



# A Preregistered Longitudinal Analysis of Aggressive Video Games and Aggressive Behavior in Chinese Youth

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## Abstract

Whether aggressive video games (AVGs) promote aggression in youth remains a matter of debate despite decades of research. Longitudinal studies to date have provided mixed results, with effect sizes, overall, being quite low. However, few longitudinal studies have preregistered their analyses. The current article presents a preregistered analysis of AVG influences on later youth aggression. With several other variables controlled (age, sex, family income, moral disengagement, Time 1 aggression) AVG exposure did not predict Time 2 aggression. Evidence from this sample did not support the common belief that AVG exposure is a risk factor for future aggression in youth.

**Keywords** Video games · Aggression · Violence · Preregistration

## Introduction

Playing aggressive video games (AVGs) is a common pastime for youth, particularly among boys [1]. This has led to decades of debate regarding whether exposure to such games might be a risk factor for serious aggression in youth players. For instance, a 2015 report by the American Psychological Association (APA) linked AVG playing to youth aggression [2]. However, more recently a group of scholars concluded that the APA resolution and others like it failed to adequately represent the conflicted state of the science [3]. In contrast to professional guild statements such as that of the APA, the US Supreme Court concluded in 2011 that research evidence did not support a link between AVGs and youth aggression [4]. Other analyses have focused on societal level data, which have generally found that the release of highly popular AVGs is associated with reduced societal aggression [5, 6]. As such, continued lack of clarity or consensus exists regarding whether AVGs should be viewed as a risk factor for youth aggression.

Recent analyses have focused on longitudinal studies. From such studies, long-term relationships between AVGs and later youth aggression appear to be weak [7, 8]. This has

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led to confusion regarding how to interpret these effect sizes. In meta-analyses, longitudinal effects appear to range from approximately  $r = .04$  to  $r = .08$  [9, 10]. Scholars disagree about how to interpret effects this close to zero. For instance, Prescott and colleagues concluded that an effect of  $r = .08$  was sufficient to consider AVGs a risk factor for youth aggression. However, other scholars have concluded that effect sizes in this range lack practical significance or may be due to statistical and methodological artifacts rather than real effects [11].

This issue of whether such small effects are meaningful relates not only to the degree to which tiny effects are practically significant, but also whether such effects are explainable due to methodological issues such as unstandardized measures and researcher degrees of freedom (when researchers have multiple ways to analyze data and select, consciously or unconsciously, those that best fit their hypotheses). One way to reduce researcher degrees of freedom is through the use of preregistration. Preregistration involves a public document that locks in an analysis plan prior to conducting analyses. Although common prior to data collection, preregistration can also be made with existing datasets prior to data analysis [12]. Preregistered studies in AVG research, particularly with youth, are very few. One correlational study found no evidence to link AVG exposure to aggression in youth [13]. Likewise, there currently is only a single preregistered longitudinal study of AVG use, using a sample of several thousand youth in Singapore [14]. This study, likewise, concluded that no substantial links exist between AVG use and later youth aggression. Thus, it is possible that preregistered analyses are less likely to return hypothesis supportive results than studies that are not preregistered.

The current study is designed to add to the literature by examining longitudinal links between AVG use and aggression in a large sample of Chinese youth using preregistered analyses. The main research question regarded whether AVG use would prove to be a risk factor for later aggression once other theoretically relevant variables were controlled. Based on the Catalyst Model [15], these theoretical control variables included age, sex, family income as well as well as preexisting moral disengagement and time 1 aggression to control for selection effects. The preregistration for this study can be found at: <https://aspredicted.org/j4gh5.pdf>

## Methods

### Participants

Participants in the current study were drawn from a preexisting database of Chinese youth [16]. There were 1340 participants 45.1% of whom were male. Mean age at Time 1 (T1) was 14.86 ( $SD = 1.50$ ). The outcome period (T2) was assessed one year later.

### Measures

**Aggressive Behavior** Aggression was measured using a composite of self and peer rated aggression consistent with the original dataset [16]. Self-reported aggression was measured using the Brief Aggression Questionnaire [17]. This measure is a 12-item measure of trait aggression. Internal consistency was .68 at T1 and .74 at T2. Peer-reported aggression was assessed using a six-item measure of physical and relational aggression [18]. Internal consistency was .78 at T1 and .76 at T2. A composite was formed by averaging the two scores.

**AVG Exposure** Exposure to AVGs was measured via self-report. Participants named the top three games they played, indicated how frequently they played each game as well as the violence content of the game. When games were reported by multiple participants, average violence scores across participants were used to indicate violent content. Overall AVG exposure was measured by taking summary scores of the violent content ratings multiplied by frequency.

**Moral Disengagement** Relationships between AVG play at moral engagement are complex [19]. However, it is not unreasonable to suggest that those with preexisting moral disengagement might be more attracted to more aggressive video games. Thus, this variable was viewed as an important control variable. Moral disengagement was measured using a Chinese version of the Moral Disengagement Scale [20]. The scale consisted of 32 items related to the approval of aggressive acts. Such scales have been used as control variables in other longitudinal studies of AVG effects [14]. Coefficient alpha was .92 at T1.

## Procedure

Details on data collection and management are provided in full by Teng and colleagues [16]. All surveys were administered in Chinese classrooms with research assistants supervising. Data for the current analysis were graciously provided by the original scholars in June 2019. Consistent with the preregistered analyses, an OLS regression with pairwise deletion was used. Predictor variables included age, sex, family income, T1 aggressive behavior, T1 moral disengagement and T1 AVG exposure. The outcome variable was T2 aggressive behavior.

## Results

The overall regression model was significant [ $R = .460$ ,  $R^2_{adj} = .207$ ,  $p < .001$ ]. No evidence of multicollinearity was detected, with the highest VIF = 1.45. In the model, age ( $\beta = -.056$ ,  $p = .048$ ), family income ( $\beta = -.066$ ,  $p = .020$ ), T1 aggression ( $\beta = .344$ ,  $p < .001$ ) and T1 moral disengagement ( $\beta = .164$ ,  $p < .001$ ) were significant predictors of T2 aggression. AVG exposure ( $\beta = .027$ ,  $p = .410$ ) was not a significant predictor of T2 aggression.

Although not part of the preregistration, and thus exploratory in nature, several alternate analyses were conducted to test for methods invariance issues (i.e. that results may be due to a specific analytical approach and might differ with a different approach.) First, the regression was rerun with listwise, rather than pairwise deletion. This did not substantially change the results. Likewise, removal of T1 moral disengagement variable likewise did not substantially change the results. With the removal of the T1 aggression variable, the AVG exposure variable did attain statistical significance ( $\beta = .095$ ,  $p = .008$ ) albeit with a very small effect size.

## Discussion

The issue of whether AVGs contribute to youth aggression continues to be hotly debated. A small number of longitudinal studies have been conducted to examine the issue. While results are heterogeneous, effect sizes have generally been very small, suggesting caution is warranted

in considering AVGs a risk factor for youth aggression. The current article adds to this field by providing a longitudinal analysis among Chinese youth using preregistered analyses. Results did not indicate that AVG exposure is a risk factor for later youth aggression.

Although AVG exposure was not a risk factor for youth aggression, prior aggressiveness and moral disengagement were. Aggressiveness proved to be a stable trait across the 1-year time frame of the study. Indeed, only when T1 aggressiveness was removed from the regression equation were AVGs a predictor for youth aggression. This suggests there may be a selection effect at play wherein youth with preexisting aggressiveness may be more inclined to play AVGs. Nonetheless, even with the T1 aggressiveness variable removed, the effect size for AVGs as a predictor for later aggressiveness was below the threshold some scholars use for meaningful interpretation of practical effects [13]. Thus, the most cautious interpretation is that AVGs should not be considered as a risk factor for later youth aggression.

As with any study, this one has limitations. First the AVG measure used youth self-reports of violent content in games they play. There is a reasonable concern such a question may create demand characteristics and hypothesis guessing in youth. However, the lack of relationship in the current study suggests this had little impact on the ultimate results. Other variables ranging from family environment to mental health to, where possible, genetic influences may be important to control in addition to the few controls used here. Last, although the analyses were preregistered and preregistration was done prior to the author conducting data analysis, the data had already been collected by other scholars and was provided as part of an inquiry regarding data from their article. Although the current preregistration establishes that methods were not altered to produce certain results, it is obviously desirable for preregistrations to occur prior to any data analysis.

In conclusion, the issue of the impact of AVGs on youth aggression is likely to be debated into the foreseeable future. The current article adds to those which have failed to support the hypothesis that AVGs contribute directly to later youth aggression. It is hoped that this article will be a productive contribution to further debates on this issue.

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**Author's Contribution** The author of the article is solely responsible for all work reported in the manuscript.

## Compliance with Ethical Standards

**Conflict of Interest** There are no conflicts of interest to report.

**Ethics Statement** The research described in this paper passed local IRB.

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