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ORIGINAL ARTICLE

Can clans protect adolescent players of massively multiplayer online games from violent behaviors?

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Abstract
Objectives To examine whether clan membership mediates observed associations between violent game content and externalizing behaviors among youth who play massively multiplayer online games (MMOGs).
Methods Responses from 486 11- to 18-year-olds who: live in the United States, read English, have been online at least once in the past 6 months, and have played MMOGs in the past year were examined. Generalized estimating equations were used to estimate the population-averaged incident rate ratio of aggressive, delinquent, and seriously violent behaviors among MMOG players given one's self-reported exposure to in-game content depicting violence.
Results Twenty-nine percent of all youth respondents played MMOGs in the past year. Rates of aggressive, IRR: 1.59, 95 % CI [1.11, 2.26], and delinquent, IRR: 1.44, 95 % CI [0.99, 2.08], behaviors were significantly higher for MMOG players who were in clans versus not in clans. For females, clan membership attenuated but did not eliminate the observed relation between exposure to in-game violent content and both aggressive and seriously violent behavior (16 % and 10 % reductions in IRR, respectively); whereas for males, clan membership was largely uninfluential (i.e., less than 2 % change).
Conclusions Clan membership is neither associated with lower rates of externalizing behaviors for youth, nor does it affect the likelihood of reporting externalizing behaviors among male players. There is some suggestion that clan membership may attenuate the concurrent association between in-game violent content and some externalizing behaviors for females.

Keywords Adolescents · Violent video games · Clans · MMOGs · Violent behavior

Introduction

Interactive media—particularly games—may provide the opportunity to observe behaviors, practice them, and have them reinforced through repetition, reward, and realism (Anderson and Bushman 2001; Anderson et al. 2004). In support of this hypothesis, compared to neutral and violent games, prosocial games are associated with increases in positive affect and reductions in hostility, aggravation, and "mean" feelings (Saleem et al. 2012). Playing non-violent games also is associated with a lower likelihood of concurrently reporting externalizing behaviors (Ybarra, Diener-West 2008). On the other hand, there is suggestion that playing violent games may be associated with an increased likelihood of aggressive behavior for some youth (Anderson et al. 2010), although other concomitant factors may explain this relation (Browne and Hamilton-Giachritsis 1983). [Readers who are interested in learning more about the extant research about violent media and how it relates to violent behavior are referred to studies such as: Anderson et al. (2010), (2013), Ferguson (2013), and Ferguson and Kilburn (2010)]

For the 95 % of adolescents in the United States (US) who have internet access (Madden et al. 2013), playing

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games is no longer a solitary endeavor. Youth can connect with friends through networked games or participate in public gaming communities through massively multiplayer online games (MMOGs). MMOGs often involve thousands of simultaneous players, usually in a persistent online "virtual world," where participants play with and against each other. Like other gaming environments, MMOGs are particularly popular with youth: MMOGs are played by about 21 % of the 97 % of teenagers who play games (Lenhart et al. 2008b), compared to 6 % of the 53 % of adults who play games (Lenhart et al. 2008a). MMOG participants commonly play as part of a social collective known as "clans" or "guilds." Because guilds and clans provide social support, structure, and teamwork (Steinkuehler and Williams 2006; Williams et al. 2006), these positive benefits may counteract any potential negative influence that violent game content may have on behavior.

Gameplay generally, and clan membership specifically, differ in prevalence rates across different groups of youth. Indeed, 30 % of male gamers have played MMOGs compared to 11 % of female gamers (Lenhart et al. 2008b). Varied participation rates may be a result of different preferences between males and females or of normative ideas about who can or should play games. It may also be that youth benefit differently from participation in MMOGs generally and clan membership specifically. For example, research suggests that males are more affected by violent game content when they play rather than watch, whereas there is no difference for females (Polman et al. 2007). Perhaps males' behavior is also more affected by clan membership. On the other hand, associations between amount of time spent in playing games is related, although to a small degree, with involvement in physical fights and bullying for female youth, but not male youth (Janssen et al. 2012). Thus, the influence of gameplay on behavior should potentially be examined for males and females separately.

Our objectives in this paper are to: (a) examine the relative rates of externalizing behaviors for youth who both play MMOGs and are in clans versus those who play MMOGs but are not in clans; and (b) to examine whether clan membership attenuates any observed association between violent game content and externalizing behavior. Findings will address the research question: Is clan membership associated with reduced levels of externalizing behaviors among youth who play MMOGs?

It should be noted at the outset that this study is not without significant limitation. The main aim of the Growing up with Media survey, from which this study's data come, was to understand associations between violent behavior and violent media, but not MMOGs specifically. Measures for MMOG play are crude and reflect only whether youth played or did not play MMOGs in the previous year. There are many different MMOGs and gaming styles which young people can play, resulting in what is likely a complex behavior that is not well reflected in a simple yes/no dichotomy. We hope that this first inquiry will provide preliminary evidence to invigorate future research that employs more sensitive measures of MMOG play.

Methods

Participants and procedure

Growing up with Media is a longitudinal survey examining the associations between exposure to violent media and violent behavior. The Centers for Disease Control and Prevention Institutional Review Board reviewed and approved the survey protocol. Wave 1 data were collected August–September 2006 with 1,586 youth-caregiver pairs; data were collected again November 2007–January 2008 (Wave 2, $n = 1{,}206$) and August–November 2008 (Wave 3, $n = 1{,}159$).

Participants were recruited through an email sent to randomly identified adult Harris Poll OnLine (HPOL) panel members who reported a child living in their household. Eligible adults were required to be equally or more knowledgeable about the youth's daily activities as compared to other adults living in the household. Adult caregivers provided informed consent for their participation and permission for their child's participation. Youth participants were 10–15 years old who: read English, lived in the household at least 50 % of the time, had used the Internet in the last six months, and had provided informed assent. Recruitment was balanced on youth age and sex.

The Wave 1 survey response rate (31 %) is consistent with well-conducted surveys using online panels at the time of baseline recruitment (Kaplowitz et al. 2004). To maximize data, respondents were invited to take part in the Wave 3 survey irrespective of their participation at Wave 2. Seventy-six percent of baseline participants also responded at Wave 2, as did 73 % at Wave 3. On average, adult surveys lasted 5 min and youth surveys 21 min. For their participation, youth received a $15 gift certificate and caregivers a $10 check at Waves 1 and 2, and $25 and $10 respectively at Wave 3.

Identifying the analytical sample

Questions about clan membership were added in Wave 2. As such, the current analyses include data from Waves 2 and 3. As shown in Table 1, demographic characteristics for respondents and non-respondents were statistically similar in almost all cases.

Table 1 Comparison of Wave 1 characteristics for respondents at Wave 2 and/or 3 versus non-respondents across 2006–2008 in the Growing up with Media study conducted in the United States ($n = 1{,}586$ youth)

Wave 1 demographic characteristics	Non-responders at Wave 2 or 3 ($n = 436$)	Wave 2 and/or 3 responders ($n = 1{,}150$)	p value
Age	12.5 (0.1)	12.8 (0.06)	0.04
Male sex	49.1 % (214)	49.7 % (582)	0.87
Hispanic ethnicity	20.2 % (68)	17.3 % (137)	0.39
Race			0.61
White	72.3 % (301)	71.8 % (852)	
Black/African American	12.8 % (66)	15.0 % (151)	
Mixed	7.6 % (33)	7.9 % (81)	
All others	7.4 % (32)	5.4 % (65)	
Caregiver married	75.5 % (297)	72.5 % (842)	0.37
Household income <$35,000 per year	24.5 % (123)	26.3 % (269)	0.58

By definition, clans are specific to MMOGs. Clans are not a part of single shooter games, for example. The analytical sample was therefore restricted to the 665 observations (316 respondents at Wave 2 and 349 respondents at Wave 3; 486 independent respondents) of youth who reported MMOG play in the past 12 months at either or both Waves 2 and 3.

Measures

Main variables of interest

To identify youth who were part of a clan or guild, youth were first asked how often in the past year they played "massively multiplayer online games (MMOGs)?" Examples of MMOG titles were provided. Response options ranged from "never" to "everyday/almost everyday." Youth who reported playing MMOGs more often than never were then asked whether they were "a regular member of a clan or guild (yes/no)."

Among youth who reported ever playing MMOG games in the past 12 months, exposure to violence in gameplay was measured by asking (Windle et al. 2004): "In the last 12 months, when you play massively multiplayer online games, how many show physical fighting, shooting, or killing?" Because only four options were allowed for the response, the item could not be used as a continuous variable (Jamieson 2004). In this case, the measure was dichotomized to reflect youth who said: (a) none/almost none or (b) some versus (c) many or (d) all/almost all.

Externalizing behaviors. Externalizing behaviors were queried in a separate section of the survey, about 15 min apart from the section about violent content in gameplay. All questions referred to the past 12 months.

Aggressive behavior was measured with six different behaviors (Bachman et al. 2001; Dahlberg et al. 2005): (a) shoved or pushed, or hit or slapped another person of your age; (b) threatened to hurt a teacher; (c) been in a fight in which someone including yourself was hit; (d) gotten into a fight where a group of your friends were against another group of people; (e) excluded someone from your group; or (6) spread a rumor about someone. The items were interrelated among MMOG players; Wave 2: $\alpha = 0.79$; Wave 3: $\alpha = 0.78$.

Delinquent behavior was operationalized as behaviors that are consistent with the DSM-IV definition of conduct disorder (American Psychiatric Association 2000; Finkelhor et al. 2000; Wolak et al. 2006): (a) banged up or damaged something that did not belong to you; (b) started a fire on purpose, where you wanted something to get damaged or destroyed; (c) broken into someone else's house, building, or car; (d) lied to someone to get something that you wanted, to get someone to do you a favor, or to get out of doing something you did not want to do; (e) taken something that was valuable, like shoplifting or using someone else's credit card, when no one was looking; (f) stayed out at night even though you knew your parents would not want you to; (g) run away from home and stayed away overnight; (h) ditched/skipped school; (i) hurt an animal on purpose. The items were interrelated among MMOG players; Wave 2: $\alpha = 0.87$; Wave 3: $\alpha = 0.82$.

Seriously violent behavior was measured with five items (Bachman et al. 2001; Udry 1996) that are consistent with the definition of "violent crime" (Federal Bureau of Investigation 2012): (a) behavior likely resulting in murder (i.e., stabbed or shot someone); (b) aggravated assault (i.e., threatened someone with a weapon [gun, knife, club, etc.] or hurt someone badly enough that they needed to be treated by a doctor or nurse); (c) robbery (i.e., used a knife or gun or some other kind of weapon like a bat to get something from someone else); and (d) sexual assault (i.e., kissed, touched, or done anything sexual with another person when that person did not want you to). Acceptable internal consistency was noted among MMOG players; Wave 2: $\alpha = 0.95$; Wave 3: $\alpha = 0.90$.

Gameplay

Youth were asked whether they had played a video or computer game in the past year, the average number of days they played games per week (Range 0–7), and the average number of hours they played games per day (Range 0–3+ hours). Among MMOG players, answers were interrelated; Wave 2: $\alpha = 0.66$; Wave 3: $\alpha = 0.68$. As such, a factor score was estimated for each wave, reflecting a general intensity of gameplay for the year; Wave 2: Eigenvalue = 1.54, factor loadings range from 0.48 to 0.87; Wave 3: Eigenvalue = 1.57, factor loadings range from 0.50 to 0.83.

Data cleaning

Data were weighted statistically to reflect the population of adults with children aged 10 to 15 years in the US based upon adult age, sex, race/ethnicity, region, education, household income, and child age and sex (Bureau of Labor Statistics, Bureau of the Census 2006). Adults were the weighting target as they were the participants initially recruited into the sample. Survey sampling weights also adjusted for adult respondents' self-selection into the HPOL as well as differential participation of survey respondents over time (Schonlau et al. 2004). HPOL data are comparable to data that have been obtained from random telephone samples of adult populations once appropriately weighted (Schonlau et al. 2004). Accordingly, the demographic characteristics of both Growing up with Media adult (Ybarra and Mitchell 2008) and youth participants (Ybarra et al. under review) were statistically similar to those of the US population.

"Do not want to answer" responses were imputed using the "impute" command in Stata (StataCorp 2009). To reduce the likelihood of imputing truly nonresponsive answers, participants were required to have valid data for at least 80 % of the survey. Nine respondents from Wave 2 and 7 respondents from Wave 3 did not meet this criterion and were dropped.

Data cleaning indicated that Wave 1 respondents included a handful of youth who were one year outside of the eligible age range (9 or 16 years of age). To maximize the amount of data—and because caregivers did not know the eligibility criteria and therefore were unlikely to have misreported their child's age purposefully—these youth are included in the analyses.

Data analyses

First, aggression, delinquency, and seriously violent behaviors were individually tabulated by amount of self-reported exposure to in-game violence depicted in MMOGs and clan membership. Distributions across categories were tested for statistically significant difference using a design-based F, which is a Chi square test adjusted for the survey weights. Next, a sum score was created to reflect the total number and frequency of each externalizing behavior. This summation was chosen instead of factor score to allow for easier replication by future studies. Because counts were highly skewed and indicated overdispersion (i.e., the variance was greater than the mean), we used negative binomial regression to examine combined effects of violent gameplay and clan membership. A marginal model with generalized estimating equations (GEE) was used to estimate the population-average incident rate ratio (IRR) of each externalizing behavior as a function of concurrent exposure to in-game violent content during the same 24-month observation period. Marginal models treat time as a within-unit factor and cluster on the individual to account for clustering in the data within person over time. An exchangeable correlation was assumed, and robust standard errors were estimated. The resulting IRRs reflect the average relative rate of each externalizing behavior in the population given the amount of in-game violence depicted (i.e., many and almost all/all versus some and almost none/none). Next, clan membership was added to the models to observe its influence on the association between violent content and externalizing behaviors. If the odds ratios were attenuated by at least 10 % with the inclusion of clan membership, we concluded that clan membership was a confounder, having a positive influence on reducing the odds of externalizing behavior for these youth. Both models were adjusted for the amount of gameplay, self-reported honesty in answering the survey questions, whether the respondent was alone or with others when completing the survey, and time (i.e., survey wave). Youth sex was examined as an effect modifier on violent content. Models were subsequently stratified by sex if the interaction term appeared influential in contributing to the regression model.

Results

Twenty-nine percent ($n = 486$ youth, 665 observations) of Growing up with Media respondents at either Wave 2 and/or 3 reported playing MMOGs in the past year. MMOG players were significantly more likely than non-players to be male, 73 versus 45 % ($p < 0.001$). Differences by race were not apparent, however: 77 % of players versus 72 % of non-players were white ($p = 0.18$).

Among male players, those who played MMOGs were older than non-players of MMOGs (Table 2). Among female players, MMOG players appeared remarkably similar to non-players of MMOGs. White players and non-players were similar except for sex: Among White youth,

Table 2 Comparison of youth demographic characteristics by clan membership among respondents in the 2007–2008 Growing up with Media study conducted in the United States

Youth characteristics	Males (n = 1,186)			Females (n = 1,159)			White (n = 1,752)			Non-White (n = 593)		
	Does not play MMOGs 60.3 % (723)	Plays MMOGs 39.7 % (463)	p-value	Does not play MMOGs 83.2 % (957)	Plays MMOGs 16.8 % (202)	p-value	Does not play MMOGs 69.8 % (1,258)	Plays MMOGs 30.2 % (494)	p-value	Does not play MMOGs 74.9 % (422)	Plays MMOGs 25.2 % (171)	p-value
Age [M (SE)]	14.09 (0.12)	14.5 (0.13)	0.03	14.2 (0.10)	14.05 (0.21)	0.51	14.11 (0.09)	14.35 (0.14)	0.16	14.3 (0.14)	14.5 (0.19)	0.37
Male % (n)	NA	NA		NA	NA		44.4 % (533)	72.8 % (345)	<0.001	45.7 % (190)	71.5 % (118)	0.001
White % (n)	71.9 % (533)	77.6 % (345)	0.23	72.9 % (725)	76.4 % (149)	0.55	NA	NA		NA	NA	
Hispanic % (n)	18.2 % (93)	15.2 % (59)	0.49	14.0 % (104)	16.0 % (25)	0.69	9.7 % (95)	9.6 % (38)	0.96	32.0 % (102)	35.1 % (46)	0.69
Low Income (<$35,000) % ($n$)	18.6 % (155)	18.4 % (82)	0.97	27.7 % (194)	22.0 % (38)	0.35	23.1 % (238)	20.4 % (92)	0.52	25.0 % (111)	16.1 % (28)	0.14

MMOGs massively multiplayer online games, *NA* not applicable

73 % of MMOG players were male as compared to 44 % of non-players. Similar patterns were noted between non-White players and non-players.

Are youth who are in clans less likely to also report externalizing behaviors?

Twenty-six percent of youth who played MMOGs in the past year were also in clans. Overall, rates of aggressive behaviors, IRR: 1.59, 95 % CI [1.11, 2.26], and delinquent behaviors, IRR: 1.44, 95 % CI [0.99, 2.08], were significantly higher among MMOG players who were in clans versus MMOG players who were not in clans. Borderline significant findings were noted for rates of seriously violent behavior, IRR: 2.10, 95 % CI [0.83, 5.31].

The amount of self-reported exposure to in-game violence depicted differed by clan membership (see Fig. 1; $p < 0.001$): Compared to 39 % of MMOG players in clans, 14 % of MMOG players not in clans said that almost all/all of the MMOGs they played depicted in-game violence. On the other hand, 7 % of clan members said that almost none/none of the MMOGs they played depicted in-game violence, compared to 30 % of non-clan MMOG players. Indeed, youth in clans were 52 %, OR: 1.52, 95 % CI [1.18, 1.97], more likely to report that many or almost all/all versus some or almost none/none of the MMOGs they played depicted in-game violence.

Hereafter, we will refer to MMOG-playing youth as:

- NV/NC for players who said that almost none/none or some of the MMOGs they played depicted in-game violence and were not in clans;
- V/NC for players who said that many or almost all/all of the MMOGs they played depicted violence and were not in clans;
- NV/C for players who said that almost none/none or some of the MMOGs they played depicted violence and were in clans; and
- V/C for players who said that many or almost all/all of the MMOGs they played depicted in-game violence and were in clans.

Do in-game depictions of violence moderate the relation between clans and externalizing behaviors?

As shown in Table 3, the frequency with which almost all of the aggressive behaviors examined were reported differed significantly based upon clan membership and the amount of MMOGs played that depicted in-game violence. For example, compared to 20 % of NV/NC youth, 43 % of V/NC youth, 31 % of NV/C youth, and 54 % V/C youth reported shoving, pushing, hitting, or slapping someone in the past year ($p = 0.001$).

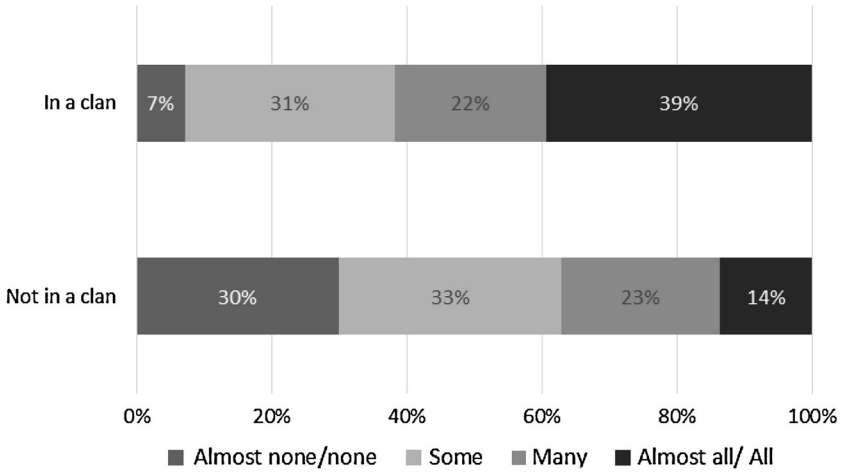

Fig. 1 Self-reported amount of massively multiplayer online games played that depict in-game violence among respondents who played massively multiplayer online games in the 2007–2008 Growing up with Media study conducted in the United States ($n = 665$ observations)

About one-third of the delinquent behaviors examined also significantly varied in frequency based upon clan membership and the amount of MMOGs played that depicted in-game violence. For example, 12 % of the NV/NC group reported damaging someone else's property in the past year, compared to 24 % of the V/NC, 18 % of NV/C, and 33 % of V/C ($p = 0.04$).

One of the five seriously violent behaviors assessed, threatening someone with a weapon, differed significantly by the amount of MMOGs played with in-game violence depicted and clan membership. Other behaviors varied in prevalence rates across the four groups, but not significantly so.

Does clan membership attenuate any observed association between violent game content and externalizing behavior?

The interaction term of "sex" and "amount of exposure to in-game violent content" contributed to the regression models for aggression ($p = 0.14$) and delinquent behavior ($p = 0.09$) but not for seriously violent behavior ($p = 0.52$). For consistency in reporting the results, all three models were stratified by sex.

As shown in Table 4, clan membership attenuated the relation between the amount of MMOGs played that depicted in-game violence and aggressive behavior for females by 16 %, falling from IRR = 2.42 to 2.04 ($p = 0.07$). The relation between seriously violent behavior and the amount of MMOGs played that depicted in-game violence also diminished, a 10 % change in IRR = 4.90–4.40 ($p = 0.22$). Less magnitude of change was noted for delinquent behavior, a 7 % change of IRR = 3.75–3.50 ($p < 0.001$). For male players, clan membership appeared to have little impact (<2 % change) on the relation between the amount of MMOGs played that depicted in-game violence and externalizing behaviors. In all cases, the rate ratio predicting externalizing behavior given the amount of MMOGs played with in-game violence depicted was higher for females than for males, even after adjusting for clan membership and general amount of time spent playing games.

Discussion

Because of the prosocial benefits noted for members of guilds and clans (Steinkuehler and Williams 2006; Williams et al. 2006), we posited that clan membership would buffer youth from influences that in-game violent content may have on behavior in this national survey of MMOG players 11 to 18 years of age. This hypothesis is not well supported by the data however. Clan membership is neither associated with lower rates of externalizing behaviors for youth, nor does it affect the likelihood of reporting externalizing behaviors among male players. There is some suggestion that clan membership may attenuate the concurrent association between in-game violent content and aggressive and seriously violent behavior for females. Although these data are cross-sectional, precluding temporal inferences, several possible explanations arise, including that: the content has a greater impact on female behavior; the content is more memorable for females; or aggressive and violent females are drawn to MMOGs that depict in-game violence.

It is possible that our definition of "violent" affected the results. Exposure was defined as "fighting, shooting, and killing" in games. Other types of violence, such as "gags" shown in cartoon-based games, and behaviors that reflect aggression or violence but do not specifically involve fighting, shooting, or killing would not necessarily meet this definition. Anecdotally, the vast majority of MMOGs depict aspects of physical fighting, destruction, and killing. Given that only half of players indicated that at least some

Table 3 A comparison of externalizing behaviors based upon clan membership and violent game playing among respondents who played massively multiplayer online games in the 2007–2008 Growing up with Media study conducted in the United States ($n = 665$ observations)

Type of externalizing behavior	Not in a clan ($n = 493$)		In a clan ($n = 172$)		p-value
	MMOG-playing youth who played some or fewer games depicting violence and were not in clans (NV/NC) ($n = 323$)	MMOG-playing youth who played many or greater games depicting violence and were not in clans (V/NC) ($n = 170$)	MMOG-playing youth who played some or fewer games depicting violence and were in clans (NV/C) ($n = 68$)	MMOG-playing youth who played many or greater games depicting violence and were in clans (V/C) ($n = 104$)	
Aggressive behavior					
Spread rumors	23.1 % (80)	25.3 % (50)	20.5 % (13)	51.5 % (36)	0.005
Shoved, pushed, hit, slapped someone	20.1 % (72)	42.8 % (75)	31.1 % (22)	53.6 % (49)	0.001
Social exclusion	*20.0 % (72)*	*34.2 % (64)*	*21.3 % (18)*	*33.6 % (25)*	*0.091*
Been in a fight	19.5 % (68)	46.3 % (62)	24.8 % (18)	29.8 % (31)	0.003
Been in a group fight	7.6 % (28)	21.0 % (24)	7.4 % (6)	19.0 % (17)	0.048
Threatened to hurt a teacher	0.1 % (1)	2.8 % (6)	3.0 % (4)	5.9 % (6)	0.019
Delinquency					
Lied to get something	36.6 % (127)	54.1 % (90)	29.9 % (25)	60.6 % (55)	0.008
Stayed out over night	21.1 % (68)	32.9 % (54)	22.0 % (14)	37.0 % (30)	0.213
Damaged someone else's property	12.0 % (53)	23.6 % (42)	18.0 % (10)	32.7 % (29)	0.042
Ditched school	*8.6 % (37)*	*25.0 % (34)*	*17.6 % (8)*	*23.6 % (19)*	*0.052*
Shoplifted	4.8 % (18)	11.3 % (21)	6.6 % (4)	8.9 % (7)	0.36
Ran away from home	2.3 % (12)	6.7 % (14)	1.2 % (2)	8.1 % (7)	0.105
Purposely hurt an animal	1.0 % (5)	1.5 % (8)	1.2 % (2)	3.5 % (4)	0.336
Purposely started a fire	*0.8 % (5)*	*5.9 % (13)*	*1.2 % (2)*	*4.6 % (5)*	*0.071*
Broke into someone else's house, car	0.1 % (2)	7.1 % (11)	1.2 % (2)	12.7 % (8)	0.001
Seriously violent behavior					
Forced kissing, sexual touching or other sexual interactions	2.3 % (6)	5.8 % (11)	2.0 % (3)	4.6 % (4)	0.479
Hurt someone badly enough to need medical attention	2.1 % (7)	2.3 % (8)	1.9 % (3)	3.3 % (3)	0.906
Stabbed or shot someone	0.8 % (3)	0.6 % (5)	1.2 % (2)	3.5 % (4)	0.131
Aggravated robbery	*0.7 % (5)*	*3.1 % (7)*	*2.5 % (3)*	*5.9 % (6)*	*0.09*
Threatened someone with a weapon	0.6 % (5)	5.4 % (9)	2.5 % (3)	6.4 % (8)	0.028

p-value reflects the Chi square statistic testing significant difference in distribution across the four categories of youth. Italics denotes borderline significance ($p \leq 0.10$)

of the MMOGs they play depict in-game violence, it may be that some youth interpreted the question differently than intended. It also is possible that youth who are more aggressive attend to the violent components of games more than those who are not, thereby introducing measurement bias into the classification of youth based upon their self-reported exposure to violence in games. Future research with more nuanced measures of MMOG play, clan membership, and exposure to violence in the MMOG could build upon and improve the sensitivity of the findings in the current study.

Our data cannot speak to causality. It may be that MMOG-playing youth who are more likely to engage in externalizing behaviors are also more likely to be in clans compared to MMOG-playing youth who are not in clans. Results of the current study do not appear to support the hypothesis that clan membership attenuates externalizing behaviors for players of MMOGs, whether or not they

Table 4 Impact of clan membership on association between violence in gameplay and externalizing behaviors within male and female respondents who played massively multiplayer online games in the 2007–2008 Growing up with Media study conducted in the United States

Subgroup of youth	Type of externalizing behavior	Statistical comparisons[a]			
		Model 1: Unadjusted IRR predicting externalizing behavior given exposure to content depicting in-game violence or not		Model 2: IRR adjusted for clan membership	
		IRR (95 % CI)	*p*-value	IRR (95 % CI)	*p*-value
Males ($n = 463$)					
	Aggressive behavior	1.59 (1.12, 2.27)	0.009	1.57 (1.10, 2.24)	0.013
	Delinquent behavior	1.83 (1.31, 2.54)	<0.001	1.80 (1.29, 2.51)	0.001
	Seriously violent behavior	*2.75 (0.90, 8.37)*	*0.075*	*2.72 (0.90, 8.23)*	*0.076*
Females ($n = 202$)					
	Aggressive behavior	2.42 (1.23, 4.77)	0.011	2.04 (0.95, 4.39)	*0.066*
	Delinquent behavior	3.75 (2.17, 6.48)	<0.001	3.50 (1.84, 6.67)	<0.001
	Seriously violent behavior	*4.90 (0.81, 29.72)*	*0.084*	4.40 (0.42, 45.71)	0.215

Italics denotes borderline significance ($p < 0.10$)

[a] 12 different models are shown: three different behaviors, 2 models, for males and females each IRR, incident rate ratio. Both Model 1 and 2 are additionally adjusted for general time spent playing games, self-reported honesty in answering the survey questions, whether the respondent was alone or with others when completing the survey, and survey wave

depict in-game violence. Peer reinforcement of pro-aggressive behaviors can lead to an individual's positive appraisal of aggressive behavior, which may then be integrated as a cognitive schema used to guide future behavior (Wood and Alleyne 2010). Perhaps then, both prosocial benefits and externalizing behaviors are being simultaneously reinforced by clans and guilds. While admittedly a different group of youth, violent youth gangs are notable for high levels of social capital (Morrow 1999; Portes 1998). It may be that a similar dynamic occurs in clans: Social capital is fostered, while delinquent and aggressive behavior is reinforced or, at the very least, not negated. It also is possible that youth who engage in externalizing behaviors are attracted to clans for the broader support and validation they may provide for aggressive and delinquent behavior. Alternatively, it may be that age is a factor: Previous research has focused on adult players (Snodgrass et al. 2011; Williams et al. 2006). Perhaps younger players are less able to filter out or ignore the influence that in-game violence has on their emotions compared to adults, whose behaviors are less malleable.

Our aim is not to vilify gameplay or clans. As with internet-facilitated communication more generally (Kuntsche et al. 2009), it is possible that playing games in clans facilitates peer relationships in a positive manner even if they do not attenuate the relation with externalizing behavior. More research is needed to examine this hypothesis.

Because the focus of the current investigation was on clans, it should also be noted that other factors outside the scope of the current investigation may explain the observed cross-sectional relations between in-game depictions of violence and externalizing behaviors, or between clan membership and externalizing behaviors. Possible factors include, but are not limited to: substance use, poor parent–child relationships, child abuse, and even the average amount of sleep a child gets each night (Office of the Surgeon General 2002; Nuutinen et al. 2014). Furthermore, given our interest in the influence of clans on externalizing behavior, we excluded youth who were not MMOG players. It is possible that other types of games and game components may encourage social interaction, support the development of social capital, or reinforce other positive behaviors that may buffer the influence of in-game depictions of violence in other ways or in other game player populations.

Additionally, the data in this paper are based upon self-reports of socially undesirable behaviors. It is possible that youth under- or overreported their exposures or behaviors. Results may have been different if parents or other reporters had provided the assessments of externalizing behaviors. However, previous research suggests that self-reported aggression is similar to observer reports (Espelage et al. 2003) and efforts were made to minimize data quality issues resulting from self-report in the current study (e.g., computer-based versus face-to-face data collection).

Future directions

Members of clans play different classes of characters that fulfill specific jobs in their group. Examples include healer, tank, and DPS (damage per second). The role that an individual plays in their clan may have implications for the relation between in-game violence and externalizing behaviors. For example, although a healer and a tank will both be exposed to violence in the game, the tank engages in more violence (for the most part). This nuance is an important area for future research to explore.

Importantly, too, there are arguably at least two different types of violence in MMOGs: One type is directed at non-human opponents and is depicted as a type of heroism. For example, the player qua hero may have a quest to save someone's life or free someone from danger and encounter computer-controlled characters (mobs) that need to be defeated to complete the quest. A second type of violence is directed at other human players [player versus player (PvP)]. Different MMOGs and their various servers allow diverse levels of confrontation between players. In some cases, PvP can take the form of in-game bullying. Whether and how this second type of in-game violence may relate to externalizing behaviors in face-to-face spaces is an interesting and heretofore understudied inquiry that warrants future research attention.

Conclusion

While the current study is preliminary, it provides an important base from which future research may extend the inquiry about the roles that clans and other social components of games may play in moderating face-to-face behavior among youth. Clans do not appear to protect MMOG-playing youth—particularly male players—against possible influences that in-game depictions of violent content may have on externalizing behavior. Findings need to be replicated. Nonetheless, it seems useful for health professionals and other adults who interact with youth—particularly those who play MMOGs that depict in-game violence and/or in clans—to discuss their gaming experiences and help them interpret which behaviors are translatable to the real world and which are not.

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