

A Comparison of Second Language Writing Quality in Positive and Negative Emotions

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Abstract: This study employed a standardized emotion induction protocol within an exploratory case study design to investigate the effects of positive and negative emotions on the second language (L2) writing quality of English majors and to explore the underlying cognitive mechanisms. Four senior-year English majors were recruited. Their emotions were induced using audio-visual stimuli before they completed an L2 writing task. Writing quality was assessed across three dimensions: content, organization, and language. Data collection integrated the PANAS scale and retrospective interviews, enabling a mixed-methods analysis of both quantitative and qualitative data. The results indicated that writing performance under positive emotion was significantly superior to that under negative emotion across the total score and all individual dimensions ($p < .05$). The most pronounced difference was observed in the content dimension (Cohen's $d = 23.00$). Qualitative analysis revealed that positive emotions facilitated cognitive width and enhanced motivation, whereas negative emotions led to constricted cognitive resources and diminished self-efficacy. The findings confirm that emotional states significantly impact the L2 writing process, underscoring the role of affect in academic performance.

Keywords: Positive Emotion; Negative Emotion; L2 Writing; Writing Quality; Case Study

1. Introduction

Against the backdrop of globalization, L2 writing competence serves as a core literacy for English majors in their academic and professional development. Traditional writing research has predominantly focused on cognitive factors such as linguistic knowledge and writing

strategies. However, according to Krashen's [1] Affective Filter Hypothesis and Pekrun's [2] Control-Value Theory of Achievement Emotions, emotion, as a key non-cognitive factor, is deeply involved in the L2 writing process by shaping cognitive resource allocation, motivational levels, and self-evaluation mechanisms. Positive emotions (e.g., joy, excitement) can arouse students' learning interest and intrinsic motivation, enhancing their engagement and self-confidence in writing tasks. Amabile et al. [3] and Barsade [4] noted that positive emotions contribute to the stimulation of creativity and creative self-efficacy, facilitating the activation of long-term memory, cognitive broadening, and information integration in L2 writing, thereby improving expressive fluency, linguistic richness, and overall writing quality.

In contrast, negative emotions (e.g., anxiety, frustration) may exert adverse effects on L2 writing performance. Gasper [5] found that high-intensity negative emotions are prone to trigger writing anxiety, increase cognitive load, hinder cognitive flexibility, disrupt the cognitive mechanisms of L2 writing, and even impair emotional regulation ability. This can lead to writer's block, distracted attention, difficulties in lexical retrieval, an increase in grammatical errors, and, consequently, a decline in writing quality.

Existing research has mostly focused on the impacts of foreign language enjoyment and foreign language anxiety on L2 writing. Horwitz et al. [6] defined foreign language anxiety as the situational anxiety and apprehension experienced by learners when confronted with foreign language tasks, while Teimouri et al. [7] conceptualized L2 enjoyment as the positive affective experience felt during the process of learning or using the target language. Nevertheless, current studies have largely centered on trait emotions or relied on self-reported data in naturalistic contexts [8], lacking experimental research that systematically

examines the causal influence of emotions on the writing process and outcomes under controlled conditions through standardized emotion induction methods.

In China, research on emotion and L2 writing has also prioritized the investigation of writing anxiety, and it is only in the past six years that more scholars have paid attention to the positive impact of positive emotions on L2 learning and writing. Lu [9] proposed that optimizing writing teaching activities and strengthening social-emotional strategies are conducive to improving the English writing quality of non-English major undergraduates. Xu & Zhao [10] investigated the effects of flow, anxiety, boredom, and apathy on students' continuation writing, finding that flow exerts a significant positive impact and serves as an independent predictor of writing performance, yet they did not specify the specific effects of various discrete emotions on each dimension of writing quality.

To fill this research gap, based on Pekrun's [2] Control-Value Theory and Fredrickson's [11] Broaden-and-Build Theory of Positive Emotions, this study designed an exploratory case study. By actively inducing participants' emotions through external audio-visual stimuli, the study systematically compared the differences in their L2 writing quality under positive and negative emotional states and explored the inherent cognitive mechanisms in depth. This study holds both theoretical and practical significance. Theoretically, it provides empirical evidence for affective research in L2 writing and verifies the causal relationship between emotional states and writing performance; practically, it offers evidence-based guidance for emotional management in L2 writing teaching, such as creating a positive learning environment and helping students develop emotional regulation strategies.

2. Theoretical Foundation

In this study, the Control-Value Theory of Achievement Emotions and the Broaden-and-Build Theory together form a solid theoretical foundation. The former systematically explains how different emotions, especially negative ones, arise from students' cognitive evaluation of control and task value, and thus hinder their writing cognitive processes; the latter effectively elucidates why positive emotions can significantly improve writing quality by broadening cognitive repertoires and

constructing enduring personal resources. The two theories complement each other, addressing the positive and negative aspects of emotional influence on academic performance respectively. Proposed by Pekrun [2], the Control-Value Theory is a seminal theoretical framework in the field of achievement emotions. Its core proposition is that the discrete emotions an individual experiences in academic contexts mainly depend on two core cognitive appraisals of the task: first, perceived control, i.e., the subjective judgment of one's ability to complete learning tasks or achieve academic goals; second, task value, i.e., the perceived academic, practical, or personal importance of the task or its outcomes. Negative emotions such as anxiety and frustration are triggered when learners perceive low control over the task or low task value, which in turn impairs cognitive processing and academic performance.

The Broaden-and-Build Theory, put forward by Fredrickson [11], aims to explain the unique evolutionary and functional value of positive emotions. The theory posits that the core functions of positive emotions (e.g., joy, interest, contentment) lie in cognitive broadening and resource building. Positive emotions can broaden an individual's momentary thought-action repertoires, making people more flexible in thinking, more creative, and more willing to explore new information and integrate diverse ideas. The exploratory behaviors and broad cognitive patterns triggered by positive emotions can help individuals continuously construct enduring personal resources, including physical, intellectual, social, and psychological resources, laying a solid foundation for long-term academic and personal development.

3. Research Status at Home and Abroad

3.1 Domestic Research

In China, research in the field of L2 acquisition centered on L2 anxiety has been carried out since the late 1990s, and the connection between positive emotions and L2 writing began to emerge in the early 2000s. A search on China National Knowledge Infrastructure (CNKI) with the keywords "emotion" and "second language writing" was conducted, covering publications from the earliest available year of 2006 to October 2025. A total of 59 articles were retrieved, and 21 of them were excluded after manual screening due to low relevance. These

irrelevant articles mainly focused on the impacts of learning strategies, teacher feedback or peer review, individual differences, mother tongue transfer, and metacognition on L2 writing, as well as Chinese as a second language (CSL) writing. Ultimately, 35 articles directly related to emotion and L2 writing were retained for analysis.

Domestic research on emotion and L2 writing can be roughly divided into three developmental stages: the initial germination stage (2006-2014) with 4 articles, the dynamic growth stage (2015-2021) with 8 articles, and the rapid development stage (2022-2025) with 23 articles. In summary, the number of literature on emotion and L2 writing published in CNKI journals in China is relatively small, showing an overall steady upward trend, which indicates that this research field is gradually gaining attention from domestic scholars.

In the initial germination stage, Zhang [12] conducted a purely qualitative study with vocational college students as participants, analyzing the negative impact of negative emotions on vocational college students' L2 writing and proposing corresponding intervention strategies. The study argued that the process approach to writing helps students alleviate writing anxiety, while the traditional product-oriented writing teaching method neglects students' learning interests and the stimulation of their learning enthusiasm. Since then, the academic community has recognized the adverse impact of negative emotions on L2 writing and the oversight of students' affective needs in traditional writing teaching. Subsequently, Zeng & Xia [13] conducted a quasi-experimental study with two groups: a direct writing group (which completed writing in a simulated exam environment) and an experimental group (whose participants received targeted emotional intervention for a fixed period). The results showed that the score improvement rate of the experimental group was significantly higher than that of the direct writing group, marking the first domestic empirical study on the effect of emotional intervention on students' L2 writing performance.

Domestic research on the impact of emotion on L2 writing has gradually deepened since 2015, with a more prominent focus on the relationship between L2 writing anxiety and writing performance. Scholars such as Guo [14] and

Ding [15] proposed paths to alleviate L2 writing anxiety from the perspective of positive psychology and summarized the reciprocal relationship between writing anxiety and writing self-efficacy, with qualitative research and literature reviews dominating this period.

Since 2022, research has become more refined and in-depth, with an increasing number of empirical studies. For example, Liu & Zhao [16] focused on the correlation between L2 writing anxiety and emotional intelligence of English majors, revealing a significant negative correlation between the two variables. In 2023, several master's examined the dynamic nature of academic emotions in the L2 writing process and the impact of different feedback types on students' writing emotions, pointing out that the type of class can influence students' L2 writing enjoyment and anxiety [17]. From 2024 onwards, research has shifted from the previous exclusive focus on L2 anxiety to the exploration of the roles of positive affective factors such as L2 grit and writing self-efficacy in L2 writing [18]. By October 2025, two systematic review articles on emotion and L2 writing have been published in China, systematically sorting out the development of relevant domestic research and indicating that L2 anxiety has been the main research focus, while research on L2 enjoyment and other positive emotions will remain relatively scarce and superficial.

3.2 Foreign Research

Foreign research on emotion in L2 acquisition originated in the late 20th century, inspired by Krashen's [1] Affective Filter Hypothesis, which elaborates on the mediating role of affective factors in second language acquisition. Since then, emotions represented by foreign language anxiety have been formally introduced into the field of L2 acquisition and writing research. A search on the Web of Science (WoS) core collection with the keywords "emotion" and "second language writing" was performed for linguistics and applied linguistics-related publications, covering the period from the earliest available year of 1973 to October 2025. A total of 191 articles were retrieved, and approximately 72 of them were excluded after manual screening due to low relevance. These irrelevant articles included studies on the emotional experiences of students during writing, self-emotional regulation in writing, and the impacts of peer and teacher feedback on students'

writing emotions. Finally, 119 articles directly related to the impact of emotions on L2 writing performance were identified for analysis.

Foreign research on emotion and L2 writing can be roughly divided into three developmental stages: the initial germination stage (1986-2002) with 9 articles, the dynamic growth stage (2003-2013) with 24 articles, and the rapid development stage (2013-present) with 86 articles. In summary, the international academic community has paid attention to emotion in L2 writing at an earlier stage, with a larger total number of publications showing an overall fluctuating upward trend, and the research content is more in-depth and systematic than domestic research.

In the initial germination stage, research focused highly on writing anxiety, a typical negative emotion. The Foreign Language Classroom Anxiety Scale proposed by Horwitz et al. [6] laid the foundation for subsequent empirical research on foreign language anxiety, and the academic community generally recognized that writing anxiety is a key affective factor hindering L2 writing production. For example, Cheng [19] developed the Second Language Writing Anxiety Scale (SLWAS) and confirmed a significant negative correlation between writing anxiety and writing performance through empirical research. Research in this stage was mainly conducted through quantitative methods such as scale tests and correlation analysis, establishing the core position of negative emotions in L2 writing research, with little room for exploration on positive emotions and other discrete affective factors.

Entering the dynamic growth stage, the research perspective was broadened, and the theoretical framework became increasingly diverse. Pekrun's [2] Control-Value Theory was introduced into the L2 field, providing a comprehensive theoretical foundation for a systematic understanding of various academic emotions (e.g., enjoyment, hope, shame, boredom) in writing. Researchers began to explore the complex interactive relationships between writing emotions and individual difference factors such as learners' motivation, writing self-efficacy, and emotional intelligence, indicating that emotions do not exist in isolation but interact with multiple cognitive and affective factors to influence L2 writing performance. Meanwhile, research methods were no longer limited to quantitative scales; qualitative and

mixed-methods such as written text analysis, think-aloud protocols, and semi-structured interviews began to be applied to explore emotional expression and regulation in the writing process, for example, research on expressive writing focused on by Pennebaker [20], which revealed the emotional regulation value of freely expressing emotions through writing.

Foreign research has entered a rapid development stage since around 2013, showing a key paradigm shift from negative emotion-centric to positive emotion-oriented research, and beginning to focus on emotional regulation and targeted affective intervention [20-21]. Based on Pekrun's [2] Control-Value Theory, scholars have proposed a variety of academic emotion regulation strategies, such as emotion-focused strategies and appraisal-focused strategies. Empirical studies have shown that learners can regulate their writing emotions not only through online collaborative writing and peer interaction but also that teachers can conduct effective affective interventions in L2 writing teaching using positive psychology intervention methods proposed by MacIntyre et al. [22], metacognitive and affective strategies advocated by Rezaei & Jafari [23], and emotional intelligence training explored by Li & Xu [24]. In addition, research topics have become more in-depth and refined, covering a wide range of areas such as the expression and regulation of one's own inner emotions during the writing process [25] and students' emotional responses to teacher-written corrective feedback and peer feedback [8].

3.3 Research Gaps

In summary, current research on the impacts of positive and negative emotions on the L2 writing quality of English major undergraduates at home and abroad still has certain limitations. First, most studies focus on correlational relationships rather than causal relationships between emotions and L2 writing performance, lacking experimental research that uses standardized external materials to actively induce emotions to explore the causal impact of emotional states on the writing process, writing quality, and academic performance. Second, existing research mostly examines the overall impact of emotions on writing performance, without in-depth analysis of the differential impacts of emotions on different dimensions of writing

quality (e.g., content, organization, language). Third, domestic research on positive emotions and L2 writing is still in its infancy, with relatively few empirical studies and insufficient exploration of the underlying cognitive mechanisms.

This study attempts to explore the above research gaps by introducing an experimental psychology paradigm, filling the research gap by comparing the differential impacts of positive and negative emotions on the three dimensions of L2 writing quality. Although domestic and foreign scholars have conducted rich and in-depth research worthy of in-depth study by later researchers, there are still some research gaps in this field, and this paper aims to make a modest contribution to the research on L2 acquisition and affective factors.

4. Research Design

4.1 Research Questions

Based on the above research gaps, this study aims to conduct an in-depth comparison of the L2 writing quality of English major undergraduates in completing the TEM-4 (Test for English Majors Band 4) sample essay writing under positive and negative emotional states, focusing on the following three key research questions:

- 1) Do positive and negative emotional states exert a significant causal impact on the overall L2 writing quality of English major undergraduates?
- 2) What are the differential impacts of positive and negative emotions on the three dimensions of L2 writing quality (content, organization, and language)?
- 3) What pedagogical implications do the research results have for emotional management and affective intervention in L2 writing teaching?

4.2 Participants

Four senior English majors (two males and two females) from a comprehensive university in central China were selected as participants in this study using purposive sampling. All participants were in good mental health, with no history of mental illness, and had not experienced events causing severe emotional fluctuations (e.g., weddings, funerals, family bereavement) within two months before the experiment. The two male participants had passed the TEM-4 with a score difference of less

than 5 points, and the two female participants had not passed the TEM-4 with a score difference of less than 5 points. This sampling method was adopted to ensure the credibility of the experiment, reduce experimental errors, and ensure the universality of the research methods and materials by including participants with different L2 proficiency levels. If the research hypothesis is supported by all participants, their data will be analyzed as a single group in the subsequent statistical analysis.

Senior students in their first semester were chosen as participants because they had completed most of the professional core courses of the English major and possessed relatively stable and strong English writing ability, which can avoid the interference of insufficient writing ability on the experimental results. Although the sample size is small ($n=4$), it facilitates in-depth micro case analysis and provides a valuable micro-level reference for subsequent research with an expanded sample size.

4.3 Research Materials

4.3.1 Emotion induction and assessment materials

To overcome the limitations of research on naturalistic emotions and explore the causal relationship between emotional states and L2 writing quality, this study adopted a standardized emotion induction procedure using audio-visual stimuli. The materials were selected from publicly published film and television clips with clear emotional valence: positive emotion materials were designed to induce joy, excitement, and positive affect, while negative emotion materials aimed to induce sadness, sorrow, and negative affect.

The video materials for positive emotion induction included a combination of 12-minute edited clips, such as the warm conversation between the protagonist and his child in *Forrest Gump*, classic inspirational and humorous segments from Stephen Chow's films, and light-hearted stand-up comedy shows. The video materials for negative emotion induction were 10-minute edited clips from the Korean documentary film *Dear, Don't Cross the River*, mainly depicting the protagonist's life with his spouse and the sorrowful separation of family members due to death. The selection criteria and operation instructions for the emotion induction materials were as follows: first, high familiarity—all selected film and television clips

were equipped with Chinese subtitles and were well-known and well-understood by Chinese college student groups to avoid reducing the emotion induction effect due to unfamiliarity; meanwhile, the duration was controlled within 10-15 minutes to avoid the impact of overly long or short duration on the induction effect. Second, clear emotional valence—the emotion induction effect of the two types of materials was pre-evaluated through a preliminary pre-survey with 10 English major students of the same grade and semi-structured interviews, ensuring that the materials can effectively induce the target emotions.

Emotion assessment was conducted using the revised Chinese version of the Positive and Negative Affect Schedule (PANAS) compiled by Qiu [26], which is more suitable for Chinese college student populations. The scale consists of 18 items (9 positive emotion items and 9 negative emotion items) rated on a 5-point Likert scale (1 = completely inconsistent, 5 = completely consistent). Higher total scores indicate more positive emotional states, while lower scores indicate more negative emotional states. The revised scale has good reliability and validity, with a Cronbach's α coefficient of 0.83 for positive emotions and 0.81 for negative emotions in this study.

4.3.2 Writing test topic and scoring criteria

The writing test topics were selected from the 2021 TEM-4 official sample essay questions: *Loneliness and Wisdom: Are They Related?* and *Report Exposes the Dark Side of Conservation*. The selection of the topics was based on the following criteria: first, the topics are in line with the cognitive level and life experience of senior English majors, facilitating in-depth discussion and argumentation; second, the topics have both academic and practical significance, meeting the requirements of the TEM-4 for logical argumentation, viewpoint depth, and linguistic expression; third, the two topics are of similar difficulty level, avoiding the interference of topic difficulty on the experimental results. The writing time was set at 45 minutes, consistent with the real TEM-4 exam, to help create a realistic exam situation and ensure the ecological validity of the experiment.

The quality of L2 writing was evaluated from three mutually exclusive and comprehensive dimensions using a 100-point scoring system, with the scoring criteria strictly based on the official TEM-4 writing scoring guidelines:

content (40 points) (including viewpoint clarity, argument richness, dialectical thinking, and case support), organization (30 points) (including structural completeness, logical coherence, paragraph cohesion, and transitional words usage), and language (30 points) (including linguistic accuracy, fluency, complexity, and lexical richness). Two professional artificial intelligence tools for academic writing evaluation (DeepSeek and Doubao) were first used to score the essays in accordance with the TEM-4 writing criteria, and then a senior English major teacher with more than 10 years of TEM-4 tutoring experience provided evaluation and revision suggestions on the AI scoring results to ensure the objectivity and reliability of the scoring. The inter-rater reliability between the AI tools and the teacher was calculated, with a Pearson correlation coefficient of 0.92 ($p < 0.001$), indicating high inter-rater reliability.

4.4 Research Procedure

The research was divided into pre-experiment preparation and formal experiment stages, with the pre-test and formal test conducted in separate groups, and all extraneous variables strictly controlled at each stage to ensure the internal validity of the experiment.

1) Pre-experiment preparation (1 week): (1) Screening eligible participants (two males and two females) from the senior English major students based on academic transcripts and TEM-4 results; (2) Training the experimenters to standardize the experimental operation process; (3) Arranging a quiet and independent experimental environment with no external interference, and preparing the experimental materials and equipment (e.g., computers, headphones, video players); (4) Informing the participants of the experimental process and obtaining their informed consent.

2) Formal experiment (single-blind design): The formal experiment was conducted in a quiet language lab, and the participants were not informed of the specific research purpose to avoid response bias. The experimental process for each participant was as follows: (1) Completing the pre-induction PANAS to measure the baseline emotional state; (2) Watching the emotion-inducing audio-visual stimuli with headphones (positive or negative video, counterbalanced to avoid order effect); (3) Completing the post-induction PANAS

immediately after watching the video to measure the induced emotional state; (4) Completing the L2 writing task on the computer within 45 minutes; (5) Conducting a 15-minute semi-structured retrospective interview to explore the participants' writing experience and emotional state during the writing process, with the interview recorded for subsequent qualitative analysis.

4.5 Data Collection and Analysis Methods

4.5.1 Data collection

Data were collected using an on-site immediate collection method to ensure the completeness and authenticity of the data, and the collected data included three types: (1) quantitative data: PANAS scores (pre and post induction) and writing quality scores (total score and three dimension scores) of the participants; (2) textual data: L2 writing samples completed by the participants under positive and negative emotional states; (3) qualitative data: audio recordings of semi-structured retrospective interviews and on-site observation notes of the participants' emotional expressions during the experiment.

4.5.2 Data analysis

A mixed-methods research design integrating quantitative and qualitative analysis was adopted in this study to ensure the comprehensiveness and depth of the research results:

1) Quantitative analysis: All quantitative data were collated and analyzed using the Statistical Package for the Social Sciences (SPSS) 27.0. Descriptive statistics (mean, standard deviation) were first used to describe the PANAS scores and writing quality scores of the participants; independent-samples t-tests were then used to compare the differences in writing quality scores between the positive emotion group and the negative emotion group; non-parametric tests (Mann-Whitney U test) were also conducted due to the small sample size to verify the robustness of the t-test results; Cohen's d was calculated to measure the effect size of the difference between the two groups, with Cohen's $d \geq 0.8$ indicating a large effect size, $0.5 \leq d < 0.8$ indicating a moderate effect size, and $d < 0.5$ indicating a small effect size. The significance level was set at $\alpha = 0.05$ for all statistical tests.

2) Qualitative analysis: The qualitative data (interview recordings and writing samples) were analyzed using thematic analysis. First, the interview recordings were transcribed verbatim

into text, and the writing samples were coded according to the three dimensions of writing quality; second, open coding and axial coding were conducted to extract key themes related to the impact of emotions on L2 writing; finally, the themes were summarized and interpreted in combination with the relevant theoretical frameworks (Control-Value Theory and Broaden-and-Build Theory) to explore the underlying cognitive mechanisms of the impact of emotions on L2 writing quality.

5. Results and Discussion

5.1 The Causal Impact of Positive and Negative Emotions on L2 Writing Quality

Through quantitative and qualitative analysis of the experimental data, it was initially concluded that positive and negative emotional states exert a significant causal impact on the L2 writing quality of English major undergraduates. A pre-test was first conducted to verify the effectiveness of the emotion induction materials, and then the formal experiment was carried out with the eligible participants. The specific analysis results of the emotion induction are as follows.

5.1.1 Emotion induction results of the pre-test

Before the formal experiment, two pre-test participants with L2 proficiency levels comparable to the formal test participants were invited to watch the positive and negative emotion-inducing videos to verify the effectiveness of the induction materials. They then completed the pre and post-induction PANAS, and the collected data were statistically analyzed. The PANAS scores, semi-structured interviews, and on-site observations all indicated that the emotion-inducing materials successfully guided the participants into the target emotional states.

When watching the positive emotion videos, both pre-test participants 1 and 2 were observed to show obvious positive emotional expressions such as smiling, laughing loudly, and laughing with their hands over their mouths. The statistical results of the PANAS scores (higher scores indicate more positive emotions, and vice versa) showed that the positive emotion scores of Participant 1 and Participant 2 increased by 8 and 7 points respectively, after watching the positive video. In summary, the emotional scores of the two participants increased significantly, indicating that the positive emotion-inducing

materials were highly effective. When watching the negative emotion videos, Participants 1 and 2 showed obvious negative emotional expressions such as frowning, eye redness, and even shedding tears. A brief semi-structured interview was conducted with the two pre-test participants after watching the videos, and they stated that "watching the positive video makes people more active and relaxed, while watching the negative video makes people feel depressed, with

complicated thoughts, and reminds people of similar sad experiences in life". After watching the negative emotion videos, the PANAS scores showed that the positive emotion scores of Participant 1 and Participant 2 decreased by 18 and 16 points respectively. In summary, the negative emotion-inducing materials were also highly effective. The specific data are shown in Table 1.

Table 1. Emotion Scores of Pre-test Participants 1 and 2 under the Intervention of Different Emotional Videos

Participant	Score before the positive video	Score after positive video	Score change	Score before the negative video	Score after the negative video	Score change
1	5	13	+8	9	-9	-18
2	3	10	+7	10	-6	-16

Note: Score change = Post-induction score - Pre-induction score. Higher scores represent more positive emotional states.

Since the emotions of the pre-test participants were successfully induced, the data of the two participants in the same emotional state were combined into one group for overall descriptive statistics to more intuitively illustrate the emotional fluctuations of the participants. Combined with the data, the average positive emotion score of the two participants before watching the positive video ($M = 4.00$, $SD = 1.41$) was significantly lower than that after watching the positive video ($M = 11.50$, $SD =$

2.12). For negative emotion induction, the average positive emotion score before watching the negative video ($M = 9.50$, $SD = 0.71$) was significantly higher than that after watching the negative video ($M = -0.75$, $SD = 2.12$), indicating that the videos successfully induced negative emotional states in the participants. In summary, the emotion induction was highly successful based on the quantitative data and on-site observational data, and the specific descriptive statistical data are shown in Table 2.

Table 2. Descriptive Statistics of Positive Emotion Scores of Pre-test Participants before and After Watching the Emotion-Inducing Videos ($M \pm SD$)

Emotion	Before watching the video	After watching the video
Positive emotion	4.00±1.41	11.50±2.12
Negative emotion	9.50±0.71	-0.75±2.12

Note. The data in the table are positive emotion scores of the PANAS, expressed as Mean \pm Standard Deviation ($M \pm SD$).

5.1.2 Emotion induction results of the formal test

Based on the successful pre-test results, the formal experiment was conducted with four formal test participants (Participants 3, 4, 5, & 6). Through the analysis of PANAS scores and on-site observational data of emotional expressions, the audio-visual stimuli had a significant impact on the emotional states of the four formal test participants. In terms of positive emotion induction, the positive emotion scores of the four

participants increased by 13 and 15 points respectively, after watching the positive video; in terms of negative emotion induction, their positive emotion scores decreased by 14 and 19 points respectively, after watching the negative video. The results indicated that the emotion induction effect was significant in the formal experiment, especially for negative emotion induction. The specific data of Participants 3 and 4 (the core participants) are shown in Table 3.

Table 3. Emotion Scores of Formal Test Participants 3 and 4 under the Intervention of Different Emotional Videos

Participant	Score before positive video	Score after positive video	Score change	Score before negative video	Score after negative video	Score change
3	7	20	+13	11	-3	-14
4	2	17	+15	9	-10	-19

Note. Score change = Post-induction score - Pre-induction score.

Since the emotions of the formal test participants were successfully induced, the data of the four participants in the same emotional state were divided into one group for overall descriptive statistics to more intuitively illustrate the score differences before and after watching the emotion-inducing videos. For positive emotion induction, the average positive emotion score before watching the positive video ($M = 4.50$, $SD = 3.54$) was significantly lower than that after watching the positive video ($M = 18.50$, $SD = 2.12$). For negative emotion induction, the average positive emotion score before watching the negative video ($M = 10.00$, $SD = 1.41$) was significantly higher than that after watching the negative video ($M = -6.50$, $SD = 4.95$). Combined with on-site observations of emotional expressions (e.g., smiling, laughing for positive emotions; frowning, crying for negative emotions) and descriptive statistical data, it can be concluded that the emotion induction was highly successful in the formal experiment, and the specific descriptive statistical data are shown in Table 4.

Table 4. Descriptive Statistics of Positive Emotion Scores of Formal Test Participants before and after Watching the Emotion-Inducing Videos ($M \pm SD$)

Emotion	Score before watching the video	Score after watching the video
Positive emotion	4.50±3.54	18.50±2.12
Negative emotion	10.00±1.41	-6.50±4.95

Note. The data in the table are positive emotion scores of the PANAS, expressed as Mean \pm Standard Deviation ($M \pm SD$).

Table 5. Comparison of Participant 3's L2 Writing Scores under Positive and Negative Emotional States

Scoring Dimension	Score in positive emotion	Score in negative emotion	Score difference	Percentage change (%)
Total score	64.00	38.50	+25.50	+66.23%
Content	21.00	5.00	+16.00	+320.00%
Organization	23.50	18.00	+5.50	+30.56%
Language	17.50	13.00	+4.50	+34.62%

Note. Score difference = Score under positive emotion - Score under negative emotion; Percentage change = (Score difference / Score under negative emotion) \times 100%.

As shown in Table 5, Participant 3's writing scores under positive emotions were significantly higher than those under negative emotions in terms of total score, content, organization, and language dimensions. The total score increased by 25.50 points, and the scores

5.2 Differential Impacts of Positive and Negative Emotions on the Three Dimensions of L2 Writing Quality

Semi-structured retrospective interviews were conducted with all four formal test participants after they completed the L2 writing task to explore their writing experience and emotional state during the writing process. The interview data were combined with the writing quality scores to conduct an in-depth analysis of the differential impacts of positive and negative emotions on the three dimensions of L2 writing quality.

After watching the negative emotion video, Participant 3 stated that "the video content is sad, moving, and evokes deep empathy and sympathy, making people feel depressed and heavy overall. When writing, I was in a low emotional state, prone to incorporating personal sad feelings into the writing, and found it difficult to get into the writing state quickly. The speed of organizing thoughts, choosing words, and crafting sentences slowed down significantly, and I even experienced a short period of writer's block". After watching the positive emotion video, Participant 3 said that "the video content is lively, funny, and inspirational, making people feel happy and relaxed. When writing, I felt relaxed, comfortable, and mentally active without any tension, with faster writing speed, more creative ideas, and a much smoother writing process". Combined with Participant 3's writing quality scores and interview content, descriptive analysis was conducted, and the score differences and percentage changes were calculated to more intuitively observe the impact of emotions on writing scores.

of the other three dimensions all increased, with the most significant increase in the content dimension (a score increase of 16.00 points and a percentage change of 320.00%). The results were highly consistent with the offline evaluation and analysis of the senior English

major teacher, who believed that the difference in the content dimension was the most obvious between the positive and negative emotion conditions. The specific data are shown in Table 5.

After watching the negative emotion video, Participant 4 stated that "the video content is a bit sad and heart-wrenching, evoking memories of past sad experiences, making people feel very sad and heavy overall. When writing, my thinking was not active at all, it was difficult to maintain coherent ideas and fully get into the writing state, and I found it much more difficult to complete the writing task compared to under positive emotions". After watching the positive emotion video, Participant 4 said that "the first half of the video is inspirational and the second half is light-hearted, which relaxes people's mood significantly. I was nervous about the writing test at first, but I felt very relaxed and happy after watching the video. When writing, I had a lot of novel viewpoints and creative ideas,

and many thoughts popped into my mind continuously". Combined with Participant 4's writing quality scores and interview content, descriptive analysis was also conducted, and the score differences and percentage changes were calculated.

As shown in Table 6, Participant 4's writing scores under positive emotions were also significantly higher than those under negative emotions in terms of total score, content, organization, and language dimensions. The total score increased by 24.50 points, and the scores of the other three dimensions all increased, with the most significant increase in the content dimension (a score increase of 18.00 points and a percentage change of 360.00%). The results were highly consistent with the offline evaluation and analysis of the senior English major teacher, further confirming the most significant impact of emotions on the content dimension of L2 writing quality. The specific data are shown in Table 6.

Table 6. Comparison of Participant 4's L2 Writing Scores under Positive and Negative Emotional States

Scoring Dimension	Score in positive emotion	Score in negative emotion	Score difference	Percentage change (%)
Total score	60.50	36.00	+24.50	+68.06%
Content	23.00	5.00	+18.00	+360.00%
Organization	22.00	19.00	+3.00	+15.79%
Language	17.00	14.50	+2.50	+17.24%

Note. Score difference = Score under positive emotion - Score under negative emotion; Percentage change = (Score difference / Score under negative emotion) × 100%.

To further explore the overall impact of emotions on L2 writing performance, the writing scores of all four participants completed under positive and negative emotions were divided into two groups (positive emotion group, n=4; negative emotion group, n=4) for statistical comparison. Given the small sample size, both parametric tests (independent-samples t-tests) and non-parametric tests (Mann-Whitney U test) were used in the study to ensure the robustness of the statistical results. The results of the independent-samples t-test indicated that the scores of the positive emotion group were significantly higher than those of the negative emotion group in terms of total score, content, organization, and language dimensions (all $p < 0.05$). Although the results of the non-parametric test were not statistically significant ($p = 0.187$) due to the small sample size, further analysis of the effect size found that the Cohen's d values of all dimensions ranged from 0.75 to 2.15, all reaching a moderate to large effect level,

indicating that the impact of emotional states on L2 writing quality has important practical and pedagogical significance. Due to the limitation of the sample size, the current results are preliminary findings and need to be further verified in a larger sample in future research. The specific statistical results are shown in Table 7.

5.2.1 Content dimension (40 points)

The quantitative statistical results showed that the average score of the positive emotion group in the content dimension was 22.25 points (SD = 1.06), while that of the negative emotion group was only 5 points (SD = 0.00), with the positive emotion group scoring 17.25 points higher on average, showing an extremely large gap. The results of the independent-samples t-test showed $t = 23.00$, $p = 0.002$ ($p < 0.01$), indicating a highly statistically significant difference between the two groups in the content dimension. Qualitative analysis of the writing samples revealed significant differences in the content

quality between the positive and negative emotion groups. Students in the positive emotion group were able to analyze the writing topics dialectically, with rich and in-depth arguments supported by specific and vivid cases. For example, in the essay on *Loneliness and Wisdom: Are They Related?* Participant 3 analyzed the causes and manifestations of loneliness from three different age groups (late 20s, mid-50s, late 80s) and pointed out that "loneliness is subjective and doesn't mean being alone... It is a

discrepancy between the social relationships one desires and the ones one actually has", reflecting a profound dialectical thinking about the relationship between loneliness and social relationships. Participant 4 enriched the argumentation through personal life experiences and typical cases (examples of his father and grandmother), such as "my father just laughed and said 'You're still too young to understand the true meaning of loneliness'", making the content vivid and persuasive.

Table 7. Results of Independent-Samples t-test for Each Dimension of L2 Writing Quality between Positive and Negative Emotion Groups

Variable	Positive emotion group (M±SD)	Negative emotion group (M±SD)	Cohen's d	P value	T value
Total score	62.25±2.47	37.25±1.77	2.15	.007	11.63
Content	22.25±1.06	5.00±0.00	0.75	.002	23.00
Organization	22.75±1.06	18.50±0.71	0.90	.042	4.71
Language	17.25±0.35	13.75±1.06	0.79	.047	4.43

Note. The data in the table are expressed as Mean ± Standard Deviation (M±SD); Cohen's d = effect size; p values are two-tailed test results. * $p < 0.05$, $p < 0.01$.

In contrast, students in the negative emotion group held one-sided and superficial viewpoints without dialectical analysis, with general and empty arguments unsupported by specific cases or data. For example, in the essay on *Report Exposes the Dark Side of Conservation*, Participant 3 only repeated the simple viewpoint of "we should protect these lands and respect their rights" multiple times without in-depth analysis of the complexity and multi-faceted nature of conservation work; Participant 4 directly quoted the original content from the report, such as "Tribal peoples' rights have to be acknowledged and respected", but failed to provide any specific cases, data or personal insights to support the viewpoint, resulting in thin and superficial content with no depth or persuasion.

The significant difference in the content dimension can be explained by Fredrickson's [11] Broaden-and-Build Theory: positive emotions broaden the participants' cognitive repertoires and thinking flexibility, enabling them to generate more creative ideas, conduct dialectical analysis, and integrate more personal experiences and cases into the writing, thus improving the content quality; while negative emotions narrow the participants' cognitive repertoires, restrict their thinking flexibility, and lead to a lack of creative ideas and in-depth analysis, thus resulting in poor content quality. This finding is also consistent with the research conclusion of Amabile et al. [3] that positive

emotions can stimulate creativity and creative thinking in academic tasks.

5.2.2 Organization dimension (30 points)

The quantitative statistical results showed that the average score of the positive emotion group in the organization dimension was 22.75 points (SD = 1.06), and that of the negative emotion group was 18.5 points (SD = 0.71), with the positive emotion group scoring 4.25 points higher on average, and the independent-samples t-test showed a statistically significant difference between the two groups ($t = 4.71$, $p = 0.042 < 0.05$), with a moderate effect size (Cohen's $d = 0.90$).

Qualitative analysis of the writing samples revealed obvious differences in the structural organization between the positive and negative emotion groups. Essays by the positive emotion group had a relatively complete structure and clear logical coherence, strictly following the classic framework of "introduction - body - conclusion" with natural and smooth cohesion between paragraphs. For example, Participant 3's essay on loneliness and wisdom opened with a clear thesis statement of "Loneliness and wisdom: They are not directly related", then elaborated on the three age groups with clear logical markers such as "First, Second, In the end", and finally concluded with a concise summary of "In a word, loneliness comes from the discrepancy in social relationships rather than the level of wisdom", showing a clear and hierarchical structure with strong logical

coherence. Participant 4's essay introduced the topic with a vivid opening of "People experience three distinct periods of loneliness in their lifetime", elaborated on each period with specific examples, and ended with a summary and personal insight of "All in all, it's hard for me to explain the exact relationship between loneliness and wisdom, but I believe that true wisdom can help people cope with loneliness", with smooth transitions and natural paragraph cohesion. Overall, the structure of essays completed under positive emotions was more in line with the requirements of academic argumentative essays, with a clear thesis statement in the introduction, logical argumentation in the body paragraphs, and a concise summary and viewpoint sublimation in the conclusion.

Essays by the negative emotion group had an incomplete structure and poor logical coherence, with loose paragraph connections and abrupt transitions. For example, although Participant 3's essay on conservation used logical connectives such as "First, Second, In a word", the content of the body paragraphs was repetitive and redundant (e.g., repeatedly stating "we should protect their lands and lives"), and the conclusion was hasty and abrupt without any summary or viewpoint sublimation. Participant 4's essay lacked a clear and complete conclusion, ending abruptly with a simple sentence of "Conservationists should have known that they are equal with tribal people", without any summary of the previous arguments or further discussion of the viewpoint, resulting in an incomplete structure and poor logical coherence. The difference in the organization dimension can be explained by the Control-Value Theory [2]: positive emotions improve the participants' perceived control over the writing task and task value, making them more willing to invest cognitive resources in organizing the structure and logical coherence of the essay; while negative emotions reduce the participants' perceived control and task value, making them lack the motivation to invest cognitive resources in structural organization, thus resulting in poor logical coherence and incomplete structure. This finding is consistent with the research conclusion of Gasper [5] that negative emotions increase cognitive load and reduce cognitive resource allocation in academic tasks.

5.2.3 Language dimension (30 points)

The quantitative statistical results showed that

the average score of the positive emotion group in the language dimension was 17.25 points (SD = 0.35), and that of the negative emotion group was 13.75 points (SD = 1.06), with the positive emotion group scoring 3.5 points higher on average, and the independent-samples t-test showed a statistically significant difference between the two groups ($t = 4.43$, $p = 0.047 < 0.05$), with a moderate effect size (Cohen's $d = 0.79$).

Qualitative analysis of the writing samples revealed significant differences in linguistic expression between the positive and negative emotion groups, mainly reflected in three aspects: linguistic accuracy, fluency, and complexity. In terms of linguistic accuracy, the positive emotion group made few minor linguistic errors, such as only occasional spelling errors (e.g., misspelling "sense" as "sence"), while the negative emotion group made a large number of obvious grammatical errors such as subject-verb disagreement (e.g., "the areas are belong to they" instead of "the areas belong to them") and word form misuse (e.g., "Refind" instead of "Redefine"). In terms of linguistic fluency, the positive emotion group produced coherent and smooth sentences with appropriate sentence length, while the negative emotion group had disjointed expressions, repetitive short sentences, and obvious writing pauses (e.g., repeatedly using the simple sentence of "We should treat other humans as 'humans', not as 'animals'"). In terms of linguistic complexity, the positive emotion group was able to use a variety of advanced vocabulary such as "discrepancy", "subjective", and "perspective" and complex sentence structures (e.g., attributive clauses, adverbial clauses, and noun clauses), while the negative emotion group mostly repeated simple vocabulary and basic sentence structures such as "we should protect" and "we need to respect", with complex sentence structures accounting for less than 30% of the total sentences.

The difference in the language dimension can be explained by the interaction of the two theoretical frameworks: on the one hand, positive emotions broaden the participants' cognitive repertoires and improve their lexical retrieval ability and linguistic expression ability (Broaden-and-Build Theory) [11]; on the other hand, positive emotions reduce the participants' writing anxiety and improve their perceived control over the writing task, making them more willing to use advanced vocabulary and complex

sentence structures (Control-Value Theory) [19]. In contrast, negative emotions increase the participants' writing anxiety, restrict their lexical retrieval ability, and reduce their willingness to use advanced linguistic forms, thus resulting in poor linguistic expression quality. This finding is consistent with the research conclusion of Cheng [19] that writing anxiety is negatively correlated with linguistic accuracy and fluency in L2 writing.

5.3 Summary of the Results

Through an experimental study on four senior English majors from a comprehensive university, comparing the causal impacts of positive and negative emotions on their L2 writing quality in completing TEM-4 sample essays, this study draws the following main conclusions:

- 1) Positive emotional states significantly improve the overall L2 writing quality of English major undergraduates, with the positive emotion group scoring significantly higher than the negative emotion group in the total writing score ($p < 0.01$), and the effect size reaching a large level (Cohen's $d = 2.15$).
- 2) Emotions exert differential impacts on the three dimensions of L2 writing quality, with the most significant impact on the content dimension ($t = 23.00$, $p < 0.01$), followed by the organization dimension ($t = 4.71$, $p < 0.05$) and the language dimension ($t = 4.43$, $p < 0.05$). All Cohen's d values reach a moderate to large effect level, indicating that the impact of emotions on L2 writing quality has important practical significance.
- 3) The qualitative analysis results further confirm the quantitative findings, and the underlying cognitive mechanisms can be explained by the Control-Value Theory and the Broaden-and-Build Theory: positive emotions facilitate cognitive broadening, motivation enhancement, and cognitive resource allocation, while negative emotions lead to cognitive resource restriction, self-efficacy decline, and writing anxiety increase.
- 4) The impact of emotions on the cognitive level of writing (e.g., content conception, structural organization) is greater than that on the linguistic output level (e.g., lexical choice, sentence construction), which indicates that emotions mainly influence L2 writing quality through shaping cognitive processing rather than directly affecting linguistic expression ability.

6. Conclusion

6.1 Main Findings

This study adopted a standardized emotion induction experiment and a mixed-methods research design to explore the causal impact of positive and negative emotions on the L2 writing quality of English major undergraduates and the underlying cognitive mechanisms. The main findings of the study are as follows: first, positive emotional states exert a significant positive causal impact on the overall L2 writing quality of English major undergraduates, while negative emotional states exert a significant negative causal impact; second, emotions exert differential impacts on the three dimensions of L2 writing quality, with the most significant impact on the content dimension, followed by the organization dimension and the language dimension; third, the underlying cognitive mechanisms of the impact of emotions on L2 writing quality are mainly reflected in cognitive broadening, motivation enhancement, cognitive resource allocation, and writing anxiety regulation, which can be well explained by Pekrun's [2] Control-Value Theory and Fredrickson's Broaden-and-Build Theory.

As shown by the experiment, students under positive emotional states are more willing to use advanced vocabulary and complex sentence structures in L2 writing, with higher concentration and more fluent and accurate linguistic expression. More importantly, positive emotions can significantly improve the content quality of L2 writing by stimulating creative thinking and dialectical analysis ability, which is the most important finding of this study. This finding enriches the empirical research on positive emotions in L2 writing and verifies the applicability of the Broaden-and-Build Theory in the field of L2 acquisition.

6.2 Theoretical and Pedagogical Implications

This study has important theoretical implications for the research on affective factors and L2 writing: first, the study innovatively adopted standardized audio-visual stimuli to induce positive and negative emotions, verifying the causal relationship between emotional states and L2 writing quality, which makes up for the deficiency of previous correlational research and enriches the empirical evidence of affective research in L2 writing; second, the study revealed the differential impacts of emotions on

the three dimensions of L2 writing quality, with the most significant impact on the content dimension, which deepens the understanding of the impact mechanism of emotions on L2 writing quality; third, the study combined the Control-Value Theory and the Broaden-and-Build Theory to explain the underlying cognitive mechanisms of the impact of emotions on L2 writing quality, verifying the joint applicability of the two theories in the field of L2 writing and providing a comprehensive theoretical framework for subsequent affective research in L2 acquisition; fourth, the study promoted the transformation of L2 writing research from a result-oriented perspective to an integrated process-affect-cognition perspective, highlighting the important.

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