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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи.** Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html. В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректуре авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საყურადღებო!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე, დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ADVANCES IN RESEARCH OF PSYCHOTHERAPY FOR SOCIAL ANXIETY DISORDER

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Abstract.

Social Anxiety Disorder (SAD) is a common anxiety disorder characterized by a persistent fear of negative evaluation, avoidance of social situations, and significant impairment in social functioning. Psychological interventions for SAD have expanded considerably in recent years, with increasing attention to treatment mechanisms, alternative delivery formats, and emerging intervention targets. Cognitive Behavioral Therapy (CBT) remains one of the most extensively studied psychological treatments for SAD, while mindfulness-based interventions, Acceptance and Commitment Therapy (ACT), Virtual Reality Exposure Therapy (VRET), and emerging integrative approaches have broadened the range of therapeutic targets and treatment strategies. This review synthesizes recent domestic and international research on psychological interventions for SAD, focusing on their theoretical foundations, empirical evidence, therapeutic targets, and clinical characteristics. Overall, current evidence supports the efficacy of CBT, while mindfulness-based interventions, ACT, VRET, and emerging integrative approaches show varying levels of evidence and require further investigation. Digital technologies are increasingly incorporated into established psychological interventions and should be understood primarily as delivery modalities rather than independent treatment categories. Future research should place greater emphasis on treatment mechanisms, active components, patient-treatment matching, and the long-term maintenance and functional significance of treatment gains.

Key words. Social anxiety disorder, cognitive behavioral therapy, mindfulness-based interventions, acceptance and commitment therapy, virtual reality exposure therapy, psychological interventions.

Introduction.

Social Anxiety Disorder (SAD) is a common anxiety disorder characterized by persistent and marked anxiety, fear of negative evaluation, and avoidance behaviors in social or performance situations. The disorder typically follows a chronic course and substantially impairs social functioning and quality of life. Individuals with SAD experience persistent and intense fear during social interactions, public speaking, or situations in which they may be observed by others, often accompanied by pronounced avoidance behaviors [1]. They are typically concerned that their actions or performance will be negatively evaluated, resulting in significant impairment in interpersonal relationships, academic achievement, and occupational functioning [2]. According to epidemiological data published in 2024, SAD is highly prevalent among children and adolescents, with estimated global prevalence rates of 4.7% in children, 8.3% in adolescents, and 17.0% in young adults [3]. The cognitive model proposed by Clark and Wells suggests that individuals

with SAD are characterized by negative self-schemas, heightened self-focused attention, and catastrophic cognitive processing, all of which contribute to the maintenance of anxiety [2]. Rapee and Heimberg further proposed that heightened sensitivity to external evaluation promotes continuous threat monitoring, safety behaviors, and avoidance, thereby creating a self-perpetuating cycle that maintains the disorder [4].

Research on psychosocial interventions for SAD has increasingly evolved toward diversified and integrative treatment approaches. Nevertheless, important questions remain regarding the underlying mechanisms, target populations, and comparative effectiveness of different therapeutic modalities [5]. Therefore, a comprehensive review of recent research is warranted to synthesize current evidence, clarify existing advances, and identify priorities for future research.

Cognitive Behavioral Therapy (CBT).

Cognitive Behavioral Therapy (CBT) is currently the most widely used and well-established evidence-based psychological intervention for the treatment of Social Anxiety Disorder (SAD). CBT primarily employs psychoeducation, cognitive restructuring, behavioral experiments, and exposure training to help patients modify maladaptive cognitive patterns and reduce avoidance behaviors.

A large number of randomized controlled trials and meta-analyses have confirmed the effectiveness of CBT in the treatment of SAD. Morina et al. [6] analyzed patients with SAD in routine clinical practice and found that CBT significantly reduced social anxiety symptoms while improving social functioning and daily adaptation. Furthermore, a meta-analysis conducted by Kindred et al. [7], which included multiple randomized controlled trials, demonstrated that CBT not only significantly alleviated symptoms of social anxiety but also maintained stable therapeutic effects during follow-up periods exceeding one year after treatment. Overall, CBT can not only alleviate social anxiety symptoms in the short term but may also promote changes in maladaptive cognitive and behavioral patterns, thereby contributing to the long-term maintenance of treatment gains in some patients. However, although the overall efficacy of CBT is well supported, the relative contributions of different treatment components to the maintenance of therapeutic effects remain unclear. For example, the extent to which cognitive restructuring and exposure training respectively contribute to the initiation and maintenance of treatment effects remains to be further elucidated.

In children and adolescents, Cognitive Behavioral Therapy (CBT) has also demonstrated favorable therapeutic effects. A systematic review conducted by Tse et al. [8] found that school-based CBT interventions effectively reduced social anxiety symptoms while improving social adaptation and classroom

engagement. The authors suggested that school settings provide natural opportunities for social interaction, which may facilitate behavioral practice and skill generalization. Similarly, Feng et al. [9] conducted a randomized controlled trial among Chinese university students and found that video conference-based group Cognitive Behavioral Therapy (CBT) significantly reduced social anxiety symptoms and improved participants' knowledge of social anxiety-related concepts. Overall, these studies indicate that CBT can be applied across different age groups and social contexts, while implementation formats such as school-based, group, and videoconference-based CBT may further expand the settings in which CBT can be delivered. However, existing studies differ in sample characteristics, treatment intensity, treatment format, and outcome measures, making it difficult to determine whether school-based, group, or videoconference-based CBT offers any distinct efficacy advantage over traditional individual face-to-face CBT. Further research directly comparing different treatment formats is therefore needed.

Regarding treatment outcome domains, Etkin et al. [10] conducted a systematic review and found that, following CBT, adolescents with anxiety disorders showed significant improvements in interpersonal relationship quality, peer acceptance, and levels of social participation. The study emphasized that treatment goals for social anxiety should not be limited to symptom reduction but should also focus on restoring positive interpersonal functioning. This perspective has contributed to a shift in outcome assessment in social anxiety research. While traditional studies primarily focused on changes in anxiety scale scores, an increasing number of recent studies have incorporated broader indicators, including quality of life, occupational functioning, and social adaptation, for comprehensive evaluation.

With the development of digital technologies, Cognitive Behavioral Therapy (CBT) has gradually extended beyond traditional face-to-face treatment models. A meta-analysis conducted by Winter et al. [11] found that remote CBT demonstrates comparable efficacy to face-to-face CBT in the treatment of social anxiety disorder, while effectively addressing limitations related to treatment availability and geographical barriers, thereby improving access to psychological services. Furthermore, a randomized controlled trial by Clark et al. [12] showed that internet-delivered cognitive therapy can significantly improve treatment efficiency while reducing therapist time input. A meta-analysis by Guo et al. [13] also confirmed that internet-based CBT produces stable therapeutic effects in reducing social anxiety symptoms. For children and adolescents, therapist-guided internet-based CBT has been shown to be more effective than unguided supportive online interventions [14]. The above studies indicate that the core therapeutic processes of CBT can be transferred relatively consistently to internet-based settings. However, existing research has focused primarily on establishing the overall efficacy of internet-delivered CBT and comparing it with traditional face-to-face treatment, while relatively little attention has been paid to the specific contributions of different treatment components within digital interventions.

Building on this work, Šipka et al. [15] conducted a randomized full factorial trial to examine the active components of internet-delivered CBT. Psychoeducation and exposure showed significant incremental effects at post-treatment, whereas cognitive restructuring and attention training did not demonstrate additional benefits when included. However, these component-specific effects were not maintained at follow-up, suggesting that the contribution of individual components may vary across treatment stages. Rather than simply asking whether ICBT is effective, this study shifts attention toward which components contribute to therapeutic change and under what conditions.

Overall, CBT for SAD has a relatively robust evidence base. Research has gradually expanded its focus from symptom improvement alone to social functioning, treatment maintenance, and the contribution of specific treatment components, while internet-based and remote technologies have helped reduce some temporal, geographic, and resource-related barriers to treatment. However, current evidence does not indicate that digital CBT is more efficacious than traditional face-to-face CBT; its primary value lies in expanding access and modifying treatment delivery rather than enhancing efficacy *per se*. Future research should therefore move beyond comparisons of treatment formats and examine the mechanisms and active components of CBT, their interaction with patient characteristics, and whether treatment gains can be maintained and translated into stable improvements in everyday social functioning.

Mindfulness-Based Interventions.

Unlike traditional Cognitive Behavioral Therapy (CBT), which primarily focuses on modifying maladaptive cognitive content, mindfulness-based interventions emphasize changing individuals' relationship with their thoughts and internal experiences. Rather than attempting to eliminate anxious thoughts, mindfulness training encourages individuals to recognize that thoughts are psychological events rather than objective facts, thereby reducing engagement with negative cognitions [16]. This therapeutic approach is highly consistent with the principles of third-wave cognitive behavioral therapies, which emphasize psychological flexibility and decentering [17].

In recent years, numerous meta-analyses and systematic reviews have demonstrated the effectiveness of mindfulness-based interventions in the treatment of social anxiety. Liu et al. [16] conducted a meta-analysis of multiple randomized controlled trials and found that mindfulness training significantly reduced social anxiety symptoms by decreasing experiential avoidance and rumination, while improving emotion regulation and quality of life. Furthermore, Galante et al. [17] reported that mindfulness-based programs were associated with improvements in overall mental well-being and subjective well-being among non-clinical adults. It should be noted that evidence of mental health promotion derived from non-clinical populations cannot be directly equated with clinical evidence for the treatment of SAD. Therefore, conclusions regarding the efficacy of mindfulness-based interventions for SAD should currently be based primarily on studies involving individuals with SAD or those experiencing clinically significant social anxiety symptoms.

With the continuous development of mindfulness research, intervention formats have become increasingly diverse, and mindfulness-based approaches have emerged as important complementary strategies for alleviating social anxiety. Mindfulness-Based Stress Reduction (MBSR) is one of the most widely implemented mindfulness programs. Ye [18] conducted a randomized controlled trial and found that Mindfulness-Based Stress Reduction (MBSR) significantly reduced social anxiety symptoms among university students, alleviating anxiety and avoidance behaviors in social situations while enhancing stress coping capacity. In recent years, nature-based mindfulness interventions have received increasing attention. Vitagliano et al. [19] found that group-based mindfulness training grounded in natural environmental exposure effectively reduced anxiety levels and enhanced psychological resilience among university students. Similarly, mindfulness-based interventions combined with physical activity have demonstrated promising application prospects. Ding et al. [20] conducted a randomized controlled trial among left-behind adolescents in rural areas and found that dance-based mindfulness training significantly reduced social anxiety levels. Overall, these studies suggest that mindfulness-based interventions are highly adaptable in terms of their delivery formats, and that incorporating natural environments or physical activity may enhance engagement and further broaden their applicability. However, whether these extended formats provide consistent additional therapeutic benefits remains unclear, as direct comparative evidence is currently limited. Their incremental effects therefore require further validation through rigorous randomized controlled trials.

With the rapid development of digital mental health, traditional face-to-face mindfulness training has increasingly been integrated with internet- and mobile-based platforms, giving rise to digital mindfulness interventions. Accumulating evidence has examined the potential effectiveness of digital mindfulness interventions. Xiong et al. [21] reported that digital mindfulness training significantly reduced perceived stress and anxiety among university students. These findings suggest that digital platforms may provide more flexible modes of delivery for mindfulness training, particularly for interventions requiring sustained self-directed practice. However, whether digital delivery provides additional therapeutic benefits over conventional face-to-face mindfulness interventions remains unclear, and evidence specifically targeting SAD remains limited.

Overall, mindfulness-based interventions have received some empirical support for the treatment of SAD. Their potential advantages lie not only in addressing anxiety symptoms themselves but also in their potential to reduce rumination and experiential avoidance, enhance emotion regulation, and alter individuals' relationships with negative internal experiences. Meanwhile, MBSR and various delivery formats incorporating natural environments, physical activity, and digital platforms have further broadened the potential applications of mindfulness-based interventions. However, substantial heterogeneity remains across studies in terms of target populations, intervention content, delivery formats, and outcome measures. In particular, some studies have involved non-clinical populations or individuals with general anxiety, and whether their findings

can be directly generalized to patients with SAD requires further investigation. Therefore, future research should move beyond examining whether mindfulness-based interventions can reduce social anxiety symptoms and further clarify their underlying mechanisms, the incremental effects of different intervention formats, and the fit between patient characteristics and mindfulness-based interventions. Greater emphasis should also be placed on long-term follow-up and direct comparative studies, thereby advancing mindfulness-based interventions from general efficacy validation toward more clearly defined mechanisms, optimized delivery formats, and individualized applications.

Acceptance and Commitment Therapy (ACT).

Compared with traditional Cognitive Behavioral Therapy (CBT), which primarily focuses on modifying maladaptive cognitions, Acceptance and Commitment Therapy (ACT) places greater emphasis on transforming individuals' relationship with their internal experiences. By enhancing psychological flexibility, ACT encourages individuals to respond to anxiety with openness and acceptance while continuing to engage in value-based actions, thereby reducing social avoidance and improving functional impairment [22]. This therapeutic framework is particularly relevant to Social Anxiety Disorder (SAD), in which experiential avoidance, excessive self-focused attention, and behavioral withdrawal are prominent clinical characteristics.

The application of ACT in the treatment of social anxiety has evolved from early case reports to randomized controlled trials, longitudinal studies, and systematic reviews. Samad et al. [22] demonstrated in a randomized clinical trial that ACT significantly reduced symptom severity in patients with SAD and produced positive effects on perceived anxiety control and social functioning. These findings suggest that ACT not only alleviates social anxiety symptoms but may also contribute to the long-term restoration of psychosocial functioning.

Several studies have compared the therapeutic effects of Acceptance and Commitment Therapy (ACT) and traditional Cognitive Behavioral Therapy (CBT) in the treatment of social anxiety. While conventional CBT primarily focuses on modifying maladaptive cognitions, ACT emphasizes changing individuals' relationship with their thoughts and internal experiences. Krafft et al. [23] compared ACT-based self-help interventions with traditional CBT-based self-help interventions and found that both approaches effectively reduced social anxiety symptoms. However, ACT demonstrated greater improvements in reducing experiential avoidance and cognitive fusion. Similarly, Ebrahimi et al. [24] reported that ACT may be more effective than traditional CBT in reducing anxiety sensitivity. Unlike traditional approaches that primarily emphasize symptom control, ACT focuses on enhancing psychological flexibility and helping individuals pursue value-based actions despite the presence of anxiety. Taken together, these studies suggest that ACT and CBT may produce broadly comparable effects on overall symptom reduction, although the therapeutic processes emphasized by the two approaches are not identical. The potential advantage of ACT may lie more in changing how individuals respond to internal experiences of anxiety, whereas

the current evidence remains insufficient to conclude that ACT is superior to CBT in terms of overall clinical efficacy. Accordingly, rather than simply comparing which of the two therapies is more effective, greater attention should be given to whether different therapeutic mechanisms are associated with different treatment benefits, and whether changes in core ACT processes, such as psychological flexibility, experiential avoidance, and cognitive fusion, can account for improvements in symptoms and social functioning.

In terms of applicable populations, Acceptance and Commitment Therapy (ACT) demonstrates good age adaptability, with current research primarily focusing on adolescents and university students. Francisca et al. [25], through a case study design, reported that ACT effectively improved emotional awareness and real-life adaptive functioning in adolescents with social anxiety. Similarly, Ebrahimi et al. [24] found that both ACT and CBT reduced anxiety sensitivity among socially anxious adolescents. However, the limited sample sizes and heterogeneous study designs, including case-based evidence, make it difficult to draw firm conclusions regarding age-specific treatment advantages. Larger randomized controlled trials are needed to determine whether baseline psychological flexibility, experiential avoidance, or symptom severity moderates treatment response.

In addition to conventional face-to-face interventions, the digitalization and internet-based delivery of Acceptance and Commitment Therapy (ACT) have emerged as important areas of development in recent years. A systematic review by Kelson et al. [26] reported that internet-delivered ACT demonstrated good acceptability and favorable clinical outcomes in the treatment of anxiety disorders. Cross et al. [27] further found that brief internet-based ACT interventions effectively alleviated symptoms of chronic anxiety and depression. Moreover, Simone et al. [28] showed that Virtual Reality–Assisted Acceptance and Commitment Therapy (VR-ACT) significantly reduced public speaking anxiety and social avoidance behaviors. Compared with conventional exposure therapy, virtual reality provides a more immersive and psychologically safe therapeutic environment, while ACT helps individuals reduce resistance to anxiety-related experiences during exposure. The integration of these approaches may therefore enhance the tolerability and sustainability of exposure-based interventions. Group-based interventions have also shown some potential for application. Srichan et al. [29] reported that ACT group interventions among female university students in Thailand significantly reduced social anxiety and fear of negative evaluation while improving psychological flexibility. Similarly, Meryem et al. [30] found that group-based ACT was both feasible and effective in reducing social appearance anxiety. Compared with individual therapy, group-based ACT may not only reduce treatment costs but also enhance behavioral practice through authentic interpersonal interactions. However, these studies involve different delivery modes and varying degrees of therapist involvement, and their effects cannot be attributed simply to digitalization or group format itself. Some internet-delivered ACT studies have targeted broader anxiety or depression rather than strictly diagnosed SAD, and VR-ACT requires further direct comparison with standalone VRET or traditional ACT.

Overall, ACT has established a preliminary evidence base for the treatment of SAD. Its overall effects on symptom reduction may be broadly comparable to those of traditional CBT, while preliminary empirical support has also been obtained for changes in process variables such as experiential avoidance, cognitive fusion, acceptance, and psychological flexibility. However, the existing literature is characterized by relatively small sample sizes, substantial heterogeneity in study designs, limited direct comparative evidence, and the inclusion of samples that do not always consist of patients with clinically diagnosed SAD. Therefore, ACT is currently better understood as a treatment approach with distinctive theoretical mechanisms and clinical potential rather than as an alternative that has been demonstrated to be superior to CBT. Future research should further examine the mediating roles of psychological flexibility, experiential avoidance, and other core ACT processes, clarify the fit between patient characteristics and treatment response to ACT, and compare ACT with CBT and different modes of delivery in larger randomized controlled trials with long-term follow-up. Such research may help delineate the appropriate scope of ACT for SAD and clarify its potential advantages.

Virtual Reality Exposure Therapy (VRET).

Virtual Reality Exposure Therapy (VRET) is a novel exposure-based intervention developed within the framework of traditional exposure therapy. VRET utilizes computer-generated immersive virtual environments to simulate real-life social situations, enabling patients to engage in exposure training under safe and controllable conditions. A systematic review by Caponnetto et al. [31] reported that virtual reality technology can recreate a variety of social scenarios, including public speaking, job interviews, social gatherings, and classroom presentations, while allowing flexible adjustment of stimulus intensity according to patients' anxiety levels. This high degree of controllability represents a key advantage that is difficult to achieve in traditional *in vivo* exposure. From a theoretical perspective, VRET remains grounded in the principles of exposure therapy and emotional processing theory. The primary difference lies in the fact that virtual reality technology enhances the standardization and reproducibility of exposure procedures, thereby improving the consistency and controllability of therapeutic delivery [32].

A growing body of meta-analyses has consistently supported the effectiveness of Virtual Reality Exposure Therapy (VRET) for the treatment of Social Anxiety Disorder (SAD). Wong et al. [33], in a systematic review, reported no significant difference in therapeutic efficacy between VRET and conventional exposure therapy, suggesting that virtual environments can elicit treatment effects comparable to those achieved in real-world social situations. Horigome et al. [34] further conducted a meta-analysis of randomized controlled trials and found that VRET significantly reduced social anxiety symptoms, with particularly pronounced effects on social avoidance and fear of negative evaluation, yielding a moderate-to-large overall effect size. Similarly, Rejbrand et al. [35] demonstrated that standalone VRET significantly improved social anxiety symptoms even without integration with conventional face-to-face psychotherapy. Taken together, the existing evidence consistently supports the efficacy of VRET. However, the

better-supported conclusion at present is that VRET can achieve therapeutic effects comparable to those of traditional exposure, rather than that it has been demonstrated to be more efficacious. Therefore, research on VRET should move beyond simply establishing whether it is effective and further examine under what conditions virtual exposure can achieve treatment effects comparable to those of real-world exposure, as well as which patients may derive greater benefits from this mode of delivery.

VRET may also be combined with cognitive interventions to address both behavioral avoidance and cognitive factors such as fear of negative evaluation and catastrophic expectations. Tan et al. [36] reported that VRET demonstrated effects comparable to in-vivo exposure and other active interventions overall. Among participants with symptomatic social anxiety, greater effects were observed when VRET was combined with CBT than with VRET alone. However, the available evidence does not yet establish the independent incremental contribution of cognitive components beyond VRET. Therefore, direct comparisons and component-dismantling designs are needed to clarify whether combined VR-based interventions provide benefits beyond exposure alone.

With the growing accumulation of evidence supporting the efficacy of Virtual Reality Exposure Therapy (VRET), increasing attention has been directed toward its underlying mechanisms and key factors influencing therapeutic outcomes. Among these, “immersion” is considered a critical variable associated with treatment effectiveness. It refers to the subjective experience of “being present” in a virtual environment, in which individuals perceive the simulated context as if it were real [32]. Shahid et al. [37] conducted a systematic review of 18 studies and found that Virtual Reality Exposure Therapy (VRET) significantly reduced social anxiety symptoms. Their findings further suggested that immersion represents an important factor associated with VRET efficacy. Therefore, immersion should be considered not merely a user-experience indicator but also a potential mechanism-related determinant influencing therapeutic outcomes. Based on this perspective, researchers have attempted to enhance immersive experience through improved visual quality, enriched interactive functions, and the incorporation of artificial intelligence-driven virtual agents. Porter et al. [32] further suggested that the development of high-immersion virtual reality systems may contribute to improved therapeutic outcomes and increased patient adherence in the future.

Self-guided and mobile-based forms of VRET have also attracted increasing attention because of their potential to reduce therapist involvement and facilitate access to treatment. Kan et al. [38] reported that smartphone-based self-administered VRET reduced social anxiety symptoms among university students, while Kim et al. [39] reported sustained effects following an interactive VR intervention. Recent meta-analytic evidence further indicates that VRET can effectively reduce anxiety symptoms compared with waitlist controls, while its effects are generally comparable to those of other active interventions [36]. However, evidence specifically concerning self-guided VRET remains more limited, and the optimal level of therapist support and the long-term efficacy of self-guided formats remain to be established.

Overall, VRET has established a relatively clear evidence base for the treatment of SAD. Its core value does not lie in changing the fundamental principles of exposure-based treatment, but rather in enhancing the controllability, standardization, and flexibility of exposure through virtual environments. Existing meta-analyses generally support the efficacy of VRET in reducing social anxiety symptoms, with some studies also reporting improvements in social avoidance and fear of negative evaluation. However, its efficacy advantage over traditional exposure therapy has not been sufficiently established. Therefore, VRET is currently better understood as a technology-enhanced mode of delivering traditional exposure-based treatment rather than as an alternative treatment with demonstrated independent efficacy advantages. Meanwhile, factors such as immersion, the degree of therapist involvement, virtual scenario design, and self-guided delivery may influence the effectiveness of VRET, but the available evidence remains largely at the level of associations and feasibility. Future research should use direct comparisons and component-dismantling designs to clarify the incremental value of VRET over traditional exposure, investigate the fit between different patient characteristics and forms of virtual exposure, and strengthen high-quality research on long-term outcomes and self-guided VRET. Such work may help determine whether the primary benefits of VRET lie in improving treatment efficacy, treatment acceptability, or the efficiency of treatment delivery.

Other Emerging and Integrative Interventions.

Beyond established interventions such as CBT, mindfulness-based interventions, ACT, and VRET, an increasing number of emerging therapeutic approaches have been explored for the treatment of SAD. Shahar [40] highlighted that Emotion-Focused Therapy (EFT), which emphasizes emotional awareness, processing, and transformation, may target several core pathological features of SAD, including emotional avoidance, difficulties in emotional differentiation, and excessive self-criticism, thereby contributing to the improvement of maladaptive emotional patterns associated with social anxiety. Fu et al. [41] conducted a randomized controlled trial and demonstrated that therapeutic group-based physical activities produced greater reductions in social anxiety symptoms among female university students compared with aerobic exercise alone. In addition, Teale Sapach and Carleton [42] reported that self-compassion training was effective in alleviating symptoms of SAD in adults, suggesting that interventions targeting self-critical cognition and negative self-evaluation may represent a valuable complementary approach to conventional psychological treatments.

Taken together, these emerging interventions do not simply represent an increasing number of new therapeutic techniques; rather, they reflect a gradual shift in the targets of SAD interventions from simply reducing anxiety symptoms toward addressing more specific psychological and behavioral processes, such as emotional avoidance, self-criticism, and insufficient social engagement. EFT and self-compassion interventions offer approaches that differ from traditional cognitive restructuring by primarily targeting emotional processing and individuals’ relationships with themselves, while

group-based physical activity further extends the therapeutic process into real-world social interaction. These approaches also share certain underlying mechanisms with mindfulness-based interventions, ACT, and behavioral exposure, suggesting that future treatment development may not necessarily involve adding more independent therapeutic modalities, but rather developing more targeted combinations of interventions around specific maintaining mechanisms. However, research on these approaches remains largely exploratory, with relatively limited sample sizes, heterogeneous study designs, and insufficient evidence from long-term follow-up. Direct comparisons between different interventions are also scarce, leaving their reproducibility and suitability for different patient populations unclear. Therefore, future research should move beyond preliminary evaluations of whether these interventions are effective and focus more closely on their underlying mechanisms, incremental effects, and fit with patient characteristics, in order to clarify whether these emerging interventions are best suited as standalone treatments, adjunctive interventions, or specific components integrated into existing evidence-based treatments.

Conclusion and Future Perspectives.

Current evidence indicates that psychological interventions for Social Anxiety Disorder (SAD) have developed from primarily symptom-focused approaches toward a more diversified framework targeting cognitive, emotional, behavioral, and interpersonal processes. CBT remains one of the most extensively studied psychological treatments, with substantial evidence supporting its effectiveness in reducing social anxiety symptoms and avoidance and improving social functioning. At the same time, mindfulness-based interventions and Acceptance and Commitment Therapy (ACT) have broadened therapeutic targets by emphasizing processes such as experiential avoidance, acceptance, psychological flexibility, and individuals' relationships with internal experiences. Virtual Reality Exposure Therapy (VRET) has further expanded the possibilities for exposure-based treatment by providing more controllable and standardized social situations, while emerging approaches such as emotion-focused therapy, self-compassion interventions, and group-based physical activity have extended intervention targets toward emotional processing, self-criticism, and real-world social engagement.

Despite these developments, the current evidence base remains uneven across intervention types. Established treatments such as CBT have relatively robust empirical support, whereas mindfulness-based interventions, ACT, VRET, and emerging integrative approaches vary in the quantity, methodological quality, and consistency of available evidence. Importantly, the increasing use of digital technologies and virtual environments does not necessarily represent the emergence of entirely new treatment categories. Rather, these technologies primarily provide alternative ways of delivering or adapting established therapeutic components. Current evidence therefore suggests that the value of digital and virtual interventions should be considered not only in terms of symptom reduction, but also in relation to accessibility, therapist involvement, treatment adherence, scalability, and the feasibility of integrating evidence-based therapeutic components into routine care.

Several limitations remain in the existing literature. First, research has predominantly focused on changes in anxiety symptoms, while the mechanisms through which different interventions produce therapeutic change remain insufficiently understood. Second, substantial heterogeneity exists in diagnostic status, age, symptom severity, intervention intensity, therapist involvement, outcome measures, and follow-up duration, which complicates comparisons across studies and limits the generalizability of findings. In particular, evidence derived from non-clinical or subclinical populations cannot always be directly generalized to individuals with clinically diagnosed SAD. Third, direct comparisons between different psychological interventions and studies examining the specific contribution of individual treatment components remain relatively limited, making it difficult to determine whether particular therapeutic elements provide additional benefits beyond established treatment procedures. Long-term evidence is also insufficient for several emerging and technology-assisted approaches, especially self-guided interventions.

Future research should therefore move beyond the simple question of whether an intervention is effective and place greater emphasis on how therapeutic change occurs, for whom particular interventions or treatment components are most appropriate, and under what conditions treatment effects can be maintained. Mechanism-oriented research should examine changes in cognitive, emotional, behavioral, and interpersonal processes over the course of treatment, while patient-treatment matching research should consider potential moderators such as symptom severity, developmental stage, psychological characteristics, comorbidity, treatment preferences, and cultural context. In addition, comparative and implementation research should evaluate different intervention and delivery formats using broader indicators of treatment value, including adherence, acceptability, therapist time, cost, social functioning, and long-term maintenance.

Overall, the future development of psychological interventions for SAD is likely to depend less on the continuous addition of new therapeutic techniques than on a more precise understanding of therapeutic processes, the optimization of active treatment components, and the adaptation of interventions to different patient and clinical contexts. The central task for future research is therefore to clarify which therapeutic components are most relevant to particular patients, through which mechanisms they produce change, and how treatment gains can be maintained and translated into meaningful improvements in everyday social functioning.

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