INFLUENCE OF AFFECTIVE PRIMING EFFECT OF IMMERSIVE VIRTUAL REALITY HORROR GAMES ON COGNITIVE PROCESSING OF COLLEGE STUDENTS

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Abstract
This paper aims to disclose how the affective priming effect of immersive virtual reality (VR) horror games influences the cognitive processing of college students. A total of 200 college students were selected and divided evenly into four groups by the random number table method: long-time game (LTG), medium-time game (MTG), short-time game (STG) and non-game (NG) group. Each group has 25 males and 25 females. The members of first three groups were asked to play a horror game for 10, 20 and 30 min, respectively. Then, all the subjects underwent the Implicit Association Test (IAT), followed by a word identification task, in which the correct number of responses and reaction time of each student were recorded. The results show that the LTG group outperformed the other groups in cognitive processing and correctness of word identification; the affective state of the fixed intensity level can improve cognitive processing, the hyper-high level of affective activation interferes with or even hinders cognitive processing, and the excessively low activation is insufficient to support cognitive processing. The research results shed new light on the application of immersive VR technology in cognitive learning.

Key words: Immersive Virtual Reality Horror Game, Affective Priming Effect, Cognitive Processing, College Student.

INTRODUCTION
The mental health status of college students have always been a topic of concern to the whole society; Since they are faced with greater learning and employment pressure, various psychological problems will inevitably occur, and the most obvious manifestation is the fluctuating mood. Uncontrollable emotions can easily lead to behavioral errors. Emotions are closely related to cognitive processing, and affective priming research is an effective way to reveal affective-cognitive relationships (Steinbeis & Koelsch, 2011). Affective priming refers to the fact that an individual first processes a stimulus with a certain affective potency, so that subsequent processing is also easy to cast a corresponding affective color (Voyer & Myles, 2017); the priming effect can also be expressed in cognitive bias, which means that the subject is affected by the initiation of stimulation. In the processing of target stimulation, it is reflected in an increase in the bias rate. In general, the priming effect depends on some positive or negative relationship between the initiation and the target stimulus; this relationship can be either meaning, such as semantics, or formal, such as word or glyph; it involves many problems such as word recognition, semantic processing, and unconscious processing, and is related to the differences between various writing systems (Lemout, Yoon, & Joormann, 2012). Cognitive activity is one of the important psychological activities of human beings and good
cognitive function is the basic guarantee for people to successfully engage in all activities. Psychological research shows that the psychological feelings of the audience are brought about by the stimulation of the senses; virtual reality allows mankind to enter another possible world, which has both the virtual reality of possibility and the virtual impossibility (Rebernjak & Buško, 2018). The virtual impossibility, once surpassing reality and forming a huge contrast, will definitely bring the audience come directly to the stimulating experience. A large amount of behavioral evidence shows that the attention bias of immersive virtual reality horror stimuli is the cognitive characteristics of high-anxiety individuals; an in-depth discussion of this phenomenon not only helps to understand the relationship between emotion and cognition, but also develops new for clinicians (Spapé, Harjumen, & Ravaja, 2017). The cognitive therapy provides a theoretical basis. However, the current research on terror-related attention bias is only at the level of phenomenon description, lacking understanding of its essence and related brain mechanisms. Studies have also shown that emotions can influence a person’s cognitive processing strategies, such as positive emotions and heuristic processing strategies, while negative emotions are associated with systematic, fine processing (Wentura, Rohr, & Degner, 2017).

In order to explore the influence of affective priming effect of immersive virtual reality horror games on college students’ cognitive processing, this paper selected 200 college students as research objects, and divided them into 4 groups according to the random number table method: long-time game (LTG), medium-time game (MTG), short-time game (STG) and non-game (NG) group with 50 objects in each group including 25 male and 25 female students. The students in LTG, MTG and STG group were firstly arranged to play horror game—The Brookhaven Experiment; after the corresponding game plans were carried out in the experiment group, the Implicit Association Test (IAT) implicit emotion test was carried out for each group of students. The detailed chapters are arranged as follows: Section 2 introduces experiment objects and methods; Section 3 analyzes experiment results; Section 4 discusses the affective effects induced by the immersive virtual reality horror games and its impact on cognitive processing of college students; Section 5 is conclusion.

STUDY OBJECTS AND METHODS

Study objects
Inclusion criteria: (1) college students who are physically and mentally healthy; (2) college students aged at 18-22 years old and still enrolled in the school within 0.5 years of the study; (3) college students with no internet addiction history, and their average weekly computer game play time is less than 10 hours within 0.5 years and subjectively did not change intentions; (4) college students with no psychological counseling or treatment history; (5) college students can be followed up and intervention; (6) college students informed and agreed to participate In this study, an informed consent form was signed.

Exclusion criteria: (1) college students who are unable or unwilling to complete the immersive virtual reality horror game task in this study; (2) college students whose vision correction is abnormal.

In this study, a total of 200 college students were selected as research subjects and divided into 4 groups according to the random number table method: long-time game (30 minutes) (LTG), medium-time game (20 minutes) (MTG), short-time game (10 minutes) and non-game (NG) (control group) group with 50 objects in each group including 25 male and 25 female students. The general information of the 200 selected college students is shown in Table 1.

Table 1. General information of the 200 selected students in the 4 groups (x ± s)

| Group | Average age (years old) | Gender (male/female) | Major type (SE/HA) | Academic grade |
|-------|-------------------------|----------------------|-------------------|---------------|
|       |                         |                      |                   | F  | S  | JS | SS |
| LTG   | 20.24±1.09              | 25/25                | 29/21             | 12 | 14 | 17 | 7  |
| MTG   | 20.37±1.14              | 25/25                | 33/17             | 19 | 15 | 11 | 5  |
| LTG   | 20.55±1.12              | 25/25                | 27/23             | 13 | 12 | 14 | 11 |
| NG    | 20.47±1.15              | 25/25                | 35/15             | 18 | 16 | 10 | 6  |
| P     | > 0.05                  | > 0.05               | > 0.05            |    |    |    |

Note: SE-Category of science and engineering; HA-Category of humanity and art; F-Freshmen; S-Sophomore; JS-Junior student; SS-Senior student.
Experiment design
This study selected Valve’s horror-themed zombie survival shooting game, The Brookhaven Experiment, as the experimental material on the HTC Vive platform. During the game, the player was placed in a dark and terrifying environment with horror-themed sound effects. Control the virtual gun to fight off the zombies. The experiment adopts a design scheme in which the game duration and the player gender are mixed. The group is the inter-subject factor, the gender is the internal factor of the subject, and each group is operated with the same material.

The LTG, MTG and STG group were firstly arranged to play horror game—the Brookhaven Experiment for 10, 20 and 30 minutes, respectively; after the corresponding game is over for each group, each student was tested for IAT implicit emotions and the students in NG group were directly tested for implicit emotions; after conducting the IAT implicit emotion test, each group of students immediately carried out a word identification task: randomly present words, the students judge whether there are typos in the words, there are typos to raise the red card response and no typos to raise blue card response; after judging and responding, the next word will continue to be presented; if the students do not have a placard response for more than 3 seconds, it will automatically jump to the next word; the correct number of responses and reaction time of each student will be recorded. In the preparation experiment stage, the reaction results and response time feedback were presented to the students while the formal experiment stage does not feedback the response results; there were 10 sample examples in the practice experiment phase including 6 no typos examples and 4 typos examples and there are 20 idiom examples in the formal experiment stage including 5 no typos and 15 typos. The correct number of responses and response time of the students were recorded.

Observation indicators
In the test, when the correct number and reaction of the subjects’ responses were recorded, the correct rate of word discrimination was calculated. The positive vocabulary (PV), negative vocabulary (NV), similar vocabulary (SIV), metaphorical vocabulary (MV), sensual vocabulary (SEV) and rational vocabulary (RV) were tested and calculated separately.

Data processing
Statistical analysis was performed using SPSS 19.0 statistical software, and the data entered were analyzed. The measurement data were expressed as mean ± standard deviation (X ±s). The t-test and one-way analysis of variance were used to analyze the experiment observation indicators of students in different groups. The statistical results were P<0.05 as the significant standard.

EXPERIMENT RESULTS AND ANALYSIS
Validity analysis of affective priming in immersive virtual reality horror games
Under the condition of short stimulation interval, the cue effect brought by the game’s horror element is greater than the cue effect brought by the control group. Visual stimuli indicating that horror can affect tactile attention, thus demonstrating the effect of terror stimuli on the trans-sensory channel of attention, and further analysis shows that this effect is related to the individual’s level of fear and the higher the level of immersion into the game, the greater the degree of attention bias. The interaction between the types of horror and non-terror games, the types of valid and invalid prompts is statistically significant, and the virtual reality games are more effective than the common games. Table 2 shows the test results of the affective priming effect of horror games on cognitive processing of college students in the 4 groups. The relevant experiments successfully replicate the phenomenon of terror-related attention bias; there is a attention bias towards terror stimuli and low-anxiety individuals like high-anxiety individuals, showed attention bias; the results suggest that when the threat level is high enough, both high and low anxiety groups show similar attention bias. A large amount of behavioral evidence shows that the attention bias of terror stimuli is the cognitive characteristics of high-anxiety individuals and an in-depth study of this phenomenon helps us understand the relationship between emotion and cognition.

Negative bias refers to the player’s sensitivity to negative stimuli in the periphery, always paying more attention to negative events or threatening events. Compared with neutral and positive stimuli, players will prioritize negative stimuli and judge them and it is also faster and more accurate.
This study found that in the analysis of the correct rate of response and the average response time, the nature of the target game has a significant main effect, the player’s response rate to short-time horror games is significantly higher than the response to long-time horror games; the average response time of a horror game is significantly shorter than that of a long-time horror game, which supports the existence of a negative bias, and also indicates that there is a significant negative bias in the subliminal affective start (Pan, Shi, Lu et al., 2016). In the pairing type of long-time and short-time horror games, the player’s correct rate is the lowest; this can be explained from two aspects of negative bias theory. First, the player’s response to long-time horror games is shorter. The time horror game is slow and the correct rate is low. Secondly, the priority processing of the negative stimulus will seriously interfere with the player’s processing of other stimuli.

The long-time horror game group scored the lowest in all dimensions of empathy, indicating that the virtual reality horror game addicts have lower empathy and affective low performance includes stubbornness, affective numbness, lack of compassion, and increased pain. Most of the horror games have a fast pace and players can completely control their own characters or units and they rely on fast real-time reactions and operations. In most cases, they can rely on their own efforts to complete tasks and win, so the players’ own ideas and plans are successful. To a certain extent, the horror online game strengthens the recognition of college students’ violent victory, thus obscuring their moral judgments, leading to the continuous deviation of social responsibility and value judgment in the virtual world. Empathy can make people help altruistic motives, and experiencing true empathy will drive people to ease the plight of others. People with higher empathy can better understand the feelings of others, easily recognize the needs of another person, adopt behaviors to calm their emotions, and do not use attack methods to deal with and solve problems, thereby suppressing aggressiveness (Li & Lu, 2014).

**Table 2. Test results of the affective priming effect of horror games on cognitive processing of college students in the 4 groups (\( \bar{x} \pm s \))**

| Items | Male college students | t | P | Female college students | t | P |
|-------|-----------------------|---|---|-------------------------|---|---|
|       | Positive | Negative |       | Positive | Negative |       |       |
| Accuracy (%) | LTG | 98.15±1.68 | 97.98±4.66 | -0.06 | 0.013 | 98.02±1.78 | 97.35±1.14 | -0.01 | 0.001 |
|       | MTG | 97.89±2.55 | 96.23±3.26 | -0.14 | 0.025 | 97.44±1.67 | 96.67±1.03 | 0.35 | 0.016 |
|       | STG | 95.98±2.12 | 95.79±2.56 | 0.25 | 0.011 | 96.21±1.32 | 95.55±1.09 | -0.12 | 0.005 |
|       | NG | 95.29±1.78 | 94.98±4.66 | 0.07 | 0.027 | 95.52±1.03 | 94.84±2.07 | 0.08 | 0.012 |
| Reaction time (s) | LTG | 0.57±0.01 | 0.62±0.01 | -0.48 | 0.009 | 0.59±0.01 | 0.64±0.01 | -0.23 | 0.024 |
|       | MTG | 0.63±0.02 | 0.71±0.01 | 0.55 | 0.024 | 0.67±0.01 | 0.75±0.01 | -0.22 | 0.007 |
|       | STG | 0.71±0.02 | 0.79±0.02 | -0.34 | 0.035 | 0.76±0.02 | 0.80±0.01 | -0.37 | 0.014 |
|       | NG | 0.79±0.03 | 0.82±0.02 | -0.03 | 0.018 | 0.80±0.02 | 0.88±0.02 | -0.25 | 0.023 |

**Dimensional analysis of affective priming effect of horror games on cognitive processing of college students**

Horror content is an important factor in immersive virtual reality horror games that cause players to recognize cognitive changes, but it is not the only factor. If the studies have shown that the cause of player cognitive processing changes may not be the horror component of the game, but rather competitive; there are also studies that the cognitive change of the individual is the result of the synergy between the games competitive and horror content. The comparison of accuracy and reaction time of different vocabulary types in the 4 groups is shown in Table 3. This shows that only by clearly separating the different game elements can we reveal the reasons why immersive virtual reality horror games affect player cognition changes and players have strong interactivity with avatars in video games. By manipulating avatars to participate in various activities and experiencing various emotions, it is easy to identify with avatars and the avatar recognizes the psychological phenomenon in which the avatar is integrated into the self-concept, and the self-perception is temporarily changed, thus having a potential impact on the individual’s psychology and behavior. Game designers should present a more positive avatar in the game, and try to enable players to recognize and observe these positive elements, activate their positive stereotypes by activating conscious processes, thereby reducing the negative impact of the game avatar and achieving correct shaping the purpose of social behavior.
The visual spatial relationship recognition of immersive virtual reality horror games involves not only controlled processing, but also automatic processing and the automatic processing process can be divided into two processes: an automatic process that is restricted to genetics (Villepoux, Vermeulen, Niedenthal et al., 2015). There is no age, gender, and individual differences; the basic characteristics of the information flow, the object name, space, time, and frequency of occurrence are automatically processed. It is always carried out at a constant level under environmental conditions; another process that is constrained by learning and practice, and which is continuously improved with learning and practice, is an important basis for skilled skills. Contrary to visual processing in the sense, visual spatial relationship processing is not only related to the specific function of the brain, but also involves advanced spatial cognitive processing such as visual recognition, spatial localization and representational transformation. The specificity of certain neural cells on the advanced visual cortex is often the neurological basis for the specificity and plasticity of the processing subsystems that constitute the class and quantity relationship. The exercise effects and age effects of the various subsystems located on the neural network are unbalanced, which can be reflected from the specific cognitive functions of these neural circuits.

Emotion is an important factor affecting people's cognitive processing; the experiment found that the subjects in both groups showed such characteristics: under the initiation of sadness, the chances of the choice of positive words increased, and the difference was significant. However, in the positive affective state, the subjects' choice of negative words increased, and the sadness caused the subjects to have a more prominent tendency to choose positive information, while the pleasant emotions prompted the participants to increase the possibility of selecting negative information. This feature may be the cognitive adjustment function of people in different affective states and the result of regulation is to promote the balance of human emotions. If people's cognitive choices in the affective state are regular, then it can be explained that this cognitive feature is an important psychological mechanism of affective regulation and this experiment did not prove the psychological tendency of other people to propose a state of mind. In the processing situation of negative information, the long-time horror game group was significantly more prominent than the control group. That is to say, compared with the control group, the long-time horror game group subjects tend to obtain negative cognitively processing results when they are cognitively processing information (Donges, Zeitschel, Kersting et al., 2015).

**AFFECTIVE EFFECTS INDUCED BY HORROR GAMES AND THEIR IMPACT ON COGNITIVE PROCESSING OF COLLEGE STUDENTS**

**Affective effects induced by immersive virtual reality horror games**

In this experiment, the immersive virtual reality horror game was used as an experimental method to confirm the existence of the priming effect; after the students first processed the stimulus with certain affective valence, the subsequent processing also cast a corresponding affective color, which produced a promoting effect. However, in terms of horror and game time, the amount of effect initiated is different. The game with high horror level has a greater amount of startup, which indicates that college students are more susceptible to high-sensation stimulating things, and they pay more attention to negative emotions. Far more than positive emotions, perhaps more likely to be related to humans to avoid or stay away from negative, dangerous situations, and to realize that this risk exists with a lower threshold, that is, the sensitivity

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**Table 3. Comparison of accuracy and reaction time of different vocabulary types in the 4 groups (X ±s/ X %)**

| Group | Item | PV   | NV   | SIV  | MV   | SEV  | RV   |
|-------|------|------|------|------|------|------|------|
| LG (n=50) A(%) | 97.28±1.59 | 98.17±2.01 | 97.26±2.47 | 98.19±1.43 | 97.24±2.24 | 98.19±2.02 |
| MTG (n=50) A(%) | 96.16±1.22 | 97.25±1.89 | 96.63±2.06 | 97.84±1.03 | 96.44±1.65 | 97.23±2.26 |
| STG (n=50) A(%) | 0.58±0.009 | 0.52±0.015 | 0.52±0.008 | 0.50±0.018 | 0.53±0.006 | 0.55±0.017 |
| NG (n=50) A(%) | 0.76±0.014 | 0.71±0.021 | 0.71±0.019 | 0.74±0.028 | 0.71±0.023 | 0.71±0.017 |
| t    | 12.88 | 7.14 | 9.57 | 11.99 | 12.65 | 6.44 |
| F    | 4.14  | 10.63 | 0.058 | 2.77  | 8.69  | 0.57 |
| P    | 0.015 | 0.003 | 0.022 | 0.016 | 0.001 | 0.016 |

**Note:** A-Accuracy; RT-Reaction time.
of the perceived danger scene is higher. For scenarios that threaten their own safety or health, even if the probability of occurrence is small, it will increase the awareness of human prevention. This also shows that the impact of long-time high-horror games will be greater; however, it should be pointed out that there is a difference in the degree of excitement between male and female students in the stimulation of games of the same duration and horror.

**Figure 1.** Influence mechanism of affective priming effect of virtual reality horror games on cognitive processing of college students

Emotion psychologists introduce the classic initiation research paradigm in cognitive psychology into the study of emotions, which is the initiation of affective research and it has been reported that when studying affective priming and cognition, it is pointed out that during the task, the participants are required to focus on starting the stimulation, and the measured implicit attitude is more accurate. Figure 1 shows the influence mechanism of affective priming effect of virtual reality horror games on cognitive processing of college students. This attitude is strongly correlated with the direct measurement of the measured attitude; if during the mission, the subject is not required to focus on starting the stimulus, the indirect measurement method may underestimate the intensity of the attitude, indicating that the game does induce the corresponding emotion and it has always been the key to affective priming experiments (Falquez, Lang, Dinu-Biringer et al., 2016). All experiments begin the process of experimentation or other tasks after affective induction and it is found that if the experiment is too long, the resulting affective state may subside. Some studies have also found that over time, pleasant moods fluctuate slightly, and there is a slight upward trend, and the pleasant mood of starting is at least 8 minutes. Games of different durations did not produce significant affective priming effects on the subjects, who may be related to the content of the game and due to age and psychological factors, college students; prefer games with strong stimuli and complex content.

Previous research suggests that a positive affective state can promote cognitive processing, improve individual morality, and have a positive impact on thinking and decision-making compared with negative affective state. The reason may be that a happy positive affective state can make thinking more active, promote cognitive processing, improve the quality of thinking and decision-making, and improve the level of individual moral judgment. At the same time, when individuals are in a state of happy mood, they will be more inclined to make ethical behaviors, and will show more implicit altruistic tendencies, thus promoting the improvement of moral judgment (Malinowski, Moore, Mead et al., 2017). However, considering the complexity of emotion as a subjective factor, and the complexity of cognitive processing involved in the process of moral judgment, as well as the influence of cultural and social factors, it is necessary to analyze emotions more deeply in later research and the influence of state and emotion type on implicit moral judgment behavior and its internal mechanism. The happy mood weakens the cognitive processing in the process of moral reasoning; therefore, the level of moral reasoning in the happy state is lower than the level of moral reasoning in the sad state. In the sad state, the individual prefers to use more complicated concepts to reason, making the moral reasoning process cognitive processing is more systematic and in-depth.

**Influence of affective priming effect on cognitive processing in immersive virtual reality horror games**

There is a widely accepted definition of action about emotions; this definition considers emotions to be a tendency to act and it is a state of alertness and readiness that exists widely in the reported affective, physiological, and explicit behaviors. The comparison of discrimination accuracy and reaction time of the students in the 4 groups is shown in Figure 2. In general, negative events have higher
operational readiness than positive events and they can organize and stimulate combat or escape behavior in a short period of time to ensure the survival or dominance of the body in a natural or social living environment. This rapid response process can be divided into two stages: information perception and reaction initiation and execution. Analysis of behavioral data found that responses to affective stimuli were significantly shorter than responses to neutral stimuli, but at this time it was not possible to distinguish their effects on information perception and response initiation and execution. The time taken to complete the psychological processing of affective stimuli is shorter than the neutral stimuli and this time saving reflects the importance of affective activities in the body’s adaptation to the environment. It can mobilize more mental energy and make external information, so that the body can quickly respond to environmental events.

Figure 2. Comparison of discrimination accuracy (a) and reaction time (b) of students in the 4 groups

In the virtual reality environment, the objects of communication are virtualized by the computer and people can vent their liberation, are not restricted by the outside world, and have a high degree of freedom. The virtual practice of this kind of thinking raises the human perception and reaction ability to the extent that it is also true and illusory, illusory, and free of time and space, so that the subject of practice produces perceptual transcendentalism. Individuals who are unwilling to endure the constraints of the real world can even rely on virtual reality technology to build their ideal world according to their own ideas. In real life, the transformation of people’s thinking and concepts often requires long and painstaking efforts, and even cannot be put into reality by the limitations of objective conditions (Figure 3). Virtual reality technology makes the impossible in the real world become the possibility in the virtual world, breaks through the traditional way of thinking, forms a new understanding, gives the thinking intuitiveness and feasibility, and visualizes and visualizes the thinking process that originally existed only in the human brain (Athanasios & Sergi, 2016). The environment is exactly the same as the reality, and the audience can freely conceive the reality environment from the virtual environment and make it a reality in the virtual environment, and control the social relationship between the characters.

Figure 3. Impact factor of affective priming effect of immersive virtual reality horror games on cognitive processing of male and female college students

The logic of this experiment is that if the participants of the long-time horror game group have reduced the processing ability of the new information by activating a large amount of information in the memory, then their recall scores in the atypical answer should be lower than the time horror game. If the game changes only the processing method for a long time, making them rely more on heuristic processing strategies such as schemas and scripts, then in the recall results of atypical answers, the long-time game group should be equal to or better. In the short time game group, because of the dependence on general knowledge, more processing resources are released. According to the results of this experiment, the long-time game group has a high hit rate for the typical answer, and the false report rate is also high, indicating that the horror game activates a large amount of interrelated information stored in the memory; however, the two groups of subjects basically have no susceptibility and differences indicate that the positive sentiment group did not reduce processing capacity by activating a large amount of information. There was no difference between the two groups on the atypical answer, which further proved that the individuals in the positive emotion group did not lack cognitive processing ability than the individuals in the negative emotion group (Sassi, Campoy, Castillo et al., 2014).
Differences of the influence of horror game affective priming effect on cognitive processing between male and female college students

In the experiment, although the gender influence of the subjects was not obvious, the male subjects in the experimental group scored higher than the female subjects; the control group had the opposite situation, and the female subjects scored slightly higher than the male subjects. The reason for this phenomenon may be related to the type of horror game chosen by the experiment. Limited by the experimental materials, the horror game selected for this experiment includes both the horror design with males as the main character and the horror design with female as the main character, but the scene of the former is obviously more than the latter, and the terror factor in the game. Previous studies have pointed out that there are certain differences between men and women in both their perception of the atmosphere of terror and their preference for terror. Female students may be more sensitive to the horror of horror music and horror pictures, while male students are more sensitive to the task design of horror games and the rational reasoning of bridge allocation. Once horror cognition is initiated, it affects the subject's interpretation, evaluation, and behavioral decision-making process; it may cause the subject to be aggressive in information if the external information is an ambiguous explanation. Therefore, for some factors that may inhibit the horror cognition of girls to some extent, this is not the case for male students. Figure 4 shows the discrimination accuracy of different vocabulary types for the students in the NG, STG, MTG and LTG group.

Figure 5 shows the reaction times of different vocabulary types for students in the in the NG, STG, MTG and LTG group. Initiating the emotional understanding schema affects the total score of the ability type and the scores of the emotional understanding and emotional management dimensions. In the ability type, emotional understanding and emotional management belong to the same strategic field, and emotional perception and emotional use belong to the same empirical field. Therefore, the initiation of emotional understanding and emotional management patterns has a greater impact on the performance of the understanding and management dimension, and rarely affects the performance of emotional perception and emotional use dimensions. The self-regulating schema has a good performance in the test scores and most of the sub-dimensions; the activation of other people's emotion schemas is also good, and the initiation of this dimension can affect the self of the trait-type. The two dimensions of regulation and other people's emotional regulation. The regulation of self-emotion is closely related to the emotional management dimension in the regulation of other people's emotions and abilities. Both of them belong to a higher level of emotional intelligence, and their activation effect should be better than that of other schemas. The initiation of emotional perception patterns is poor in both trait and ability types, and even in the ability-based emotional comprehension test, the scores are significantly lower than the control group scores. This may be because the activation of the emotion perception schema makes the individual pay too much attention to his subjective emotional state and is not conducive to the exertion of other abilities, especially the ability to understand emotions.

For the processing level effects existing in immersive virtual reality horror games, researchers generally believe that there is a certain relationship between processing level and priming effect and consciousness extraction. According to the study, the processing level effect in the implicit test is due to the lack of game links under shallow processing conditions, compared to the complete horror atmosphere processing under deep processing conditions. The evolution of discrimination accuracy and reaction time for students in the NG, STG, MTG and LTG group is shown in Figure 6. In order to further study the relationship between the nature of processing level, the priming effect and the extraction of consciousness, it is necessary to study the problem by using two kinds of tests, the implicit test of game simulation and the explicit test of horror element aggregation. In the processing level operation, the joyful judgment of the game is regarded as the level of deep processing, and the number of horror elements is used as the shallow processing level (López-Martín, Segura Fragoso, Rodríguez Hernández et al., 2015). The results show that the processing level effect in the implicit test has nothing to do with the level of extraction consciousness and the processing level effect and the priming effect in the horror game are not related, and their respective and perceived connections are caused by independent and automatic mechanisms. In the researcher's view, the priming effect is caused by the interaction between the production process and the perceptual memory, rather than the processing of the horror element itself and the processing level effect is caused by the interaction between the unconscious plot and the perceptual memory.
CONCLUSIONS

In order to explore the influence of affective priming effect of immersive virtual reality horror games on college students’ cognitive processing, this paper selected 200 college students as research objects, and divided them into 4 groups according to the random number table method: LTG, MTG, STG and NG group with 50 objects in each group including 25 male and 25 female students. The LTG, MTG and STG group were firstly arranged to play horror game—The Brookhaven Experiment for 10, 20 and 30 minutes, respectively; after the corresponding game is over for each group, each student was tested for IAT implicit emotions and the students in NG group were directly tested for implicit emotions; after conducting the IAT implicit emotion test, each group of students immediately carried out a word identification task: randomly present words, the students judge whether there are typos in the words, there are typos to raise the red card response and no typos to raise blue card response; after judging and responding, the next word will continue to be presented; if the students do not have a placard response for more than 3 seconds, it will automatically jump to the next word; the correct number of responses and reaction time of each student will be recorded. The results show that the LTG group students have the best cognitive processing tasks, and the correctness of word recognition is significantly different from other groups; the affective state of the fixed intensity level has the effect of improving cognitive processing; the hyper-high level of affective activation interferes with or even blocks the cognitive processing process, and the excessively low activation is insufficient to maintain the activation amount required for cognitive processing. In terms of terror level and game time, the amount of effect initiated is different and the game with high horror level has a greater amount of startup, which indicates that college students are more susceptible to high-sensation stimulating things, and they pay more attention to negative emotions. Exceeding positive emotions may be more likely to be related to humans to avoid or stay away from negative, dangerous situations, and realize that the threshold of this danger exists is lower, that is, the sensitivity of perceived danger scene is higher.

Acknowledgements

2019 Jiangxi Provincial Higher Education Teaching Reform Research (Undergraduate University) Project [Research and Application of VR Virtual Reality Technology in Animation Derivatives Course]. Item Number:370.

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