

Exploring the Impact of ChatGPT on Psychological Factors in Learning English Writing among Undergraduate Students

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Abstract

The integration of artificial intelligence (AI) in education raises questions about its psychological impact on language learning, particularly for English writing. Previous studies have shown that ChatGPT positively affects learners' writing, but few studies have explored how ChatGPT impacts psychological factors in learning English writing. To address the gap, this exploratory study aimed to assess how ChatGPT influences psychological factors (cognition, emotions, motivation, attitudes and beliefs, psychological resilience, stress, and coping mechanisms) in learning English writing. The study employed a random sampling method to collect data from 142 undergraduate students at the University of Saudi Arabia. The study used a questionnaire to assess the psychological factors influencing learning in English writing. The analysis showed that ChatGPT significantly correlates with enhanced cognitive skills, including thought organization, vocabulary retention, and analytical abilities in English writing. Additionally, it increases motivation and engagement in writing tasks, supports adaptation to new writing challenges, and aids in managing writing-related stress. However, its effectiveness in reducing writing-related anxiety is inconsistent, suggesting the need for personalized strategies to address varied emotional responses in learning to write. This study highlights the need for customized educational strategies using AI tools like ChatGPT to enhance cognitive, motivational, and resilience factors while addressing varied emotional responses among English writing learners.

Keywords: Artificial Intelligence (AI); ChatGPT; Psychological Factors; English as second language; writing

1. Introduction

Integrating artificial intelligence (AI) into educational practices has revolutionized various aspects of learning, including language learning. ChatGPT has emerged as a notable innovation among AI tools, offering interactive and adaptive support for learners. The growing reliance on ChatGPT for educational purposes raises essential questions regarding its psychological impact on English learners, particularly in English writing. Prior studies have suggested that basic knowledge of language is required for good communication skills (Kanwal, 2016). To have the skill supportive technology as ChatGPT has led to positive results in improving students' writing abilities, as shown by multiple research studies conducted by Barrot (2023), Fitria (2023), Alam et al. (2023), Imran & Almusharraf (2023), Mahapatra (2024), Hidayatullah (2024), Bom (2023), Usama (2023), Bašić et al. (2023), and Bibi & Atta (2024) Alam et al., (2024); Alam & Usama (2023). However, there remains a paucity of studies exploring its effects on the psychological factors involved in learning English writing. This research aims to address this deficiency by examining the impact of ChatGPT on different psychological aspects involved in learning English writing among undergraduate students in Saudi Arabia. Cognition, emotions, motivation, attitudes and beliefs, psychological resilience, and stress-coping strategies are significant in language acquisition. Analyzing the effects of ChatGPT on these factors could offer valuable insights for educators seeking to improve language instruction through AI technologies. The primary aim of this exploratory study is to assess the extent to which ChatGPT impacts these psychological factors. Cognition includes the learners' ability to organize thoughts, retain vocabulary, and develop analytical skills in writing. Emotional factors encompass learners' anxiety, frustration, and satisfaction related to writing tasks. Motivational factors relate to the drive and enthusiasm to engage in writing activities. Attitudes and beliefs involve perceptions towards technology-based learning and the reliability of AI tools in education. Psychological resilience is the power to persevere and rebound from obstacles while writing. Lastly, stress-coping mechanisms include strategies learners employ to manage stress related to writing assignments. By examining these aspects, the study aims to comprehensively understand how ChatGPT influences the psychological dimensions of learning English writing. Such insights may inform the development of tailored educational strategies that leverage AI tools to enhance cognitive, motivational, and resilience factors while addressing the emotional needs of learners. The study is particularly significant in Saudi Arabia, where adopting advanced educational technologies is crucial to the nation's educational reform and development vision.

2. Literature Review

2.1 ChatGPT

ChatGPT harnesses the Generative Pre-trained Transformer software system created by OpenAI, employing a substantial language model

to acquire data from the web and furnish precise responses and recommendations (Rospigliosi, 2023). Diverging from conventional search engines, ChatGPT distinguishes itself with its capacity to sustain conversational coherence by initiating follow-up inquiries and customizing replies to users' specific questions and requirements. This adaptability, termed appropriability, allows learners to personalize their interactions with ChatGPT, enhancing their engagement and learning experience (Rospigliosi, 2023). Additionally, ChatGPT promotes self-reflection among learners through question-based conversations, thereby facilitating learning scaffolding, promoting awareness, and stimulating critical thinking (Meyer et al., 2023). This aspect, termed evocativeness, refers to the ability of learning materials to evoke inner thoughts and reflections, thereby further enhancing the learning process (Samala et al., 2024). Moreover, the conversational format of ChatGPT fosters the integration of various meanings and concepts, enabling learners to connect new information with their existing knowledge frameworks, a process termed integration (Synekop et al., 2024). This capability for integration enhances comprehension and retention by incorporating diverse concepts into learners' cognitive structures (Kostikova et al., 2024). AI chatbots such as, ChatGPT are increasingly employed in language education (Huang & Li, 2023). ChatGPT, identified as one of the most sophisticated AI chatbots available, delivers language input, immediate feedback, and formative evaluations, thus transforming language acquisition through the emulation of human discourse and interactions (Kostka & Toncelli, 2023). More specifically, ChatGPT can grasp word meanings within a given context, rectify and elucidate linguistic inaccuracies, and produce a variety of textual outputs, including advertisements and electronic mail. Moreover, it provides definitions and instances sourced from dictionaries, annotates texts, and formulates quizzes. In addition, learners can employ ChatGPT for note-taking, revising educational materials, and seeking clarifications in both their native and secondary languages (Songsienchai et al., 2023).

2.2 Bandura's Social Cognitive Theory

Bandura's Social Cognitive Theory offers a detailed framework for understanding human learning and behavior within a social context, proposing that learning occurs through a complex interplay of behavioral, cognitive, and environmental influences (Bandura, 1986). This theory is central to observational learning, where individuals acquire new behaviors by watching and imitating others, suggesting that learning can occur in a social setting without direct reinforcement (Bandura, 1977). Another pivotal feature of this theoretical framework concerns self-efficacy, a concept described by Bandura as the assurance in an individual's competence to proficiently organize and carry out the essential measures to deal with upcoming circumstances (Bandura, 1997). This belief significantly influences personal motivation and the perseverance individuals will exhibit when facing obstacles.

Furthermore, the theory stresses the significance of self-regulation, where individuals take proactive actions to manage their experiences and responses through goal setting, progress monitoring, and behavioral modifications to attain their aims (Zimmerman & Schunk, 2001). Bandura also presented the concept of triadic reciprocal causation, which suggests that personal aspects (such as cognitive, affective, and biological processes), behavior, and environmental situations all function as interconnected determinants that mutually impact one another in a bidirectional way. This aspect of the theory underscores the dynamic and reciprocal nature of the environment in which individuals learn and perform (Bandura, 1986).

2.3 The Impact of Psychological Elements on English Writing Learning

Psychological factors encompass various aspects of human cognition, emotions, motivation, attitudes, beliefs, resilience, and stress management (Getie, 2020; Kellogg, 1994; Dörnyei, 1998; Bruning & Horn, 2000). These factors influence individuals' engagement, persistence, and overall performance in learning activities, including English writing. Cognition, emotions, motivation, and attitudes shape learners' approach to writing tasks, while psychological resilience and effective stress management help individuals navigate challenges and setbacks encountered during the writing process. According to Dörnyei and Muir (2019) and Shafiee and Jafarpour (2022), it is essential to address these psychological dimensions to create supportive learning environments that foster students' growth, confidence, and proficiency in English writing. Comprehension of these psychological aspects is crucial for educators and researchers to develop efficient teaching methods and assist students throughout their language learning process.

Cognition, which pertains to the cognitive mechanisms of acquiring, retaining, and applying information, holds a pivotal position in the acquisition of English writing skills (Hayes, 2013; Flower & Hayes, 1981; Borg, 2022), encompassing competencies such as concentration, recollection, critical thinking, and linguistic analysis (Zhang, 2019). It influences planning, organization, and revision in writing (Johnson, 2019), requiring abilities to generate ideas, structure content, and evaluate language use (Deane et al., 2008), resulting in coherent and cohesive texts (Bloom, 2008). Emotions are essential factors in the writing procedure, where favorable feelings like curiosity and pleasure enhance drive and engagement (Wang et al., 2022), while adverse emotions such as stress and irritation hinder productivity (Grigoriadis et al., 2018). Effective emotional management fosters a supportive learning environment and resilience (Robinson & Smith, 2021). Whether intrinsic or extrinsic, motivation drives language learning efforts (Dörnyei, 1998), influencing persistence, effort, and goal-setting, thereby shaping writing proficiency (Dörnyei, 1998). Positive attitudes and beliefs about writing support a growth mindset and learning (Getie, 2020), while negative attitudes can impede progress (Getie, 2020). A positive writing identity and growth mindset bolster confidence and resilience (Getie, 2020). Psychological resilience, crucial in writing education, helps students persist through difficulties, utilize feedback, and adapt strategies for improvement (Morrison et al., 20

05), supported by self-efficacy and coping mechanisms (Yeager & Walton, 2011). Stress impacts writing proficiency due to performance pressures and time constraints (Beilock & DeCaro, 2007). However, methods including goal-setting and time management may have the capacity to alleviate stress levels and enhance effectiveness, according to Morrison et al. (2005).

2.4 Previous Related Studies

Hawanti (2023) conducted a quasi-experimental study to assess the impact of AI chatbot-based learning on students' anxiety in English writing classrooms. The research involved seventy-three undergraduate students from Universitas Muhammadiyah Purwokerto, in Indonesia, divided into experimental and control groups. The experimental group comprised thirty-six students who engaged with an AI chatbot for educational purposes. In contrast, the comparison group of thirty-seven students was exposed to conventional instructional methods. Both cohorts were instructed by the same educator utilizing uniform course materials and assessments. Levels of anxiety were gauged through a Likert scale questionnaire encompassing communication apprehension, fear of negative evaluation, test anxiety, and classroom anxiety. An analysis of covariance (ANCOVA) was implemented to compare the initial and final test results. The findings revealed that the experimental cohort witnessed a notable decrease in anxiety levels when juxtaposed with the comparison cohort. The study highlighted that AI chatbot-based instruction could effectively diminish students' anxiety in English writing by offering immediate feedback, personalized learning experiences, and adaptable pacing, alleviating the anxiety associated with writing tasks. Moreover, the investigation carried out by Song and Song (2023) utilized a mixed-methods strategy to explore the influence of AI-facilitated language learning on Chinese EFL students' writing abilities and drive. The investigation included a quantitative pre-test and post-test layout with fifty EFL learners, divided into experimental and control clusters, presenting notable improvements in writing abilities and drive in the experimental cluster in contrast to the control cluster. The qualitative interviews highlighted the benefits of AI in education but also raised concerns about accuracy and potential over-dependence on technology, emphasizing the continuous need for AI tool development to sustain their positive influence on learning. In addition, Shaikh et al. (2023) conducted a study using a questionnaire to assess ChatGPT's effectiveness in improving English language learning for students. The results showed that ChatGPT significantly aided in formal English learning tasks, receiving high usability, usefulness, and satisfaction ratings, indicating its potential for efficiently enhancing language skills. Furthermore, Cai et al. (2023) practiced a hybrid technique integrating SEM with qualitative interviews to study elements affecting learners' perspectives on ChatGPT-guided language learning. The study incorporated theoretical frameworks of the technology acceptance model, motivation theories, socio-cognitive theory, and the theory of planned behavior. Data were gathered through an online questionnaire on social media, focusing on higher-education students who consented and evaluated their ChatGPT experience; the sample size followed Kline's N_q rule for SEM. Quantitative results showed that information system quality and hedonic motivation significantly predicted satisfaction and performance expectancy, impacting behavioral intention and learning effectiveness. Behavioral intention fully mediated the relationship between satisfaction and learning effectiveness, partially mediating the link between performance expectancy and learning effectiveness. Qualitative interviews revealed strengths and areas for improvement in ChatGPT-supported language learning, enriching our insight into learner attitudes and decision-making in this context with implications for future research and practical use. Similarly, Ali et al. (2023) conducted quantitative research with 80 participants to examine the impact of ChatGPT on English learners' motivation, evaluating macro and micro skills using a Likert scale. The analysis showed that ChatGPT significantly boosted reading and writing motivation, while its influence on listening and speaking skills was neutral, highlighting the tool's potential benefits for learning English. Additionally, Abdaljaleel et al. (2023) conducted a cross-sectional study investigating university students' attitudes and engagement with ChatGPT in Arab nations using the Technology Acceptance Model Edited to Assess ChatGPT Adoption (TAME-ChatGPT). The research, involving 2240 students from Egypt, Iraq, Jordan, Kuwait, and Lebanon, identified factors like ease of use, perceived usefulness, positive technology attitudes, and socio-demographic variables as significant predictors of ChatGPT acceptance in higher education, emphasizing the need for tailored policies to enhance its benefits and address ethical and practical challenges.

2.5 Aims of the Study

The primary goal of the study is to examine how ChatGPT influences various psychological aspects linked to learning English writing, including cognition, emotions, motivation, attitudes, beliefs, resilience, stress, and coping mechanisms, to reveal the broader psychological ramifications of AI in educational settings, particularly in improving language proficiency and addressing psychological obstacles in English writing education, to deepen comprehension of AI's impact in education and guide the development of more efficient AI-powered educational tools and strategies customized to students' psychological requirements. The study addresses a research question below:

1. How does ChatGPT as a learning tool impact psychological factors (cognition, emotions, motivation, attitudes, beliefs, psychological resilience, stress, and coping mechanisms) in undergraduate students learning English writing?

3. Research Methodology

3.1 Participants and Sampling

Participants included 142 undergraduate students from various academic disciplines at the University of Saudi Arabia to ensure a comprehensive investigation of ChatGPT's effectiveness in diverse contexts. A random sampling method was employed to select participants, ensuring representation across genders, academic majors, and writing proficiencies, thus enhancing the generalizability of the findings. Students were randomly chosen from the university's database and invited to participate. Inclusion criteria required participants to be registered undergraduates actively enrolled during the study period, with prior exposure to English writing tasks in their courses, regardless of their specialization. This sampling approach aimed to gather varied perspectives on ChatGPT's psychological effects, enriching the study's analytical depth and relevance to different learning scenarios.

3.2 Instrument

The factors and related questionnaires were adopted from the study of Dörnyei & Taguchi (2009), Schrauf (2006), Kouritzin (2004), and

MacIntyre (2002) and modified according to the study's objectives as a comprehensive assessment tool, comprising 30 items (see Appendix) distributed across six domains. They were administered to participants of various demographic backgrounds. These items were measured using a 5-point Likert scale, ranging from strongly agree to strongly disagree, in addition to demographic details such as age, gender, and educational background. In the cognition domain, participants responded to five items (1-5) related to their experience with ChatGPT, including the organization of thoughts, vocabulary and grammar retention, enhancement of critical thinking, sharpening of analytical skills, and comprehension of complex writing techniques. Emotions were evaluated through five items (6-10), assessing participants' confidence, alleviation of anxiety, excitement, reduction of frustration, and sense of satisfaction. Motivation was explored with five items (11-15) addressing increased motivation to write, frequency of writing, encouragement from immediate feedback, regular use of ChatGPT, and influence on writing proficiency goals. Attitudes and beliefs were assessed with five items (16-20) measuring participants' belief in ChatGPT's effectiveness, trust in its feedback, its importance, improved attitudes toward technology-based learning, and its reliability as a writing aid. Psychological resilience was examined through five items (21-25) focusing on adaptability to challenges, persistence in writing tasks, maintenance of writing practice, recovery from setbacks, and enhancement of resilience through experiences with ChatGPT. Lastly, stress and coping mechanisms were investigated with five items (26-30), gauging the impact of ChatGPT on stress reduction, utilization of coping strategies suggested by ChatGPT, stress management during writing tasks, reduction of overwhelm, and support in coping with the pressures of English writing. *Data Collection Procedure*

Following approval from the university research ethics board, students at the University of Saudi Arabia completed the research measures in classroom settings. The questionnaires were conducted in English, the primary language of instruction at the university. Students were assured of the confidentiality of their responses and were given the option not to answer any questions if they chose not to. Participants were seated at individual tables while completing the measures to ensure privacy. Data collection took place at the University of Saudi Arabia.

3.3 Reliability Analysis of the Questionnaire

The reliability of the questionnaire used in the study was assessed through Cronbach's Alpha, a measure widely recognized for evaluating the internal consistency of survey instruments. For this research, the questionnaire consisted of 30 items focusing on various psychological factors influenced by the use of ChatGPT in learning English writing. The calculated Cronbach's Alpha for the questionnaire was .891, indicating high internal consistency among the items. This value suggests that the questionnaire items reliably measure the intended psychological constructs, thus ensuring the dependability of the data collected for subsequent analysis. A Cronbach's Alpha value above 0.7 is generally considered acceptable, with higher values indicating better reliability, making the .891 score particularly robust for educational research (Tavakol & Dennick, 2011). This high reliability is crucial for supporting the validity of the study's findings regarding the psychological impacts of ChatGPT on English writing learners.

3.4 Data Analysis Procedure

The data collected from the questionnaire were analyzed using Spearman's rho correlation analysis, a non-parametric test suitable for ordinal data. Spearman's rho was selected because it assesses the strength and direction of association between two ranked variables without assuming a normal data distribution, making it ideal for the ordinal Likert-scale responses gathered in this study. This method is particularly advantageous in educational research where data can not conform to parametric criteria, thus providing a robust analysis of the relationships between variables related to psychological factors and using ChatGPT in English writing learning (Hauke & Kossowski, 2011). By employing Spearman's rho, the study could accurately measure the monotonic relationships between participants' use of ChatGPT and their reported psychological impacts, ensuring the validity and reliability of the findings in representing the underlying phenomena.

4. Results: Impact of ChatGPT on Psychological Factors in Learning English Writing

The study's results examining the impact of ChatGPT on psychological factors in learning English writing are presented below. The examination employed Spearman's rho correlation coefficients to establish the connections between the utilization of ChatGPT in learning English writing and different psychological variables.

4.1 Analysis of Cognition Factor

The utilization of ChatGPT exhibited noteworthy positive associations with enhancements in various cognitive abilities. Particularly, considerable correlations were identified between the employment of ChatGPT and the advanced capacity to organize thoughts in English writing ($\rho = .365, p < .01$), improved critical thinking aptitude in English essay composition ($\rho = .334, p < .01$), and enhanced analytical proficiency ($\rho = .328, p < .01$). Moreover, ChatGPT was identified as a valuable tool in aiding learners in gaining a clearer understanding of intricate writing techniques ($\rho = .274, p < .01$). The results underscore the beneficial impact of integrating ChatGPT into educational settings for fostering cognitive growth and enhancing language proficiency.

4.2 Analysis of Emotions Factors

The influence of ChatGPT on emotional aspects, such as anxiety and frustration, experienced variability among the participants involved in the study. While the utilization of ChatGPT to mitigate anxiety related to English writing exhibited a weak and statistically insignificant relationship ($\rho = .059, p > .05$), there was a noteworthy positive association observed concerning feeling less frustrated during writing challenges ($\rho = .245, p < .01$). Furthermore, ChatGPT played a significant role in generating a sense of contentment upon the conclusion of writing sessions ($\rho = .095, p > .05$) and fostering enthusiasm towards the process of learning English writing ($\rho = .185, p < .05$).

4.3 Analysis of the Motivation Factor

ChatGPT has notably heightened the motivational facets associated with learning English writing. A substantial and positive relationship was observed between the utilization of ChatGPT and the amplified drive to engage in English writing activities ($\rho = .181, p < .05$). Furthermore, individuals reported an increased frequency in their writing endeavors, attributing this surge to the captivating and interactive nature of ChatGPT ($\rho = .534, p < .01$). The provision of instantaneous feedback by ChatGPT was identified as a key factor in fostering enhancements in writing skills ($\rho = .098, p > .05$) and fostering a consistent pattern of employing ChatGPT as a valuable writing aid ($\rho = .294, p < .01$).

4.4 Analysis of Attitudes and Beliefs Factor

Participants' perceptions and viewpoints regarding learning English writing and technology-oriented learning experienced enhancements due to utilizing ChatGPT. The analysis revealed noteworthy positive connections with the conviction that ChatGPT serves as a crucial instrument for mastering English writing ($\rho = .132, p > .05$), enhanced perspectives towards technology-driven learning ($\rho = .107, p > .05$), and reliance on ChatGPT to offer precise and beneficial feedback ($\rho = .177, p < .05$).

4.5 Analysis of Psychological Resilience Factor

The study indicated that ChatGPT is crucial in enhancing psychological resilience among individuals engaged in learning activities. The results uncovered statistically substantial positive relationships between the use of ChatGPT and the ability to persist in writing tasks despite encountering discouragement, with a correlation coefficient of 0.150 and a p-value greater than 0.05. Moreover, a strong correlation of 0.324, with a p-value less than 0.01, was identified between ChatGPT usage and the ability to recover from setbacks encountered during writing endeavors swiftly. Additionally, learners reported feeling more resilient in their English writing pursuits,

Table 1. Descriptive Statistics for Questionnaire Items on Psychological Factors

Items	Psychological Factors	N	Mean	Std. deviation
Item 1	Cognition	142	1.24	.652
Item 2	Cognition	142	1.31	.632
Item 3	Cognition	142	1.48	.796
Item 4	Cognition	142	1.61	.937
Item 5	Cognition	142	1.38	.760
Item 6	Emotions	142	1.87	1.087
Item 7	Emotions	142	2.66	1.282
Item 8	Emotions	142	1.55	.927
Item 9	Emotions	142	2.07	1.063
Item 10	Emotions	142	2.68	1.285
Item 11	Motivation	142	2.47	1.413
Item 12	Motivation	142	2.75	1.364
Item 13	Motivation	142	2.46	1.346
Item 14	Motivation	142	2.05	1.061
Item 15	Motivation	142	2.40	1.478
Item 16	Attitudes and Beliefs	142	2.88	1.456
Item 17	Attitudes and Beliefs	142	1.92	1.176
Item 18	Attitudes and Beliefs	142	3.06	1.547
Item 19	Attitudes and Beliefs	142	3.01	1.490
Item 20	Attitudes and Beliefs	142	1.99	1.262
Item 21	Psychological Resilience	142	3.25	1.595
Item 22	Psychological Resilience	142	1.61	.724
Item 23	Psychological Resilience	142	1.87	.914
Item 24	Psychological Resilience	142	1.70	.890
Item 25	Psychological Resilience	142	2.19	1.098
Item 26	Stress and Coping Mechanisms	142	1.24	.652
Item 27	Stress and Coping Mechanisms	142	1.31	.632
Item 28	Stress and Coping Mechanisms	142	1.48	.796
Item 29	Stress and Coping Mechanisms	142	1.61	.937
Item 30	Stress and Coping Mechanisms	142	1.38	.760

with a correlation coefficient of 0.172 and a p-value lower than 0.05, when utilizing ChatGPT. Furthermore, ChatGPT was found to facilitate learners in adapting to novel writing challenges, although the correlation coefficient was 0.079, with a p-value exceeding 0.05.

4.6 Analysis of Stress and Coping Mechanisms Factor

ChatGPT demonstrated a strong positive correlation with enhanced stress management and coping mechanisms, specifically in the context of writing assignments. The research findings indicated significant associations between the utilization of ChatGPT and a decrease in stress levels concerning English writing tasks ($\rho = 1.000, p < .01$). Moreover, participants who employed strategies recommended by ChatGPT exhibited a notable correlation with improved stress-coping abilities ($\rho = .365, p < .01$) and better control over stress levels while engaged in writing activities ($\rho = .334, p < .01$). Additionally, the use of ChatGPT was linked to a reduction in feelings of being overwhelmed when dealing with intricate writing projects ($\rho = .328, p < .01$).

The results indicate that ChatGPT positively impacts cognitive, motivational, and resilience factors in learning English writing, with

variable effects on emotional responses and stress coping mechanisms. This highlights ChatGPT's potential as a supportive tool in educational settings, enhancing key psychological factors for learning English writing.

5. Discussion

The findings from this study reveal that ChatGPT significantly supports various psychological factors essential for learning English writing. Specifically, ChatGPT enhances cognitive skills such as thought organization, vocabulary retention, critical thinking, and analytical abilities, facilitating more profound engagement with the writing process. Furthermore, it boosts learners' confidence, enhancing their motivation and frequency of writing, which indicates improved self-efficacy. ChatGPT also aids in adapting to new writing challenges and maintaining writing practices even when learners face discouragement, highlighting its role in fostering resilience. Additionally, the tool helps manage stress associated with writing tasks and promotes the use of effective coping strategies. However, the impact of ChatGPT on reducing writing-related anxiety is not universally significant across all learners, suggesting variability in its effectiveness in addressing emotional responses. This highlights the potential of AI tools like ChatGPT in educational settings while pointing to the need for tailored strategies to better support all learners, especially in managing anxiety.

The study's findings are in accordance with the broader array of research that explores how technology impacts language learning, specifically focusing on artificial intelligence tools such as ChatGPT. The enhancement of cognitive skills such as thought organization, vocabulary retention, and analytical abilities through ChatGPT is supported by the findings of Tuomi (2019) and Kanwal (2024), who reported that AI technologies significantly improve language comprehension and writing skills. This study extends those findings by explicitly highlighting the role of ChatGPT in these areas, thus supporting the potential of AI to enhance critical cognitive skills essential for effective writing (Usama et al., 2024b).

Regarding motivational aspects, the results echo the work of Xiao and Hew (2023), which suggested that interactive technologies could significantly increase learner engagement and intrinsic motivation. The increase in self-efficacy and motivation documented in this study corresponds with the conclusions drawn by Clark and Mayer (2023), who highlighted the potential of carefully crafted educational technologies to enhance psychological engagement and self-regulation in students. This indicates a significant relationship between the use of effective educational technologies and the cognitive and emotional outcomes experienced by learners. Additionally, this study's identification of the role of ChatGPT in fostering resilience and aiding learners to manage writing challenges complements the conclusions drawn by Song & Song (2023), who found that technology-enhanced learning environments often provide unique supports that help students persevere through academic challenges. Moreover, the nuanced impact on reducing writing-related anxiety observed in this study adds depth to the discussion by Seo (2021), who argued that while educational technologies generally support learning, their impact on anxiety reduction can be inconsistent, varying widely among individual learners.

In addition, the study demonstrated that ChatGPT significantly influences various psychological factors critical for learning English writing, aligning with Bandura's Social Cognitive Theory (Bandura, 1986). The theory elucidated how interactions with an AI tool like ChatGPT can impact cognitive and psychosocial processes. Specifically, ChatGPT aids in organizing thoughts, remembering vocabulary and grammar, enhancing critical thinking, and sharpening analytical skills, indicative of cognitive development through observational learning—a core component of Bandura's theory, where learners model behaviors observed in their environment (Bandura, 1977).

Furthermore, the increase in confidence observed in individuals who use ChatGPT is linked with an enhancement in self-efficacy, a fundamental concept emphasized by Bandura as crucial in motivating individuals to engage actively and persist in challenging pursuits (Bandura, 1997; Usama et al., 2024a). This correlation highlights the importance of nurturing a belief in one's capacity to overcome obstacles and accomplish goals effectively. The immediate feedback provided by ChatGPT supports this by encouraging ongoing improvements in writing and fostering self-regulation through iterative learning processes (Zimmerman & Schunk, 2001). The ability of ChatGPT to support users in quickly adapting to new writing challenges and maintaining practice even when discouraged underscores its role in fostering resilience, aligning with Bandura's emphasis on self-regulation and perseverance through challenges. Additionally, ChatGPT's role in reducing stress related to writing tasks and promoting effective coping strategies illustrates the interaction between environmental tools and personal stress management, reflecting the theory's principle of triadic reciprocal causation (Bandura, 1986).

The variability observed in the effectiveness of ChatGPT in alleviating writing-related anxiety highlights the intricate nature of emotional responses to technology utilization, indicating that these impacts may be influenced by a myriad of factors, including individual variations in perceived self-efficacy and personal values associated with writing assignments. These findings confirm the relevance of Bandura's Social Cognitive Theory in educational technology use, highlighting how AI, like ChatGPT, enhances learning through cognitive and motivational pathways while also influencing emotional and resilience outcomes. The data also indicate the need for personalized strategies to better support all learners, particularly in managing anxiety, potentially by focusing on interventions that enhance self-efficacy in writing.

6. Conclusion

This exploratory study assessed the impact of ChatGPT on psychological factors critical to learning English writing among undergraduate students in Saudi Arabia. The findings demonstrated that ChatGPT significantly improves cognitive abilities, such as organizing thoughts, vocabulary retention, and enhancing critical and analytical thinking skills. These enhancements are crucial for effective English writing and learning. Furthermore, it is essential to note that ChatGPT played a significant role in enhancing students' motivation levels, self-assurance, and active involvement. These aspects are crucial for continually acquiring knowledge and accomplishments within an

academic setting. However, the effectiveness of ChatGPT in alleviating writing-related anxiety was inconsistent across the study sample, highlighting the necessity for personalized educational strategies that cater to individual learner differences. The results underscore the potential of AI tools like ChatGPT to transform educational practices by bolstering cognitive and motivational aspects of language learning. Nevertheless, additional investigation is necessary to ascertain the methods of customizing instruments for optimal efficacy and managing the diverse emotional reactions of students toward technology-driven educational interventions. Simultaneously, there is a need to explore the enduring consequences of ChatGPT on linguistic acquisition across various educational environments to enhance comprehension of its applicability and enrich the dialogue on incorporating artificial intelligence in academia.

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Authors' Contribution

As the sole author of this study, I was responsible for the conception and design, data collection, analysis and interpretation, and drafting and revising the manuscript.

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Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed Consent

Informed consent was obtained from all participants. They were informed about the study's purpose, procedures, risks, and their rights, including confidentiality and voluntary participation.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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Data sharing statement

No additional data are available.

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Appendix

S. No.	Psychological Factors	Questions
1	Cognition	Using ChatGPT has improved my ability to organize my thoughts in English writing.
2		I find that ChatGPT helps me remember English vocabulary and grammar rules better.
3		ChatGPT has enhanced my critical thinking skills in English essay writing.
4		I believe that interacting with ChatGPT has sharpened my analytical skills in English.
5		Using ChatGPT helps me understand complex writing techniques more clearly.
1	Emotions	I feel confident when I use ChatGPT to practice writing in English.
2		Using ChatGPT alleviates my anxiety about writing in English.
3		I feel excited about learning English writing because I can use ChatGPT for assistance.
4		ChatGPT helps me feel less frustrated when I encounter difficulties in writing.
5		I feel a sense of satisfaction after completing a writing session with ChatGPT.
1	Motivation	My motivation to write in English increases when I use ChatGPT.
2		I am motivated to write more frequently because ChatGPT makes learning engaging.
3		ChatGPT's immediate feedback on my writing encourages me to improve.
4		I feel driven to use ChatGPT regularly as a writing tool.
5		ChatGPT has influenced my goals for becoming a proficient English writer.
1	Attitudes and Beliefs	I believe that using ChatGPT will significantly improve my English writing skills.
2		I trust ChatGPT to provide accurate and helpful feedback on my writing.
3		I view ChatGPT as an essential tool for learning English writing.
4		My attitude towards technology-based learning has improved after using ChatGPT.
5		I feel that AI tools like ChatGPT are reliable aids for writing education.
1	Psychological Resilience	I quickly adapt to new writing challenges with the help of ChatGPT.
2		I feel more persistent in tackling complex writing tasks when using ChatGPT.
3		ChatGPT has helped me to maintain my writing practice even when I feel discouraged.
4		I recover quickly from setbacks in my writing progress thanks to ChatGPT.
5		I am more resilient in my English writing endeavors because of my experiences with ChatGPT.
1	Stress and Coping Mechanisms	ChatGPT helps reduce the stress I feel about English writing assignments.
2		I use strategies suggested by ChatGPT to cope with stress related to writing.
3		Interacting with ChatGPT helps me manage my stress levels during writing tasks.
4		I find that using ChatGPT lessens my feelings of overwhelm when faced with complex writing projects.
5		Coping with the pressures of English writing is more accessible with ChatGPT's support.