certain moments as in the first two methods, but participants are asked to record involuntary autobiographical memories or unwanted as they appear; participants may return to them later if necessary to provide additional information. These three methods are meant to be as open as possible and to provide an unconstrained view of memory, both qualities being at the same time their main strengths and weaknesses. All of these test methods are suitable for clinical trials.

Cue words method

The cue words method was first used by Crovitz and Schiffman (1974). In essence, the cue words method consists in the successive presentation of words that are frequently used in that language and can be easily objectified by the subjects. They are asked to evoke, orally or in writing, for each word, those personal memories that come to mind first, then to date them.

This stimulus word list method is often used with adults to examine the distribution of autobiographical memories throughout life. Such studies using this tool demonstrate the existence of the concept of "childhood amnesia" - a lack of memories of events in the first 3 years of life and a gradually increasing number of memories from the age of 3 to 7 years. In the 2008 study by Bauer et al., The researchers used a modified version of the list to be used by school-age children. This study, as well as others in the literature (Hayne & Jack, 2011; Peterson et al., 2018), argue that early memories may not be consolidated and, in turn, may remain vulnerable to changes over time.

The word lists have undergone several changes over time and are found in studies in the literature in several variants ranging from the words themselves to the number of words used to evoke personal memories of the subjects: Rubin, 1982 - uses five cue words: paper, plant, wine, hospital, fire; Zola -Morgan et al. (1983) - uses ten words: bird, flag, tree, car, ship, boy, butterfly, star, clock, table; Dalgleish et al., 2007 also use ten words but divided into two categories - five pleasant words (happy, confident, interested, successful and surprised) and five unpleasant words (sad, angry, clumsy, hurt and alone).

The limitations of this method exist, although it is still the most widely used test method in the field of neuropsychology. Next, we mention limits such as: the artificial character, the criteria for choosing the cue words (to counteract this inconvenience, the rating of memories, the control of the content of memories, the control of the dating of memories (Rotărescu et al., 2013).

The list used in this study was prepared by Rotărescu et al. (2013) and contains the following fifteen words: 1. night, 2. teacher, 3. poverty, 4. cold, 5. hunger, 6. mistake, 7. food, 8. father, 9. suffering, 10 death, 11. door, 12. television, 13. home, 14. bed, 15. doctor. To choose the words, the researchers went through three stages: the lexical stage involving the generation of lists and their analysis starting from DEX (2009), the inter-evaluator stage where the criteria for listing analysis and the refining stage are established. Items are evenly distributed on the scale of the emotional

intensity they can trigger, from the most intense emotionally negative item (–4.42) to the most intense emotionally positive item (+4.66). We can also consider that the items are distributed relatively evenly in three classes: emotionally positive, emotionally neutral and emotionally negative, and thet are the words with a high frequency of use in Romanian. The purpose of the stimulus word list in the study was to provide participants with clear memories to refer to when completing the autobiographical memory questionnaire and to determine their specific and non-specific memories.

The administration of the stimulus word list was done by using an online form created by the Google forms application. Respondents were asked to complete a memory for each word and to date it approximately. They had no time limit to complete the memories evoked. The application of this method can be considered a limitation due to the fact that by applying this list orally, face to face with the evaluator, the subjects can capture the emotional component of the words through the tone of the evaluator's voice.

The Autobiographical Memory Questionnaire

The questionnaire technique in the study of autobiographical memories was first used in 1899 by Colegrove. Based on a sample of 1,658 subjects aged 9 months to 90 years, the researcher applied a questionnaire consisting of fourteen questions such as: "What is your oldest memory? No matter how mundane or childish, you are required to have the earliest experience. Make sure it's a memory and that no one has told or told it to anyone else. " wider or narrower? ". Over time, questionnaires for autobiographical memory have evolved and are now found in the literature in various forms with differences in the number of items, how to complete or apply and, the size of the memory on which it focuses, coming in addition to other cognitive tasks such as stimulus word lists to provide valid and standardized results. Thus, we find questionnaires such as: The questionnaire on the characteristics of autobiographical memory consisting of 64 items (Boyacioglu & Akfirat, 2014), The questionnaire of memory experiences (Sutin & Robins, 2007), or The questionnaire of autobiographical memory (Rubin et al., 2003) used in this study.

The autobiographical memory questionnaire (Rubin et al., 2003) is a shorter version of the 39-item questionnaire called "Memory Characteristics Questionnaire" (Johnson et al., 1988). The authors motivate the need for a shortened form of the questionnaire in order to obtain data on multiple memories from each topic.

Only 5 of the 17 questions in the questionnaire were used in this study due to the fact that they were considered the most relevant for the present study and its subject. For example, questions such as: "As I remember the event, I can now feel the emotions I felt then." or "As I remember the event, I feel like I'm reliving the original event."

Participants completed the questionnaire in a Google forms document. Measurements were made on the Likert scale from 1 to 7 where 1 = not at all, 3 = vague, 5 = distinct and 7 = clear as if it were happening right now / just like any other memory.

Social anxiety

The Liebowitz Social Anxiety Scale was used to measure social anxiety (Leibowitz, 1987). There are three versions of this scale: a self-assessment version that was used in this study - (LASA-Self-Reported), a version for clinicians (LASA-Clinician-Administered), and a version for children and adolescents (LSAS -Children and Adolescents). This scale was developed by psychiatrist and researcher Dr. Michael R. Liebowitz, containing 24 items to assess fear and hesitation in certain social situations that have the potential to trigger symptomatic anxiety.

The instructions given to the participants were as follows: "Please read the situations below. Mark, next to each of them, the level of FEAR or ANXIETY (ex: palpitations, increased heart rate, sweating, tremor) that you usually feel in that situation, respectively the extent to which you AVOID the situation of ... ". This scale is performed on a four-step Likert scale, where to measure the level of fear/anxiety 0 = Not at all and 3 = Severe, and when measuring the level of avoidance 0 = Never and 3 = Usually.

In terms of psychometric properties, studies show that the Liebowitz Social Anxiety Scale and its subscales were normally distributed (Heimberg et al., 1999) and demonstrated excellent internal consistency. The convergent validity of the scale has been demonstrated by significant correlations with other commonly used measures of social anxiety and avoidance. The scale has also been shown to be sensitive to the effects of pharmacological treatments on social phobia over time. In conclusion, the Liebowitz Social Anxiety Scale provides a reliable way to distinguish between "generalized" and "non-generalized" subtypes of social phobia (Baker et al., 2002).

Negative emotionality

To measure negative emotionality, the PANAS-X scale was used: Positive and Negative Affects - the extended form (Watson & Clark, 1994). The scale version used in this study contains 60 items, the original scale version consists of ten items, five items each to measure each positive or negative affect (Clark and Tellegen, 1988). The scale measures the two factors considered to represent the majority of the variation of self-assessed affect, together the two factors explain about one-half to three-quarters of the common variation in terms of disposition (Watson & Tellegen, 1985). The extended shape of the scale was chosen because it is simple and easy to administer. At the same time, the use of these forms is motivated by the psychometric qualities of the scale. Studies show that measurements of negative scale

effects are very robust from a statistical point of view (Bagozzi, 1992). Evidence for both convergent validity and hierarchical representation of adverse effects suggests that researchers can use scales to measure the negative effect on the overall level of general valence.

PANAS-X measures eleven specific affections: fear, sadness, guilt, hostility, shyness, fatigue, surprise, joviality, self-confidence, attention, and peace of mind. Studies show that most subjects complete the entire 60-item questionnaire in about ten minutes or even less.

The instruction for the participants to complete the scale was as follows: "This scale is made up of a number of words and statements that describe different feelings and emotions. Read each item and then mark the correct answer in the space below the word. Indicate the extent to which you have felt this way over the past week. The removal was performed on a Likert scale in five steps, where 1 = very little or not at all and 5 = extreme.

3. RESULTS

Descriptive statistics

Means, standard deviations, internal consistency coefficients and correlations between variables are presented in Table 1.

Table 1. *Means, standard deviations, internal consistency coefficients and correlations between variables*

	M	SD	α	ME	AXP	AXS	EMNE
ME	27.59	4.81	.87	1			
AXP	17.36	10.68	.94	-.54 **	1		
AXS	15.67	9.44	.95	-.47 **	.90 **	1	
EMNE	27.29	8.64	.78	-.66 **	.46 **	.43 **	1

**. p <.01

MA - Autobiographical Memory, AXP - Performance Anxiety, AXS - Social Anxiety, EMNE - Negative Emotionality

The scores for specificity of autobiographical memory are presented in Table 2.

Table 2. *Mean scores for specificity of autobiographical memory*

	N	Min.	Max.	M	SD
SMA	102	0	15	7.76	3.82

Hypotheses testing

In order to organize the data and test the hypotheses, the statistical analysis program IBM.SPSS.24 (IBM Corp, 2016) and the medmod module from Jamovi (The jamovi project, 2022) were used.

H1. *Anxiety is a significant negative predictor of autobiographical memory*.

H1a. *Performance anxiety is a significant negative predictor of autobiographical memory*.

H1b. *Social anxiety is a significant negative predictor of autobiographical memory*.

In order to test this hypothesis, a multiple linear regression analysis was performed, having as predictors the two types of anxiety, performance and social anxiety and as a dependent variable autobiographical memory.

Table 3. *Multiple linear regression analysis for anxiety as a predictor of autobiographical memory*

	Unstandardized coefficients		Standardized coefficients		
Model	B	SE	β	t	Sig.
AXP	-.27	.09	-.60	-3.05	.00
AXS	.03	.10	.07	.34	.74

R_2 = .30, AXP - performance anxiety, AXS - social anxiety

It can be observed that anxiety is responsible for 30% of the autobiographical memory variation, the regression equation being statistically significant, $F(2, 99) = 20.69$, $p < .01$. Of the two types of anxiety, only performance anxiety is negatively associated with autobiographical memory, $\beta = -.60$, $t(102) = -3.05$, $p < .01$.

Given this result, we can say that hypothesis H1 is partially supported by the analyzed data.

H2. *Negative emotionality moderates the relationship between anxiety and autobiographical memory,*

H2a. *Negative emotionality moderates the relationship between performance anxiety and autobiographical memory.*

H2b. *Negative emotionality moderates the relationship between social anxiety and autobiographical memory*.

In order to test this hypothesis, two moderation analyzes were performed, having as predictors, alternatively, performance anxiety and social anxiety, as moderator the negative emotionality and as a dependent variable the autobiographical memory.

Table 4. *Moderation estimates for negative emotionality in the relationship between performance anxiety and autobiographical memory*

			95% CI			
	appraisal	**ES**	**Min**	**MAX**	**Z**	**p**
AXP	-.13	.03	-.19	-.07	-4.35	<.001
EMNE	-.31	.04	-.38	-.24	-8.28	<.001
AXP ✻ EMNE	-.01	.00	-.02	-.01	-2.38	.017

AXP - performance anxiety, EMNE - negative emotionality

Table 5. *The relationship between performance anxiety and autobiographical memory at different values of negative emotionality*

			95% CI			
	appraisal	**ES**	**Min**	**MAX**	**Z**	**p**
Medium level	-.13	.03	-.19	-.07	-4.22	<.001
Low level	-.05	.05	-.14	.03	-1.19	.235
High level	-.21	.05	-.30	-.12	-4.50	<.001

As we can see, negative emotionality moderates the relationship between performance anxiety and autobiographical memory, $\beta = -.01$, CI95% (-.02 , -.01), $Z = -2.38$, $p < .05$. A low level of negative emotionality does not affect the relationship between performance anxiety and autobiographical memory, but a medium level and a high level of negative emotionality diminish this relationship, $\beta = -.13$, CI95% (-. 19, -.07), $Z = -4.22$, $p < .01$ at mean and $\beta = -.21$, CI95% (-. 30, -.12), $Z = -4.50$, $p < .01$.

Table 6. *Moderation estimates for negative emotionality in the relationship between social anxiety and autobiographical memory*

			95% CI			
	appraisal	**ES**	**Min**	**MAX**	**Z**	**p**
AXS	-.11	.04	-.18	-.04	-3.17	<.002
EMNE	-.33	.04	-.41	-.25	-8.46	<.001
AXS ✻ EMNE	-.01	.00	-.02	-.01	-2.02	.043

AXS - social anxiety, EMNE - negative emotionality

Table 7. The relationship between social anxiety and autobiographical memory at different values of negative emotionality

			95% CI			
	appraisal	**ES**	**Min**	**MAX**	**Z**	**p**
Medium level	-.11	.04	-.18	-.04	-3.10	<.002
Low level	-.04	.05	-.14	.06	-.73	.464
High level	-.19	.05	-.29	-.09	-3.61	<.001

It is observed that negative emotionality moderates the relationship between social anxiety and autobiographical memory, β = -.01, CI95% (-.02, -.01), Z = -2.02, p <.05. A low level of negative emotionality does not affect the relationship between social anxiety and autobiographical memory, but a medium level and a high level of negative emotionality diminish this relationship, β = -.11, CI95% (-. 18, -.04), Z = -3.10, p <.01, and at the mean level, β = -.19, CI95% (-. 29, -.09), Z = -3.61, p <.01. Taking into account these results, we can say that hypothesis H2 is supported by the analyzed data.

4. DISCUSSION

The specificity of the participants' autobiographical memories was determined manually, using the memory-specificity criteria developed by (Williams & Broadbent, 1986). The memories referring to a single, isolated event lasting no more than 24 hours, have been declared non-specific and coded "1". The specific memories of the participants were coded with "0". The descriptive statistics table reveals that almost half of the 15 memories of the participants were on average non-specific (M = 7.76, AS = 3.822). These results can be explained by the phenomenon called "overgeneral memory" (GMO). This phenomenon refers to the difficulty of finding specific autobiographical memories. The tendency to be overly general in the memory of autobiographical memory has been commonly observed among individuals with emotional disorders, compared to those without emotional disorders (Valentino, 2011). This reinforces the hypothesis that socially anxious people may have trouble remembering specific events in their lives.

Significantly negative correlations between autobiographical memory and performance anxiety (r = .54, p <.01), social anxiety (r = -.47, p <.01), and negative emotionality (r = -.66, p <.01)) reveals that as one of the variables in this relationship increases, the other decreases. Thus, the quality of autobiographical memory decreases when the scores of performance anxiety or social anxiety are high. The autobiographical memory questionnaire in this study includes questions that refer to the clarity of memories and emotions experienced by participants, which may mean that participants in this study with high scores of social anxiety have difficulty remembering their space clearly and vividly. which took place the memories or other details about them, as well as the emotions felt.

Linear regression analysis reveals that performance anxiety is a significantly better negative predictor in relation to autobiographical memory (β = -.60, t (102) = -3.05, p <.01.). Performance anxiety as seen in this study refers to the anxiety and tendency to avoid felt by participants when they have to perform actions such as "making a phone call in public" or "eating in a public space." Anxiety is responsible for 30% of the autobiographical memory variation, the regression equation being statistically significant, F (2, 99) = 20.69, p <.01.

Negative emotionality is the moderating variable in the study of the relationship between social anxiety and autobiographical memory. Thus, increased levels of negative emotionality are significantly linked with the relationship between the two variables (performance anxiety - β = -.21, CI95% (-. 30, -.12), Z = -4.50, p <.01; social anxiety - β = -.11, CI95% (-. 18, -.04), Z = -3.10). Negative emotionality is an important factor in cognitive patterns that explains the development of social anxiety disorder, so it was expected that it would play a significant moderating role in this relationship.

Final conclusions

In conclusion, the present study represents an important contribution to the specialized literature on autobiographical memory. It is important to note that the study also has limitations. The number of participants and their diversity could be expanded to provide an overview of how the specificity and other characteristics of autobiographical memory are affected by the social anxiety felt by people without a clinical diagnosis. The study had a low percentage of male participants (16%) and a high percentage of female participants (84%). Regarding the place of birth, 83 participants come from urban areas (81%) and very few from rural areas. Another limitation of the study is the method of applying the stimulus word list. Due to the application in the online environment, the emotional connotation of the cue words could not be fully felt by the participants. Thus, future studies could try to apply this part of the questionnaire, face

to face with the participants. At the same time, another limitation of the study can be considered the use of certain questions from the "Autobiographical Memory Questionnaire", thus confusing the convergent validity. The present research has practical implications that can be extended to the development of the therapeutic process of cognitive restructuring in cases of patients with social anxiety disorder. Due to the fact that negative images of oneself and imagined or real social failures remain in the repositories of autobiographical memory, people will continue to maintain anxious symptomatology such as fear of social failure.

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