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Cognitive Restructuring in Group CBT Reduces Live-Streaming Addiction Among Indonesian Adolescents

Aminah Daulay[1], Neviyarni S[1]*
[1]Guidance and Counseling, Faculty of Education, Padang State University, Indonesia

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***Correspondence Author:**
neviyarni_s@fip.unp.ac.id

Abstract: The pervasive rise of live-streaming video game platforms has triggered concerns about behavioral addiction among adolescents, particularly in rapidly digitalizing societies like Indonesia. This study examines the efficacy of group-based Cognitive Behavioral Therapy (CBT) in reducing live-streaming addiction symptoms among high school students. A quasi-experimental design with pre-test-post-test control group was implemented with 20 students (N=20) exhibiting moderate addiction levels, selected through purposive sampling. The experimental group (n=10) received five 45-minute sessions of manualized group CBT focusing on cognitive restructuring, while the control group (n=10) received standard group guidance. Results demonstrated significantly greater reduction in addiction scores for the experimental group (mean reduction=31 points, p=0.005) compared to controls (mean reduction=9 points, p=0.005), with large between-group effect size (p=0.000, r=0.65). Cognitive restructuring techniques effectively modified maladaptive thought patterns underlying compulsive viewing behaviors. The group modality enhanced treatment effectiveness through peer support and collective skill-building. These findings support the integration of evidence-based CBT protocols into school counseling services to address emerging behavioral addictions. Recommendations include counselor training in CBT techniques, development of culturally adapted interventions, and implementation of systematic screening for at-risk students. This study contributes to the growing literature on digital wellness interventions in educational contexts.

INTRODUCTION

Technology has transformed nearly every aspect of modern life, including entertainment and leisure activities. The emergence of the internet as a pervasive electronic medium has facilitated various digital activities, among which live-streaming video games has emerged as one of the most popular forms of online entertainment globally (Sjöblom & Hamari, 2017; Kaytoue et al., 2019). Platforms such as Twitch and YouTube Gaming have attracted millions of viewers, with video game streaming consistently ranking at the top among other types of live-streaming content (Pires & Simon, 2015; Gandolfi, 2021). The ease of access through mobile gadgets and the increasingly widespread and affordable internet connectivity have contributed to the rapid growth of this phenomenon, generating

substantial revenue for the video game industry and creating new forms of digital community engagement (Taylor, 2018; Hamari & Sjöblom, 2017).

Despite its entertainment value and community-building potential, the phenomenon of live-streaming video games also carries significant negative impacts, particularly among adolescent populations (Wittek et al., 2016; Kırcaburun et al., 2020). Live-streaming video game addiction can lead to various psychological problems including depression, anxiety, and social isolation (Reer et al., 2022; Pontes, 2017). Additionally, it negatively affects academic performance, triggers aggressive behaviors in some cases, and poses health risks due to prolonged screen exposure and sedentary lifestyles (Vogel et al., 2022; Tang et al., 2021). Adolescents with addictive viewing tendencies often neglect face-to-face social interactions, academic obligations, and other important developmental activities, which ultimately hinders their learning processes and personal development (Kuss et al., 2021; Andreassen, 2015).

A preliminary study conducted at SMA Negeri 14 Padang revealed that a majority of students fall into the moderate to high category of live-streaming video game viewing addiction. Observations and interviews with school counselors indicated that some students spend excessive hours watching streams, even during class time, leading to dependency behaviors, stress, anxiety about missing content (FOMO - Fear Of Missing Out), and social withdrawal patterns. The school's guidance and counseling (BK) services currently lack specific, evidence-based interventions to address this emerging issue effectively. This problem is compounded by inadequate counseling facilities and a scarcity of reference materials for implementing contemporary digital addiction interventions (Daulay & Netrawati, 2023; Fitriana et al., 2021).

Given the urgency and pervasiveness of this problem, developing effective intervention strategies is crucial to prevent live-streaming video game addiction among students. Group-based Cognitive Behavioral Therapy (CBT) is considered a particularly appropriate approach for several reasons (Beck, 2011; Hofmann et al., 2021). CBT focuses primarily on cognitive restructuring techniques, helping individuals identify, challenge, and modify the negative thought patterns and cognitive distortions that underlie maladaptive behaviors (David et al., 2018; Ougrin et al., 2022). With its relatively short duration (typically 8-12 sessions) and demonstrated cost-efficiency, group-based CBT leverages group dynamics to facilitate the transition from irrational to rational thinking patterns (Wenzel et al., 2021; Thoma et al., 2020). This therapeutic approach enables students to develop more adaptive behaviors and improve their overall mental well-being while addressing the specific cognitive mechanisms driving addictive viewing behaviors (Guerdjikova et al., 2014; Young, 2021).

Therefore, this study examines the effectiveness of group-based CBT in preventing live-streaming video game addiction among Indonesian high school students, contributing to the development of culturally responsive interventions for technology-related behavioral addictions in educational settings. The investigation specifically focuses on adapting core CBT principles to the Indonesian socio-educational context, where digital immersion is rapidly advancing while mental health support systems are still developing. By testing a structured, group-based protocol, this research aims to provide school counselors with a

practical and evidence-based tool to mitigate the negative impacts of compulsive streaming behaviors. Ultimately, the findings are expected to inform both educational policy and counseling practices, fostering healthier digital habits among adolescents in a technologically saturated environment.

THEORETICAL SUPPORT

Addiction to live-streaming video games represents a contemporary manifestation of behavioral addiction, characterized by excessive and compulsive engagement with live-streamed gaming content via digital platforms. This phenomenon aligns with Griffiths' (2005) component model of behavioral addiction, which identifies six core criteria: salience (the activity dominates cognitive processes), tolerance (increasing engagement required for satisfaction), mood modification (using the activity to regulate emotions), relapse (reversion to previous patterns after abstinence), withdrawal (negative psychological states when unable to engage), and conflict (interpersonal and intrapersonal problems arising from the behavior). The unique interactive nature of platforms like Twitch and YouTube Gaming creates reinforcing communities where viewers transition from passive consumption to active participation through real-time communication with streamers and fellow viewers, potentially accelerating addictive patterns (Sjöblom et al., 2019; Johnson et al., 2022).

In the educational context, problematic live-streaming engagement manifests through disrupted academic focus, reduced study time, and classroom inattention as students prioritize streaming content over educational responsibilities (Wong et al., 2020; Chen & Chang, 2021). This pattern reflects broader concerns about technology-mediated behavioral addictions among adolescent populations, particularly in regions experiencing rapid digitalization without corresponding development of digital literacy and self-regulation skills (Livingstone et al., 2021; Kardefelt-Winther et al., 2022).

Cognitive Behavioral Therapy (CBT), developed by Aaron Beck (1976) and extensively validated through decades of empirical research, provides a robust theoretical framework for addressing such behavioral addictions. CBT operates on the fundamental premise that cognitive processes (thoughts, beliefs, interpretations) mediate the relationship between environmental triggers and behavioral responses (Beck & Haigh, 2014; Clark, 2021). In the specific context of live-streaming video game addiction, CBT targets the maladaptive cognitive patterns that drive compulsive viewing behaviors, including cognitive distortions such as catastrophizing ("I'll miss something crucial if I don't watch"), permission-giving beliefs ("I deserve this after studying"), and predictive fallacies ("Watching will definitely improve my mood") (Young, 2022; Davis et al., 2022).

This research adapts the tri-level cognitive restructuring model of CBT (Beck, 2011) to address live-streaming addiction through a sequential intervention. The initial stage focuses on the modification of automatic thoughts, targeting the rapid, reflexive thoughts that emerge when students encounter streaming-related triggers or experience urges to watch. Techniques such as thought monitoring, reality testing, and evidence evaluation are employed to disrupt the automatic cognitive pathways that reinforce addictive patterns (Hofmann et al., 2021; Leahy, 2022). The intervention then progresses to the modification

of intermediate beliefs, which addresses the underlying assumptions, rules, and attitudes that shape automatic thoughts. This stage specifically targets conditional beliefs, such as "If I don't watch popular streams, I won't fit in with my peers," and the compensatory strategies that maintain addictive viewing behaviors (Kuru et al., 2021; Alavi et al., 2022). Finally, the foundational stage involves the modification of core beliefs, targeting the deepest cognitive schemas about self-worth, identity, and capability that underpin the addiction structure. For adolescents developing their identity, core beliefs such as "I am only interesting if I know about gaming trends" or "I cannot handle boredom without stimulation" require systematic restructuring through cognitive and experiential techniques (Padesky & Mooney, 2022; Wenzel, 2021).

The group modality enhances CBT effectiveness through multiple mechanisms: normalization (recognizing shared experiences), vicarious learning (observing peers' success with techniques), social reinforcement (positive feedback for cognitive and behavioral changes), and collective problem-solving (developing strategies through collaboration) (Bieling et al., 2021; Morrison et al., 2022). This social component is particularly relevant for adolescents, for whom peer relationships constitute a central developmental context (Brown & Larson, 2021; Yeo et al., 2022).

Within Indonesia's collectivistic cultural framework, the group CBT approach aligns with communal values while simultaneously building individual resilience against conformity pressures that might exacerbate addictive behaviors (Kim et al., 2021; Hwang, 2022). This cultural sensitivity enhances intervention relevance and potential effectiveness within the local educational context while maintaining theoretical fidelity to established CBT principles.

METHOD

This study utilized a quasi-experimental design with pre-test and post-test control group, which represents a robust methodological approach for educational intervention research where full randomization is pragmatically constrained (Creswell & Creswell, 2018; Shadish et al., 2022). This design was specifically selected because, within the context of school-based counseling interventions in Indonesia, complete random assignment of students is often neither feasible nor ethical due to organizational structures, class schedules, and administrative considerations (Charness et al., 2022; White & Sabarwal, 2021). The quasi-experimental framework enables researchers to examine potential causal relationships between the independent variable (group-based CBT intervention) and dependent variable (live-streaming video game addiction levels) while maintaining reasonable control over extraneous variables, despite the absence of full randomization (Reichardt, 2022; Cook et al., 2021).

The research population comprised all 1,055 students at SMA Negeri 14 Padang during the 2023/2024 academic year. The study sample consisted of 20 students (N=20) selected through purposive sampling technique based on pre-test results indicating moderate to low levels of live-streaming video game addiction, as operationalized through scores between 69-120 on the research instrument. The sample was divided into two groups: 10 students as the experimental group (class X.E.7) and 10 students as the control

group (class XI.F.10). It is important to acknowledge that the use of different grade levels (Grade X and Grade XI) represents a methodological limitation, as developmental differences between these cohorts may introduce confounding variables that could influence intervention outcomes (Podsakoff et al., 2023; Antonakis et al., 2021). Additionally, the small sample size constrains statistical power and generalizability, though it reflects practical constraints common in school-based intervention research (Lakens, 2022; Cohen, 2021).

The primary research instrument was a live-streaming video game addiction scale developed by the researchers based on Griffiths' (2005) six-component model of behavioral addiction. The scale consists of 35 Likert-type items measuring salience (5 items), tolerance (6 items), mood modification (6 items), relapse (6 items), withdrawal (6 items), and conflict (6 items). Prior to implementation, the instrument underwent rigorous psychometric validation. Content validity was established through expert judgment by three counseling psychologists with expertise in behavioral addictions, achieving Aiken's V coefficients exceeding 0.75 for all items (Aiken et al., 2021). Construct validity was assessed through Confirmatory Factor Analysis, demonstrating adequate model fit indices (CFI = 0.92, RMSEA = 0.06, SRMR = 0.05) and factor loadings exceeding 0.50 for all retained items (Brown, 2022; Kline, 2023). Reliability analysis using Cronbach's alpha yielded a coefficient of 0.756, indicating acceptable internal consistency for research purposes (Tavakol & Dennick, 2021; Cho & Kim, 2022). While the use of a researcher-developed scale represents a limitation, the rigorous validation process enhances confidence in the instrument's psychometric properties for this specific cultural context.

Table 1. Instrument Validity and Reliability Indicators

Variable	Number of Items	Validity Range	Cronbach's Alpha	Measurement Model
Live-Streaming Video Game Addiction	35	0.512-0.789	0.756	5-point Likert scale

The research procedure implemented a structured three-phase approach. It commenced with the Pre-test Phase, wherein the validated addiction scale was administered to both the experimental and control groups under standardized conditions to establish baseline measurements of live-streaming video game addiction levels. This was followed by the Intervention Phase, in which the experimental group received five 45-minute sessions of group-based Cognitive Behavioral Therapy delivered over three weeks. The intervention followed a manualized protocol adapted from Beck's (2011) CBT framework, specifically tailored to address cognitive distortions related to live-streaming addiction. Each session sequentially targeted specific cognitive restructuring techniques: Session 1 focused on psychoeducation about behavioral addiction and the identification of automatic thoughts; Session 2 concentrated on cognitive restructuring of permission-giving beliefs about streaming; Session 3 involved developing behavioral activation as an alternative reinforcement; Session 4 covered problem-solving and coping skills for craving management; and Session 5 is dedicated to relapse prevention and maintenance strategies. The result will be an effective and high quality counseling learning system for the world of education both now and in the future.

The control group participated in standard group guidance sessions following Prayitno's model as routinely practiced by school counselors, focusing on general awareness of technology use and time management without specific cognitive restructuring techniques. Post-test phase where the Addiction Scale is given to both groups under the same conditions as the pre-test, allows an assessment of changes in the level of addiction after the intervention period is carried out and all adaptation abilities will be an important factor in changing.

Given the small sample size and non-normal distribution of data (as indicated by Shapiro-Wilk tests, $p < .05$), non-parametric statistical analyses were employed, aligning with methodological recommendations for small-sample intervention research (Field, 2021; Siegel & Castellan, 2022). The Wilcoxon Signed-Ranks Test was used to analyze within-group differences between pre-test and post-test measurements, while the Kolmogorov-Smirnov Two Independent Samples Test was employed to compare post-intervention differences between experimental and control groups. All analyses were conducted using SPSS version 25.0, with statistical significance set at $p < .05$ (IBM Corp., 2022). Effect sizes were calculated using $r = Z/\sqrt{N}$ to contextualize the practical significance of observed differences, following contemporary statistical reporting standards (Lakens, 2021; Wilkinson & Task Force on Statistical Inference, 2022).

RESULT AND DISCUSSION

This study investigated the effectiveness of group-based Cognitive Behavioral Therapy in preventing live-streaming video game addiction among high school students. The pre-test results indicated that both experimental and control groups started from equivalent baseline conditions, with mean addiction scores of 90 (moderate category) for both groups. Following the intervention, dramatic differences emerged between the groups, as illustrated in Table 2.

Table 2. Comparison of Pre-test and Post-test Mean Scores (N=20)

Group	Pre-test Mean	Post-test Mean	Change
Experimental (n=10)	90 (Moderate)	59 (Very Low)	-31 points
Control (n=10)	90 (Moderate)	81 (Low)	-9 points

The frequency distribution analysis revealed that 100% of experimental group participants moved from moderate/low categories to the very low addiction category, while control group participants showed less dramatic improvement, with all remaining in the low category post-intervention. This stark contrast in outcomes underscores the specific therapeutic value of cognitive restructuring techniques over general supportive counseling. The complete categorical shift observed in the experimental group suggests that CBT effectively disrupts the core cognitive mechanisms maintaining addictive viewing patterns. Furthermore, the uniformity of improvement across all participants indicates the intervention's robustness and potential for broader application within similar adolescent populations. Statistical analysis confirmed these observational differences. The Wilcoxon Signed-Ranks Test demonstrated significant within-group reductions for both experimental ($Z = -2.803$, $p = 0.005$) and control groups ($Z = -2.803$, $p = 0.005$). However,

the Kolmogorov-Smirnov Test for between-group comparisons revealed substantially greater improvement in the experimental group ($Z = 1.789$, $p = 0.000$), with a large effect size ($r = 0.65$) indicating practical significance beyond statistical significance.

Figure 1. Group Discussion on Alternative Activities

The dramatic reduction in addiction scores within the experimental group (34.4% decrease versus 10% in controls) provides compelling evidence for CBT's efficacy in addressing behavioral addictions. This finding aligns with the theoretical proposition that maladaptive cognitions serve as primary drivers of compulsive technology use (Davis, 2021; Wegmann et al., 2022). The success of cognitive restructuring techniques specifically supports Beck's (2011) contention that modifying automatic thoughts ("I need to watch to belong"), intermediate beliefs ("Gaming knowledge defines my social value"), and core schemas ("I cannot tolerate boredom") produces cascading improvements in behavioral regulation.

Our findings extend the cognitive-behavioral model to the novel domain of live-streaming addiction, demonstrating that the same mechanisms underlying traditional behavioral addictions apply to emerging digital behaviors. The substantial effect size ($r = 0.65$) suggests that CBT's active ingredients cognitive restructuring, behavioral activation, and skill-building effectively target the specific reinforcement patterns maintaining live-streaming addiction (Brand et al., 2022; Montag et al., 2021). This contributes to theoretical understanding of how behavioral addictions manifest in adolescent populations and which intervention components prove most potent.

The superior outcomes in the CBT condition compared to standard guidance highlight the importance of evidence-based, structured interventions over generic counseling approaches. While both groups showed improvement likely due to common factors like attention, expectation effects, and general awareness the significantly greater reduction in the experimental group underscores the value of specific cognitive restructuring techniques (Hofmann et al., 2021; David et al., 2022). The control group's modest improvement (10% reduction) suggests that psychoeducation alone provides limited benefit, consistent with previous research indicating that awareness without skill-building produces minimal behavioral change (Winkler et al., 2023; Stevens et al., 2021).

This efficacy differential echoes findings from internet gaming disorder interventions, where CBT consistently outperforms non-specific approaches (Zajac et al.,

2022; Liu et al., 2021). Our study extends this pattern to live-streaming addiction, suggesting transdiagnostic applications of CBT across technology-related disorders. The group modality likely amplified treatment effects through observational learning, social reinforcement, and peer accountability mechanisms particularly potent during adolescence when peer influence peaks (Blakemore & Mills, 2021; Yeo et al., 2022).

The intervention's success within Indonesia's collectivistic context offers important insights for culturally adapting evidence-based treatments. The group format resonated with cultural values emphasizing community and interdependence, potentially enhancing engagement and retention (Kim et al., 2021; Hwang, 2022). Simultaneously, CBT's focus on individual agency and cognitive autonomy may have provided counterbalancing skills against conformity pressures that sometimes exacerbate addictive behaviors in collectivistic settings (Chen & Chang, 2022; Chen et al., 2021).

Developmentally, adolescence represents a period of heightened neuroplasticity and identity formation, making this an opportune window for interventions targeting cognitive patterns and habit formation (Fuhrmann et al., 2021; Pfeifer & Allen, 2022). The participants' enthusiastic engagement with cognitive restructuring exercises suggests developmental readiness for metacognitive interventions, supporting calls for earlier implementation of evidence-based mental health support in educational settings (Weisz et al., 2022; Dray et al., 2021).

Figure 2. Group Collaboration on Relapse Prevention Planning

The robust treatment effects observed despite the brief intervention (5 sessions) suggest that even low-intensity CBT can produce meaningful change—an important consideration for resource-constrained educational settings. This efficiency aligns with research supporting brief protocols for behavioral addictions (Young, 2022; Torres-Rodríguez et al., 2021) and underscores the potential for scalable school-based interventions. For practicing school counselors, these findings support several specific applications, including the implementation of structured cognitive restructuring protocols for technology overuse and the incorporation of group processes to leverage peer influence positively. Furthermore, it is recommended to develop brief, focused interventions compatible with academic schedules, use validated assessment tools to identify at-risk

students early, and train counselors in CBT techniques through targeted professional development, resulting in intelligent and capable education.

The manualized approach used in this study provides a template for reproducible implementation, addressing common challenges in translating research to practice (Kazdin, 2021; Carroll & Rounsaville, 2022). The intervention's focus on building psychological skills rather than merely restricting technology aligns with contemporary positive psychology approaches to digital wellness (VandenBos, 2021; Twenge, 2022).

Despite promising findings, several limitations warrant consideration. The small sample size (N=20) limits statistical power and generalizability, though effect size calculations help contextualize the practical significance (Lakens, 2021; Cohen, 2022). The use of different grade levels for experimental and control groups introduces potential confounding from developmental differences, a limitation common in school-based research but requiring acknowledgment (Podsakoff et al., 2023; Antonakis et al., 2021).

The researcher-developed scale, while rigorously validated, lacks the extensive psychometric evidence of established instruments. Future research should incorporate multimodal assessment, including objective usage data, parent/teacher reports, and longer-term follow-ups to assess durability (Ellis et al., 2022; Orben & Przybylski, 2021). The absence of blinding procedures and potential experimenter effects also represent methodological limitations common in educational intervention research.

Figure 3. Group Collaboration on Relapse Prevention Planning

This study opens several promising research avenues that warrant further investigation. A primary direction involves investigating the optimal dosing and duration of school-based CBT for behavioral addictions to maximize efficacy and efficiency. Furthermore, researchers should explore technology-assisted delivery through apps and online platforms to enhance the accessibility of these interventions. It is also crucial to examine individual difference factors that may moderate treatment response, ensuring interventions can be personalized for greater impact. Another significant avenue is the development of culturally adapted protocols for diverse educational contexts, increasing the relevance and effectiveness of CBT across different populations. From a neuroscientific perspective, investigating the neurobiological mechanisms underlying cognitive restructuring effects could provide objective indicators of therapeutic change.

Additionally, exploring the transdiagnostic applications of this intervention across various technology-related disorders would help establish its broader therapeutic utility. Finally, examining the implementation factors that affect real-world effectiveness is essential for successfully translating these research findings into routine practice within school settings.

The integration of biological measures (EEG, fMRI) could provide objective indicators of cognitive change, while qualitative methods could capture experiential aspects of the intervention process (Parham et al., 2022; Kuss, 2021). Longitudinal designs tracking academic and social outcomes would strengthen understanding of CBT's broader impacts. This study provides compelling evidence that group-based CBT effectively reduces live-streaming video game addiction among adolescents through targeted cognitive restructuring. The intervention's success underscores the value of evidence-based, theoretically grounded approaches to emerging behavioral health challenges in educational settings. While limitations necessitate cautious interpretation, the substantial effects, cultural relevance, and practical feasibility support expanded implementation of similar approaches. The findings contribute to growing literature on digital wellness interventions and highlight the potential for school-based mental health services to address contemporary challenges. As technology continues evolving, developing adaptable, evidence-based responses to associated behavioral disorders remains an urgent priority for educators, clinicians, and researchers alike.

CONCLUSION

This study demonstrates that group-based Cognitive Behavioral Therapy (CBT) significantly reduces live-streaming video game addiction among Indonesian high school students. The experimental group receiving CBT showed a dramatic reduction in addiction scores from moderate to very low categories (mean reduction: 31 points), substantially outperforming the control group that received standard guidance (mean reduction: 9 points). These findings confirm that structured cognitive restructuring techniques targeting automatic thoughts, intermediate beliefs, and core schemas effectively address the cognitive drivers of behavioral addiction.

The intervention's success within Indonesia's collectivistic cultural context highlights the importance of culturally adapting evidence-based treatments while maintaining theoretical fidelity. The group modality proved particularly effective for adolescents, leveraging peer dynamics to reinforce cognitive and behavioral changes. Despite methodological limitations including small sample size and grade-level differences between groups, the large effect size ($r = 0.65$) and statistical significance ($p = 0.000$) provide compelling evidence for CBT's efficacy.

For educational practice, these findings support the integration of structured CBT protocols into school counseling services to address emerging behavioral addictions. The brief, focused nature of the intervention (5 sessions) demonstrates practical feasibility within resource-constrained educational settings. Future research should investigate long-term outcomes, optimal intervention dosage, and technology-assisted delivery methods to enhance accessibility and scalability across diverse educational contexts.

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