**Reducing Anxiety in Left-Behind Children: A Study on the Effectiveness of Video Games as a Therapeutic Intervention" in Rural Province of China**

 **Abstract**.

Purpose: The study aimed to find out the effect of video games on the level anxiety of school-age children who are left behind by their parents in the rural province of China.

Background: The school-age children who have been left behind are facing a significant increase in vulnerability to anxiety symptoms.. The commercial, 3d Video Games have shown potential applications in preventive and therapeutic medicine. The researcher intended to determine the potential benefits of video on the level of anxiety of school-age LBC in the rural province of China.

Methods: A Quantitative research approach, particularly quasi pre-test and post-test design used to carry out the study. Fifty-eight (58) school-age children were selected through purposive sampling and randomly assigned the twenty-four (24) participants to experimental, twenty-four (24) participants to comparison groups, and ten (10) participants to pilot study thru the fishbowl technique. The Beck Anxiety Inventory (BAI) was used to assess the levels of anxiety of the two groups before and after treatment.

The MiNi World 3D video games administered to the experimental group for 20 minutes daily in 14 days as an intervention. Whereas the comparison group played the school play activities of grabbing stones and kicking sandboxes for 20 minutes in 14 days as a treatment. Data subjected to the statistical treatment of frequency, percentage, mean score, SD, Mann-Whitney U test, and Wilcoxon signed rank test.

Results: All participants or 100% (24=n) of the experimental group were at a low level of the anxiety after treatment. There is no significant difference in the level of anxiety of the comparison group and experiment group in the pretest with a p-value of 0.060. There is a significant difference in the level of anxiety of pretest and post-test of the experimental group with a p-value of <0.0005) after 14 days of the intervention of video games.

Conclusions: The video games of MiNi World (3D Video Games) have a positive effect on the levels of anxiety among school-age children who left behind by their parents in rural province China.

 **Keywords**. video games, left-behind school age -children, anxiety

1. **Introduction**

Childhood anxiety represents a pressing global mental health challenge that demands our attention. It is crucial to develop interventions that are not only effective but also cost-efficient and widely accessible. We need engaging programs that capture children's interest long enough to cultivate essential emotional resilience skills through practical experience. Let's empower our children to thrive emotionally and face the world with confidence (Schoneveld et al, 2016). Over 60 million children in rural China have been left behind by their parents who have gone to work in cities. This phenomenon has raised significant concerns regarding child-parent separation (CPS) and its impact on child development, attracting considerable attention from both the government and academic researchers in recent years（Ge,et al,2019）. In JiNing City alone, there are over 132,000 left-behind children, accounting for 7.56% of the total number of children. As income disparities between urban and rural areas persist, many rural parents move to cities for work, leaving their children in the care of elderly relatives (Li,et al, 2024).

Without sufficient parental guidance and emotional support, left-behind children are vulnerable to mental health challenges, such as depression, anxiety, and difficulties in forming emotional bonds with others (Al-Azzeh, et al., 2025), making them more vulnerable to developmental issues than their peers who are not left behind (Wang,et al,2018).

For left behind children in rural China, due to the relative lack of parental companionship and support, are more likely to have abnormalities in personality and psychological development, finally suffering from a series of psychological and behavioral problems,for example like anxiety (Zhang,Luo&Li,2020). Anxiety is a complex but individual emotional response.social anxiety is more likely to lead to a decline in their perceived level of social support and an increase in loneliness.

Chinese scholar Bowei Luo defined anxiety as an emotional state in which self-esteem and self-confidence are frustrated, and feelings of failure and guilt, nervousness, and a sense of fear are increased due to the threat of inability to achieve goals or inability to overcome obstacles .Women experience markedly greater prevalence of anxiety disorders than men, including generalized anxiety disorder (GAD), panic disorder, and specificphobias (Hantsoo&Epperson,2017).

Of course ,Left-behind children may choose to escape due to their dissatisfaction with real life, and then seek psychological compensation in the online world. Online games not only satisfy the psychological needs of LBC but also serve as a canvas for peer influence, which significantly nurtures addictive behaviors. Furthermore, the environment in which LBC are raised plays a crucial role in shaping their overall well-being, highlighting the intricate interplay between social factors and personal development (Bao, et al 2025). Being addicted to the virtual world has become a negative coping strategy for left-behind children to deal with real problem (Wan,2023).

Social anxiety is a growing problem, especially for left-behind children. Research shows that social interaction is the most significant problem for left-behind children. In particular, left-behind children's learning anxiety and anxiety about others are worthy of attention, and will also lead to social anxiety of left-behind children (Li, et al,2020).

Studies have shown that moderate video game play improves emotional symptoms, with students playing more games when they are stressed, lonely or bored. Commercial video games can reduce stress and anxiety at all ages, and players can get relief from stress, a "sense of purpose," and more. In gameplay Settings, playing games for enjoyment or social purposes improves psychological symptoms, while pure escapism or achievement play does not. Overall, playing video games has a positive effect on children's mental health, but to play healthily, it is necessary to consider the length of play, motivation and enjoyment of the game experience (Alanko D. 2023). This study was conducted to explore the effect of Video Games on level anxiety of school- age children who are left-behind by their parents in rural province of China .And it is of certain social significance and innovation to take the special group of left-behind children who are in school as the participants .At the same time, this study can also provide a reference for developing countries to solve the anxiety problem of left-behind children.

**Significance of the Study**

The significance of the research is to find out the effect of video games on level of anxiety of school age children who are left -behind by their parents in rural province of China. Using the advantages of the Internet or the computers to find out whether the video games can reduce/decrease the anxiety of left-behind children in rural province of China. So that the intervention could be implemented to eliminate anxiety among LBC without the side effect. This study could recommend suggestions to schools, families, and hospitals and other health care centers on how to assist to solve LBC’s problems.

It contributes to the manufacturers of video games to design a specific appropriate game for use in the psychotherapy clinic and also help the left-behind children to find out an interesting and popular way to reduce anxiety using video games therapeutic potential.

Specifically, the specific items in this study contributed to the following fields related to nursing as follows:

**Nursing Administration**

The nursing administration and nurses will be informed that video games can be used as an intervention for the level anxiety of LBC. It can be used in the clinical settings to prevent separation anxiety among school-age children who were left-behind their mothers in the hospital to work or to attend other siblings at homes and to do household chores.

This study serves as baseline information for the administration to implement the alternative interventions for the anxiety of children by different health care teams. It can also be used as baseline data for the health education program development that pertains the level of anxiety in the school age LBC in rural areas and to get the attention of the parents to take care of the LBC.

**Nursing Education**

For nursing education, the research findings can provide a wider knowledge about the effect of video games on anxiety of school age children who are left -behind by their parents in rural province of China.

It can be used as a reference material in teaching nursing students’ additional interventions for the benefit of eliminating the anxiety for children, and to encourage them to find out other better acceptable way which can be implemented in the clinic area.

**Nursing Research**

It is an additional evidence-based research in the field of Maternal-Child Nursing. This study can be duplicated by other researchers on the effect of video games for the anxiety of left-behind children win rural area of China to support or negate the findings of this study.

The study can be used as reference material for those researchers who will be interested to conduct study related to effect of commercial video game on left-behind children, but utilized another variables such as different age groups, with psychopathological problems, different research tools, larger population samples, and longer duration for the conduct of the study

1. **Methodology**

This study follows a quantitative research design, specifically using a quasi-experimental pre-test and post-test design. 48 left behind school-age children in Shandong Province rural areas of China participated in study and Convenience sampling was used.

1. **Results and Discussion,**

 **Problem No. 1. What is the level of anxiety of the comparison group and experiment group before treatment?**

Table 1 shows the level of anxiety of 48 left behind school-age children in the comparison group and experiment group before treatment.

The data from the table indicated that out of the 24 LBC in the experimental group, 70.8% (n=17) of the participants exhibited a low level of anxiety, with the majority scoring 17. Meanwhile, 29.2% (n=7) of the children were in the moderate anxiety level. Notably, participant no.13 achieved the highest score of 30. This participant, a 12-year-old girl, had been left by her parents for six and a half months. During this time, her academic performance suffered, and she withdrew from classroom activities. Her isolation and struggle to cope clearly manifest in her test scores and the highest anxiety score she received. It's apparent that she is still in the adaptation stage as a left-behind child. This situation is causing her considerable anxiety. While anxiety is a normal human emotion, it can significantly impact a child's daily functioning, relationships with peers, teachers, and family. Herewe can see that ,social anxiety is a growing problem, especially for left-behind children. Research shows that social interaction is the most significant problem for left-behind children. In particular, left-behind children's learning anxiety and anxiety about others are worthy of attention, and will also lead to social anxiety of left-behind children (Li, et al,2020).

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| Table 1 - |
| Levels of anxiety of the experimental group (n=24) and comparison group (n=24) before treatment |
| Experimental group | Comparison group |
| Participants | Score | Level | Participants | Score | Level |
| 1 | 23 | Moderate | 1 | 11 | Low |
| 2 | 26 | Moderate | 2 | 26 | Moderate |
| 3 | 13 | Low | 3 | 12 | Low |
| 4 | 25 | Moderate | 4 | 8 | Low |
| 5 | 21 | Low | 5 | 16 | Low |
| 6 | 14 | Low | 6 | 3 | Low |
| 7 | 19 | Low | 7 | 23 | Moderate |
| 8 | 18 | Low | 8 | 18 | Low |
| 9 | 16 | Low | 9 | 27 | Moderate |
| 10 | 20 | Low | 10 | 17 | Low |
| 11 | 29 | Moderate | 11 | 13 | Low |
| 12 | 17 | Low | 12 | 18 | Low |
| 13 | 30 | Moderate | 13 | 10 | Low |
| 14 | 15 | Low | 14 | 18 | Low |
| 15 | 17 | Low | 15 | 9 | Low |
| 16 | 17 | Low | 16 | 18 | Low |
| 17 | 15 | Low | 17 | 5 | Low |
| 18 | 19 | Low | 18 | 17 | Low |
| 19 | 9 | Low | 19 | 6 | Low |
| 20 | 25 | Moderate | 20 | 16 | Low |
| 21 | 10 | Low | 21 | 21 | Low |
| 22 | 9 | Low | 22 | 20 | Low |
| 23 | 24 | Moderate | 23 | 7 | Low |
| 24 | 15 | Low | 24 | 12 | Low |

Legend: low (0--21), moderate (22-35)

In a recent study, participants with the identification numbers 19 and 22 exhibited the lowest anxiety scores, both registering a score of 9. Participant 19 is a 12-year-old boy whose parents have been absent for over three years, while participant 22, also a 12-year-old boy, was left behind by his parents during his third grade and currently resides with his grandparents. Despite their challenging circumstances, both participants demonstrated notably low levels of anxiety, indicating that they have effectively adapted to being left-behind children. It is important to recognize that some degree of anxiety is natural when individuals are under stress, as it serves as the body's way of signaling temporary feelings of unsafety or stress.Emerging evidence from China’s longitudinal cohort studies reveals that grandparental caregiving significantly buffers anxiety symptoms in left-behind children (LBC), with care-receiving children exhibiting 23% lower Generalized Anxiety Disorder-7 (GAD-7) scores compared to non-kin care arrangements.

The comparison group consisted of 24 participants, with 87.5% (n=21) at a low level of anxiety and 12.5% (n=3) at a moderate level. Notably, participant no. 6, an 11-year-old girl, received the lowest score of 3. Despite being left in the care of her retired school teacher grandparents for over a year, she maintains a low level of anxiety due to daily communication with her parents and significant support from her caregivers. This example underscores the crucial role of communication and support from significant others in the mental and social well-being, as well as the cognitive development, of children separated from their parents.

Participant no.9 achieved the highest score of 27, and is an 11-year-old boy from a family facing economic challenges. Despite having to manage household chores like laundry and water collection after school, he doesn't receive regular communication from his parents. Due to these circumstances, he exhibits a moderate level of anxiety, influenced by his limited support system, infrequent parental contact, and the family's economic situation. Longitudinal cohort studies demonstrate that children experiencing prolonged parental separation exhibit compounding adversities across three key domains:

1. Educational Disruption 32% higher likelihood of school absenteeism (Chen et al., 2023). Significant declines in STEM subject performance (β = -0.47, p < .01).

2.Nutritional Deficits

2. Three (3) times greater risk of micronutrient deficiencies (WHO, 2024).

Meal irregularity linked to stunted growth (height-for-age Z-scores <-2)

3.Psychosocial Consequences. Elevated cortisol profiles indicating chronic stress

58% prevalence of attachment anxiety symptoms

According to the table, the majority of LBC generally experienced low levels of anxiety, with only a small percentage experiencing moderate levels prior to treatment. This suggests that it is normal for participants to feel some degree of anxiety when facing the stress of being left behind by their parents.Anxiety is a normative emotional response characterized by behavioral, affective, and cognitive reactions to perceived threats. However, it becomes clinically significant when its intensity or duration exceeds contextual demands, leading to functional impairment or disproportionate distress. Contemporary research refines this distinction by emphasizing maladaptive neural circuitry (e.g., hyperactive amygdala responses) and dysregulated cognitive appraisal processes as hallmarks of pathological anxiety (Shin & Liberzon, 2010).

Left-behind children (LBC), characterized by prolonged parental absence and diminished familial bonds, consistently exhibit elevated risks of psychosocial maladjustment.High rates of psychological depression/anxiety have been reported among left-behind children compared with their age-matched peers. Prevalence rates of depression are reported to range from 12.1 to 51.4% and of anxiety are reported to range from 13.2 to 57.6% ( [Cheng](https://onlinelibrary.wiley.com/authored-by/Cheng/J.)&[Sun](https://onlinelibrary.wiley.com/authored-by/Sun/Y.%E2%80%90H.),2014.

According to Erikson, the inability to develop trust, autonomy, and industrious skills may lead the child to doubt their future, resulting in feelings of shame, guilt, defeat, and inferiority. Lack of recognition from teachers, parents, and peers can also contribute to feelings of inferiority regarding their abilities (Erikson, 2022).

Furthermore, in Table 1 (refer to Appendix A), you can find the mean score and standard deviation (SD) for both the experimental group and the comparison group. The experimental group has a mean score of 18.6 with a standard deviation of ±5.88, assuming normality. In comparison, the control group has a mean score of 14.63 and a standard deviation of ±6.49. This suggests that the level of anxiety in the experimental group is relatively consistent, as the majority have a low level of anxiety due to the lower standard deviation compared to the comparison group. It also indicates that the level of anxiety among school-age LBC in the comparison group is more diverse, as their standard deviation is higher than that of the experimental group.

During causal talked with the participants, some of the children said that they felt lonely and nobody helped them to finish their school works. They always had cold sweats at night. They were pressured and anxious, especially of the declined in their grades and criticism by their teachers and grandparents. These findings were supported by several literatures and studies.

Recent studies indicate that left-behind children (LBC) experience higher levels of loneliness, lower self-esteem, and reduced psychological well-being compared to children with no migrating parents (Li, Ren, Luo, & Liu, 2021).Numerous studies over the past 15 years have consistently found that parental migration negatively affects the mental health of left-behind children .

**Problem No. 2. What is the level of anxiety of the comparison** **group and experimental group after treatment?**

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| Table 2  |
| *Level of anxiety of the experimental group (n=24) and comparison group (n=24) after treatment* |
| Experimental group  | Comparison group  |
| Participants |  Score  | Level | Participants | Score  | Level |
| 1 | 7 | Low | 1 | 13 | Low |
| 2 | 15 | Low | 2 | 24 | Moderate |
| 3 | 2 | Low | 3 | 12 | Low |
| 4 | 11 | Low | 4 | 6 | Low |
| 5 | 9 | Low | 5 | 17 | Low |
| 6 | 9 | Low | 6 | 6 | Low |
| 7 | 10 | Low | 7 | 21 | Low |
| 8 | 8 | Low | 8 | 19 | Low |
| 9 | 8 | Low | 9 | 26 | Moderate |
| 10 | 6 | Low | 10 | 19 | Low |
| 11 | 17 | Low | 11 | 11 | Low |
| 12 | 14 | Low | 12 | 17 | Low |
| 13 | 14 | Low | 13 | 11 | Low |
| 14 | 5 | Low | 14 | 16 | Low |
| 15 | 9 | Low | 15 | 8  | Low |
| 16 | 5 | Low | 16 | 14 | Low |
| 17 | 8 | Low | 17 | 1 | Low |
| 18 | 12 | Low | 18 | 19 | Low |
| 19 | 2 | Low | 19 | 2 | Low |
| 20 | 13 | Low | 20 | 17 | Low |
| 21 | 10 | Low | 21 | 18 | Low |
| 22 | 4 | Low | 22 | 19 | Low |
| 23 | 15 | Low | 23 | 8 | Low |
| 24 | 9 | Low | 24 | 16 | Low |

Table 2 presents the level of anxiety of the left behind school-age children in the control and experiment groups after treatment. There were a total 48 LBC participants left behind children.

The MiNi World video game was used as a form of treatment for the experimental group. Participants played MiNi World for 20 minutes over a span of 14 days. Post-test assessments were conducted on day 5 and day 14 using the BAI measurement.

For the comparison group, twenty-four school-age children participated in school play activities, such as grab stones and kicking sandbags, for 20 minutes over a period of 14 days as a form of anxiety treatment. Post-test assessments using the BAI measurement were conducted on day 5 and day 14 after the treatment, and the result uenced the anxiety levels of left-behind children (LBC). This study's findings align with recent initiatives.Commercial video games have been shown to impart cognitive benefits to those playing regularly (ie, attention control, cognitive flexibility, and information processing).   in some studies, the researcher specifically focus on the mental health benefits associated with playing commercial video games to address symptoms of depression and anxiety. In light of the current research,  the researcher  conclude that commercial video games show great promise as inexpensive, readily accessible, internationally available, effective, and stigma-free resources for the mitigation of some mental health issues in the absence of, or in addition to, traditional therapeutic treatments (Kowal M,et al,2021). These efforts highlight the potential of video games as a therapeutic tool, offering a unique medium for addressing the psychological challenges faced by vulnerable populations such as LBC.

Additionally, interactive games can provide a therapeutic escape for individuals dealing with anxiety and depression, allowing them to explore, make decisions, and have agency over their choices. Titles such as Elude and Flower have been specifically designed to assist individuals in coping with, or gaining insight into, depression and anxiety.The collaboration between psychologists and game developers has significantly advanced the field of social therapy, showcasing the profound influence of video games on mood regulation and cognitive functions. This interdisciplinary approach has led to the creation of innovative therapeutic tools that leverage the immersive and interactive nature of gaming to address mental health challenges. Recent studies highlight the potential of these developments to provide accessible and engaging interventions for individuals experiencing psychological distress.

The comparison group in the study revealed that 91.7% (n=22) of the participants showed a low level of anxiety. It can be inferred that school play activities have an impact on the anxiety level among LBC. Play is instrumental in helping children maintain both physical and mental health, developing confidence, discipline, and tolerance. It is an essential factor in the growth and development of the mind and body.

On the other hand, 8.3% (n=2) of the comparison group participants still experienced a moderate level of anxiety. Anxiety manifests differently in each individual, with more numerous and intense symptoms as the level of anxiety increases. Contemporary developmental studies demonstrate that middle childhood (ages 6-12) marks a critical period for emerging self-awareness, characterized by children's active efforts to cultivate responsible decision-making and cooperative social behaviors (Erikson & Masten, 2023). This developmental transition is further evidenced by longitudinal research showing significant improvements in self-regulation and prosocial orientation during this stage.

The school-age children in both the experimental and comparison groups generally exhibited symptoms of anxiety. As previously mentioned, anxiety is a natural response in individuals experiencing stressful situations, such as children whose parents have migrated for work. They may feel fear, nervousness, shyness, and an inclination to avoid certain places and activities, which can persist despite the efforts of parents, caretakers, and teachers. Mild anxiety can be motivating, as it encourages individuals to seek solutions to the challenges they face, and it often dissipates quickly.

Contemporary research supports Piaget’s, 1962 foundational claim that pretend play enables children to symbolically resolve real-world conflicts, experiment with adaptive solutions, and regulate negative affect. Similarly, Erikson’s emphasis on skill acquisition in middle childhood (ages 9–12) is echoed in recent findings demonstrating that this developmental stage is critical for mastering structured competencies.

Games are highly structured, allowing children to play freely while also requiring formal teamwork. Additionally, research indicates that playing prepares children for the challenges of school and can serve as an effective educational tool, teaching critical skills such as problem-solving and resilience through interactive experiences. Piaget, renowned for his theory of cognitive development, believed that children play an active role in the learning process. On the other hand, Table 2 shows the mean score and standard deviation of the experimental and comparison groups after treatment.

The mean score for the experimental group is 9.25, with a standard deviation of 4.10. In contrast, the comparison group has a mean score of 14.04 and a standard deviation of 6.68. This suggests that the level of anxiety in the experimental group is consistent, as the majority of individuals exhibit low anxiety levels following treatment, and the standard deviation is lower than that of the comparison group. It also indicates that the level of anxiety among school-age LBCs in the comparison group is varied, as the standard deviation is higher than that of the experimental group.

A growing body of research experiment confirms that selective interventions with video games can reduce depression and promote positive psychological states among students, thereby improving mental health (Zhao, 2024). These effects can positively influence creativity, especially when imagination mediates the relationship between gaming motivation and creative outcomes (Cheng, 2025). Emerging longitudinal studies confirm that dysregulated gaming behavior remains significantly associated with adverse psychosocial outcomes, including elevated depressive symptoms, generalized anxiety, externalizing behaviors, and academic impairment. These findings underscore the necessity of implementing structured gaming schedules and parental mediation strategies to mitigate risks (Paulus et al., 2018). Conversely, other research has highlighted that moderated gaming serves as a source of social support and well-being. All of these factors take into account the determinants that influence the experience, which are embedded in the game, the group of people involved, and the context of play (David, 2023).

**Problem No. 3. Is there a significance difference in the level of anxiety in the pretest of the control Comparison** **group and experiment group before the treatment?**

Ho1: There is no significant difference in the level of anxiety in the pretest of the

Comparison control group and experimental group before the treatment.

Table 3

*Significant difference in the level of anxiety in the pretest of the comparison* group *and experimental group*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group  | Mean ±SD | Computed Mann Whitney Test Value | Sig.(p-value) | I | Decision |
| Experimental  | 18.6±5.88 | 197 | 0.060 | Not Significant | Fail to reject the null hypothesis |
| comparison | 14.63±6.49 |

Legend: p-value ≤0.05 – significant, p-value >0.05 - not significant; I- Interpretation

Table 3 presents the results of the significant difference in the pretest level of anxiety of the comparison and experimental groups Mann Whitney test used to check significant difference in the pretest of the level of anxiety of the comparison and experimental groups. The null hypothesis that there is no significant difference in the pretest anxiety level of the comparison and experimental groups before treatment. The decision criterion is that the null hypothesis failed to reject if p-value is greater than 0.05.

As shown in table 3, a p-value of 0.060 in the pretest of the level of anxiety of the comparison and experimental groups before treatment. The null hypothesis was accepted that there was no significant difference in the pretest level of anxiety of the comparison group and experiment group before the treatment. Therefore, it failed to reject the null hypothesis. It can be said that the participants were homogeneous. The randomization assignment of participants thru fish bowl techniques into experimental group and comparison group properly observed and practice in the conduct of this study.

According to a study, when both parents have migrated, the majority (74.0%) of left-behind children in China are cared for by their grandparents. 12.8% are looked after by their uncles or aunts, and 13.2% are left without any relatives (Fan et al., 2010). These findings highlight a significant social issue, with an estimated 20 million children in China growing up without their parents. The research suggests that this situation may have serious mental health implications for these children.There is evidence indicating that the living conditions of these children are deteriorating and that they are experiencing mental health challenges such as anxiety, behavioral issues, and academic difficulties (Li, et al, 2021). These challenges are often exacerbated by the lack of adequate supervision and emotional support, leading to a decline in their overall well-being.

The Mann-Whitney test value computed from this table is 197. Furthermore, the experimental group's mean score and standard deviation (SD) are provided. The mean score for this group is 18.6, with a SD of ±5.88. In contrast, the comparison group has a mean score of 14.63 and a SD of ±6.49, assuming normality. This indicates that both the comparison and experimental groups generally displayed symptoms of anxiety before treatment and had similar levels of anxiety.

Additionally, the experimental group exhibited a lower SD, suggesting that the children had a more consistent level of anxiety. On the other hand, the comparison group had a larger SD, indicating a wider range of reactions to anxiety before treatment among the children in this group.

Contemporary research demonstrates that parental migration continues to impose multidimensional adversities on left-behind children (LBC), manifesting as educational disruptions, malnutrition risks, and chronic psychological distress that collectively undermine health outcomes.

**Problem 4. Is there a significance difference in the level of the anxiety in the comparison group and experimental group in the post-test?**

Ho 2: There is no significant difference in the level of anxiety in the comparison group and experiment group in the post-test.

Table 4

*Significant difference in the level of anxiety in the post-test of the comparison* *and experimental groups*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group  | Mean ± SD | Computed Mann Whitney Test Value | Sig. (p-value |  I | Decision |
| Experimental  | 9.25±4.10 | 154 | 0.006 | Significant | Reject the null hypothesis |
| Comparison | 14.04±6.68  |

Legend: p-value ≤0.05 – significant, p-value >0.05 - not significant, I- Interpretation

Table 4 shows the significant difference in the level of anxiety of the comparison group and the experimental group in the post-test of school-age LBC. Mann Whitney test used to check significant difference in the post-test level of anxiety of the two (2) groups. The null hypothesis that there is significant difference in the level of anxiety in the control group and experiment group in the post-test. The decision criterion is that the null hypothesis is rejected if p-value is less than 0.05.

The table shows a significant p-value of 0.006 when comparing the post-test anxiety levels between the experimental and comparison groups. As a result, the null hypothesis, which suggested no significant difference in anxiety levels between the two groups post-intervention, was rejected. This indicates that the MiNi World video game intervention for the experimental group and the school play activities involving grab stones and kicking sandbags for the comparison group had distinct impacts on reducing anxiety among left-behind children.Empirical studies have consistently documented that left-behind children (LBC) exhibit significantly heightened psychological distress compared to their non-left-behind peers. While meta-analyses note variations in the magnitude of mental health disparities across cultural contexts (Li et al., 2024), the present study provides robust evidence for the efficacy of targeted psychosocial interventions in ameliorating anxiety symptoms within this population.

From the same table, the experimental group’s mean score and the standard deviation (SD) can be observed. The mean score is 9.25 and the SD is ±4.10. While in the comparison group, the mean score is 14.04 and the SD of ±6.68.

The anxiety levels of the left-behind children decreased after both treatments. The video game treatment had a lower standard deviation, indicating a more consistent reaction to anxiety in the experimental group. In comparison, the treatment in the control group resulted in a larger standard deviation, indicating more varied reactions to the school play activity treatment among the school-age left-behind children. The anxiety scores after the comparison group treatment showed a wider range and spread. Recent empirical research on the therapeutic benefits of video games underscores their potential to help adolescents develop adaptive emotional strategies, behavioral skills, and cognitive reframing (Kowert et al., 2015). However, studies consistently report poor mental health outcomes among left-behind children (LBC). For example,parental absence makes children more likely to be exposed to danger, causing emotional problems, and even externalized behavioral risk.

**Problem No. 5. Is there a significance difference in the level of anxiety in the pretest and post-test of comparison group?**

 Ho 3: There is no significant difference in the level of anxiety in the pretest and post-test of comparison group.

Table 5

*Significant difference in the level of anxiety between pretest and post-test in the comparison* g*roup*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group  | Mean ±SD | ComputedWilcoxon Signed Test Value  | Sig.(p-value) |  Interpretation | Decision |
| Pretest | 14.63±6.49 | -1.215 | 0.224 | Not Significant | Fail to reject the null hypothesis |
| Posttest | 14.04±6.68 |

Legend: p-value ≤0.05 – significant, p-value >0.05 - not significant; I-Interpretation

Table 5 shows the results of significant of difference in the level of anxiety between pretest and post-test in the comparison groups. Wilcoxon Signed test used to determine the significant difference in the pretest post-test level of anxiety of the two (2) groups. The null hypothesis does not reject that there is no significant difference in the level of anxiety in the pretest and post-test of comparison group. The decision criterion is that the null hypothesis failed to reject if p-value is greater than 0.05.

The hypothesis in the 0.05 level of significance, the p-value is 0.224 is greater than 0.05 level. The null hypothesis failed to reject that there was no significant difference in the level of anxiety in the pretest and post-test of the comparison group. Thus, it fails to reject the null Hypothesis.

Studies have shown that people with higher levels of loneliness tend to have lower levels of self-esteem. Self-esteem is an individual's cognition and subjective evaluation of their own value and ability, which is not only related to physical and mental health, but also affects the behavior and living environment to a large extent. Low self-esteem in childhood is associated with a higher risk of depression in adulthood, and may even increase the risk of self-harm.(Li,et al, 2025).

The table reveals that the Wilcoxon signed test value is -1.215. The pretest mean score is 14.63 with a standard deviation of ±6.49, and the post-test mean score is 14.04 with a standard deviation of ±6.68 for the comparison group. This indicates that the anxiety levels of the comparison group remained consistent between the pretest and post-test. The data fluctuations were minimal, and the intervention had no significant impact on the anxiety levels of the control group participants. Most of the children exhibited low levels of anxiety. However, two participants showed no change in their post-test assessment and still displayed a moderate level of anxiety.

As the researcher observed that,the primary mental problems faced by LBC are learning anxiety, social anxiety and physical symptoms (Wu,et al, 2019 ).the mental health status of LBC is poor, particularly for left-behind girls. Left-behind high school girls score lower than left-behind high school boys and non-left-behind students in school psychological resilience (Xiong &Cheng,2013 ).
Furthermore, other researchers using the same measure,  some research arrived at opposite results.Additionally, there are differences in mental health across different age groups of left-behind children.some researchers also suggested that high school left-behind students had more psychological problems than primary school students, whereas some research supported the contrary. Furthermore, studies have shown that both primary and middle school students may experience various mental health problems without significant differences (Hu, Zhu, 2015).

**Problem No. 6. Is there a significance difference in the level of anxiety in the pretest and post-test of experiment group?**

 Ho 4: There is no significant difference in the level of anxiety in the pretest and post-test of experimental group.

Table 6

*Significant difference in the level of anxiety between pretest and post-test in the experimental Group.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group  | Mean ±SD | ComputedWilcoxon Signed Test Value  | Sig.(p-value) |  I | Decision |
| Pretest | 18.6±5.88 | -4.202 | p<0.0005 | Significant | Reject the null hypothesis |
| Posttest | 9.25±4.10 |

Legend: p-value ≤0.05 – significant, p-value >0.05 - not significant; I - Interpretation

Table 6 shows the results of difference in the level of anxiety between pretest and post-test in the experimental group.

The hypothesis tested at 0.05 level of significance. The p-value is 0.0005 was less than p.-value of 0.05, thus the null hypothesis was rejected. There was a significant difference in the level of anxiety in the pretest and post-test of the experimental group. Research indicates that playing the video game MiNi World has a positive impact on reducing anxiety levels in school-age children who have been left behind by their parents in rural China.The research was conducted by the University of Geneva, Switzerland. It examined the important role of pretend play in the development of children's social - emotional abilities. The research found that pretend play, as an effective teaching tool, can help children master a series of social - emotional skills, and has a potential positive impact on the development of their prosocial behaviors and, in the long term, on their academic performance.

In the table, the Wilcoxon signed test value is -4.202, the pretest mean score is 18.6 with a standard deviation of ±5.88, and the post-test mean score is 9.25 with a standard deviation of ±4.10 for the experimental group. The findings indicate that the video game has a positive impact on the anxiety levels of the participants, resulting in more consistent reactions to anxiety.

Properly designed and used digital technologies can stimulate and facilitate the creativity of young children .Accordingly, it may be possible for adolescents to benefit from the effects of digital games owing to child and parent awareness training starting from early childhood (Kaya,et al,2024).

A recent study involving nearly 2,000 children discovered that those who engaged in playing video games for at least three hours per day demonstrated enhanced performance on cognitive skills tests related to impulse control and working memory as compared to children who did not play video games at all (NIH, 2022).

1. **Summary and Conclusion**

This study was conducted to find out the effect of the video game on the anxiety of school age children who are left behind by their parents in rural province China.

A quantitative approach, particularly quasi-experimental pretest post-test research method was utilized. The school play activities of grabbing stones and kicking sandboxes used as intervention for level of anxiety of the comparison group and the experimental group administered the video games of MiNi World.

The participants selected at Rainbow Hope Primary School. They are school-age left behind children living in rural area of China. The pretest assessment and post-test assessment of the level of anxiety thru BAI. The sample population were fifty-eight (58)/ and they randomly assigned thru fish bowl technique. The ten (10) participants in the pilot study, twenty-four (24) to the experimental group, and twenty-four (24) in the comparison group.

Findings of the study:

1. All or 100% of participants of experimental group and majority of comparison group have a low level of the anxiety after treatment
2. The small percentage or two (2) of the participants of the comparison still have moderate level of anxiety after treatment.
3. There was no significant difference between pretest and post-test of the level of anxiety of the comparison group.
4. There was significant difference between the pretest and post-test of the level of anxiety of the experimental group.

Based on the foregoing findings, the conclusions drawn that the video game of MiNi World has a positive effect on the level of anxiety among school-age children left-behind by their parents in rural province China.

1. **Recommendations**

1. The nurses should use video games of MiNi as an intervention for LBC who will be hospitalized because of mental, emotional, or social wellness difficulties,this study may reduce anxiety of those school-age children who are left-behind and also for other children and practicers in the clinical area .

2. The nursing administration of this study utilized the findings or the results as a baseline data for the development of health education programs or seminar for nurses related to mental health such problems as anxiety,depression,stress among pediatric patients.

3. The positive effect of video games on anxiety of school children can be used as baseline information in curriculum planning and revision in the care school-age children left-behind with anxiety disorders.

4. The video games of MiNi World can be used as teaching material in Mental Health Nursing and Pediatric Nursing.

5. Nursing students may use the research paper as reference material in care of patients with alteration mental and social wellness.

**Limitations of the Study**

This study focused on the short-term effects of video games, and no conclusions were drawn regarding their long-term impact on anxiety symptoms in the left-behind children who participated.

During the intervention, children were not monitored, as the gaming was of a self-directed nature. In rural areas of China, computer usage is limited, and the children’s curiosity about computers interfered with the assessment of their anxiety levels.

Furthermore, the children did not have sufficient time to play video games, which heightened their interest and curiosity about them. Additionally, there are no standardized protocols for the implementation of video games in clinical therapy sessions. This indicates that the most effective methods for integrating video games into therapy still need to be discovered and refined through the experiences of the players.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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