It's Doubled Edged: The Positive and Negative Relationships between the Development of Moral Reasoning and Video Game Play among Adolescents

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8 **Abstract**

9 Due to the concerns over the effects of video game play, this study investigated adolescents' moral
10 development and their video game play. 166 adolescents aged 11-18 years ($M = 13.08$ $SD = 1.91$)
11 attending an English school completed an online survey, which included a measure of moral
12 development and questions regarding video game play. In contrast to previous research, male
13 participants were found to have significantly ($p = 0.02$) higher moral reasoning scores than females.
14 The results also suggested a transition in moral development, which takes place between the ages of
15 12–14. The results of moral development and video game played suggested both positive and
16 negative relationships. Regression analysis suggested that there was a significant positive relationship
17 between the more types of game genres played and higher moral scores. Although not significant, the
18 results suggested trend for the following variables; years playing video games, mature content,
19 engagement, moral narrative, Grand Theft Auto, Call of Duty, and length of time playing video
20 games had a negative relationship with moral scores. The implications of these results are discussed
21 with regards to moral education and the variables involved in video game play including the role
22 content of video games.

1 Introduction

24 Playing video games is a popular pastime, with 26% of under 18 years olds playing video games and
25 the video games industry worth a total of $23.5 billion (statistics from the USA) (ESA, 2016).
26 Research on video games began, in part, due to violent content increasingly being used and the
27 increasing popularity of video games. As a result concerns regarding the consequences of exposure to
28 violent content, such as associated aggression following playing with violent games (APA, 2015).
29 The media in the 1990s started to portray video games as a threat due to vulnerable children and
30 adolescents having access to and playing early video games (McKernan, 2013). The frequent use of
31 excessive violence in video games has become controversial and as such became the focus of
32 research for the next 20 years. However, recent research has started to examine the positive potential
33 influences and relationships that video games may have, such as skill acquisition (Boyle et al., 2016).
34

35   Gibbs et al. (1992) developed the Sociomoral Reflection Measure (SRM) to measure moral
36   development based upon Kohlberg's stage theory (Kohlberg, 1976). This measure of morality
37   categorises moral reasoning into stages of development. The first two stages transferred well from
38   Kohlberg's theory into four measurable stages of development (see table 1). However changes were
39   made during the development of the SRM, as the last two stages did not transfer well from
40   Kohlberg's theory and were dropped. Thus the stages range from stage 1 to stage 4 (see Table 1).
41   Gibbs et al. (1992) also changed the name of the levels to mature and immature (known as Moral
42   type A, henceforth Moral A) rather than Kohlberg's label, conventional level. In addition another
43   type of reasoning was proposed by Gibbs et al. (1992) known as Moral type B (henceforth Moral B).
44   Moral B reflects a different type of moral reasoning. All participants will have a Moral A score (an
45   average stage of development); however some will also have a Type B. Moral B reasoning suggests
46   an expression of moral principles, as opposed to Moral A which suggests an embedding of the ethical
47   principles from social conventions.
48
49   Moral B is described as more prescriptive and internal with an awareness of what ought to be (Gibbs
50   et al., 1992). Moral B consists of three components; Balancing, Fundamental Valuing and
51   Conscience. Balancing is shown by individuals recognising their own as well as others view points
52   for example 'treating others how you would like to be treated'. Fundamental Valuing was shown by
53   individuals understanding the intrinsic value of concepts such as promises and life. Conscience was
54   shown by individuals having an awareness of how they would feel about their actions, for example
55   feeling guilty. To have the additional Moral type B, responses had to make reference to at least two
56   of the three moral B components. Moral B components start from transition stage 2/3 to 4. Table 1
57   shows the average stage of development for the age groups (Gibbs et al. 1992).
58
59   Table 1. Adaptive *SRM norms of Moral A from Gibbs, Basinger and Fuller (1992)*
60
61   Examples of what could be considered amoral behaviour can occur when playing video games such
62   as Grand Theft Auto (GTA) (Rockstar, 1997- 2015) due to interacting with content such as nudity,
63   prostitution, guns, drug dealing and driving recklessly. Due to this the Entertainment Software Rating
64   Board (ESRB, 2015) and Pan European Game Information (PEGI, 2015) were created to oversee
65   and label content to support players in their decisions to buy and play games (Kent, 2001). These are
66   also useful resources for understanding content in video games due to the breadth of detail available.
67   (Thomas, 2006) argues that it is important to consider the role of morality in video games; the act of
68   doing and having the control to do something in a virtual world and the consequences of those
69   actions are different to merely observing them when watching a film. Virtual environments can
70   simulate real or fictional worlds; these worlds can offer many levels of social interaction and
71   Artificial Intelligence with increasing complexity. Additionally many games contain moral
72   narratives, that presents the player with moral choices such as BioShock 1 and 2 (2K-Games, 2007-
73   2013), where the player decides to "Harvest" (Kill) or "Rescue" (Save) genetically altered female
74   children.
75
76   Different measures have been used to define an individual's video game habits and include
77   experience and exposure to video games, this includes length of time playing video games (Gentile
78   et al., 2011). Many studies have also included favourite games (Bajovic, 2012). However previous
79   research has tended to focus on a limited number of game play variables. The present study aimed to
80   address this issue by collecting multiple measures. Engagement is a particularly important element of
81   video game play and consists of many components including: immersion, presence, flow,
82   psychological absorption and dissociation (Brockmyer et al., 2009). Engagement is used as a general
83   term to indicate the level of game involvement; however these components have been criticised for

84   using different definitions. Brockmyer et al. (2009) developed the Game Engagement Questionnaire
85   (GEQ) to combine these components in a measure. Engagement is important to measure as it is a
86   core experience for an individual when playing video games; thus including this variable would be
87   helpful in understanding the video game experience. Moreover engagement may connect to morality
88   and has not been previously researched.
89

90   Most research on the psychological effects of video games has investigated violent content therefore
91   much of the research on morality has been limited to focusing on violent video games. Hartmann and
92   Vorderer (2010) examined whether moral disengagement could explain enjoyment of violent content.
93   Moral disengagement is the selective disassociation of behaviour that violates an individual's moral
94   codes (Bandura et al., 1996). The results suggested that the more familiar with the game used in the
95   experiment, the less negative affect and guilt was reported but the greater the enjoyment (Hartmann
96   and Vorderer, 2010).
97

98   Joeckel et al. (2012) examined moral decisions in video games using the Moral Foundations
99   Questionnaire (MFQ) (Graham et al., 2008). The authors found that increased moral salience in the
100   video game was associated with decreased moral violations made. This was replicated in a similar
101   study by Joeckel et al. (2013), with the additional finding that enjoyment did not influence moral
102   salience. Similarly research by Weaver and Lewis (2012) found that decisions made when playing
103   Fallout 3 (Bethesda-Softworks, 2008) a Role Playing Game (RPG) with a moral narrative, were
104   similar to real life decisions made on the MFQ. Furthermore Boyan et al. (2015) examined the
105   relationships between the MFQ and the decisions made in video games from the Mass Effect series
106   (Bio-ware, 2007-2012). Participants were gathered from an online forum focused on discussing Mass
107   Effect. The results suggested that only Fairness/Reciprocity, Purity/Sanctity and Harm/Care
108   foundations were correlated with the decisions made in the video games and only care predicted
109   moral decisions. In addition Triberti et al. (2015) found participants' had a preference for moral
110   positioning in video games; some would prefer to play as evil characters and some as good
111   characters.
112

113   Grizzard et al. (2014) using a 2x2 design, examined whether behaving immorally in a video game
114   was related to feelings of guilt and moral salience. Participants were either assigned to a memory
115   recall task (either guilt memory or ordinary memory) or a video game which included either a non-
116   guilt inducing level (playing as a terrorist soldier) or a non-guilt inducing level (playing as a United
117   Nations soldier). Following participation in the assigned condition, the MFQ and measure of guilt
118   were also completed. The results suggested participants playing as terrorists felt significantly more
119   guilt than those who played as UN soldiers. This correlated significantly with the MFQ foundations
120   of Harm/Care and Fairness/Reciprocity, but not with loyalty, or authority. The authors argued that
121   this was to be expected, however given that authority was a theme, as the participants played as a
122   soldiers it would have been interesting to have a non-soldier condition to understand the role of
123   authority. The authors suggest that antisocial behaviour in video games could relate to prosocial
124   outcomes as the participants who violate the module could become more morally sensitive due to
125   levels guilt. However if the module is being activated and stimulated this does not necessarily lead to
126   a change in behaviour. For example, whether increased guilt would lead players to stop killing
127   innocent characters in the game cannot be assessed here, as this behaviour was not measured. There
128   was also a female sex bias in the sample (71% female); this could have been reflected in the results
129   especially the sex difference in game play (APA, 2015; Ferguson et al., 2015). Plus participants'
130   previous video game play and experience was unclear and this has been suggested to influence results
131   (Hartmann and Vorderer, 2010; Gollwitzer and Melzer, 2012).
132

133   Bajovic (2012) examined if playing violent video games is related to moral reasoning and attitude
134   towards violence with eighth grade students (UK year 9 aged 13-14). Bajovic (2012) used the
135   Sociomoral Reflect Measure-Short Form (SRM-SF) to measure morality. Much of the previous
136   research has examined short-term post game effects, i.e. moral decisions made in the game (Grizzard
137   et al., 2014), whereas the SRM-SF can measure the development of moral reasoning. Participants
138   were categorised into the violent group by meeting the following criteria: playing 1-3 hours every
139   day, one violent game included as a favourite, and the declaration that they played and enjoy violent
140   games. The only variable to correlate negatively with moral scores was the length of time playing
141   violent video games. There were no significant differences between the violent and nonviolent group
142   on moral scores. A sex difference was noted in that females spent less time playing video games and
143   played less violent games than males (Bajovic, 2012).
144
145   Much of the literature has focused on violent content and in-game decisions; but it is important to
146   consider other content in video games, such as mature content, to understand the potential
147   relationship between morality and exposure to a variety of video game content. A recent model of
148   media consumption and morality, suggest that the long term components of how media is received
149   and appraised, relates to individuals' selection of media, in this case their video game play
150   (Tamborini, 2011; 2012). Obtaining many video game play variables would also allow differences in
151   game play experiences to be examined e.g. violent and non-violent games, as well as to control for
152   moral/immoral content and differences of experience (and to some extent expertise). As noted by the
153   American Psychological Association there is a need for research focussed specifically on adolescents
154   (APA, 2015) , as this group make up around a third of gamers (ESA, 2015; 2016). Consequently the
155   predictive relationship of moral development and video game play is unclear; this study aims to
156   address these gaps by exploring the influences of both playing violent and non-violent video games
157   and as well as self-reported video game play on moral reasoning in adolescents (Hodge, 2018).

158   **2   Materials and Methods**

159   **2.1   Participants**

160   Ethical approval was obtained from Bournemouth University, Science, Technology & Health
161   Research Ethics Panel, and the study was carried out within accordance with the recommendations of
162   Bournemouth University's Research Ethics Code of Practice. All participants gave written informed
163   consent in accordance with the Declaration of Helsinki, with written informed consent obtained from
164   parents/guardians for all participants under the age of 16. A total of 166 participants took part in the
165   study, consisting of secondary and sixth form students from UK school years 7 to 13 (age range 11-
166   18 $M = 13.08$ $SD = 1.91$). There were similar number of males and females (Male 47% Female 53%),
167   36.1% of the sample entitled to free school[1] meals. Free school meals (FSM) was taken as measure of
168   Social Economical Status (SES). The majority of the sample had a White Scottish, Irish English or
169   other background 94.0%. One local secondary school was used in the study which included a sixth
170   form.

171   **2.2   Procedure**

172   An online survey tool (Surveymonkey) was used to create an online survey for administration to
173   participants. The survey was piloted to three secondary school pupils before the main administration.

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[1] 42.1% of all pupils were eligible for FSM, which is higher than the national average of 28.5% Ofsted (2015). *School Data Dashboard* [Online]. Available: http://dashboard.ofsted.gov.uk/ [Accessed August 2015].

174   The survey took around 40 minutes to complete and was administered during lessons. The researcher
175   delivered a 10 minute presentation to brief students about the research and how to take part in the
176   survey, followed by general information about how students should complete the survey individually.
177   The instructions for the SRM were read aloud with a fictional example used to aid understanding.
178   Finally the first question of the SRM was read aloud for the participants to think about to illustrate
179   that this is the part that required decision making. If the participants were happy they wrote their full
180   name at the start of the survey to consent. The researcher walked around the classroom while the
181   students completed the survey to make sure students taking part could access the link and to offer
182   help where needed. Gibbs et al (1992) state that when the measure is administered it is helpful to
183   prompt participants to think about why they think the question is important or not, to support scorable
184   answers. The survey was composed of the following three questionnaires.

185   **2.3   Measures**

186   **2.3.1 Sociomoral Reflection Measure–Short Form (SRM-SF)**

187   This measure was chosen for the present study as it is applicable for use with, a wide age range.
188   Additionally the SRM is not time consuming for administration (completed in about 25 minutes for
189   participants aged 12 years and older). This is less time consuming compared to other similar
190   measures of morality that require moral decisions and evaluation to be made, such as the Moral
191   Judgment interview, which can take over an hour (Colby and Kohlberg, 1987; Gibbs et al., 1992). It
192   also allowed for an individual's in-depth moral reasoning without the restrictive responses of a tick
193   box. The measure has been used previously in a similar study (Bajovic, 2012; 2013). The measure
194   required participants to type answers for 11 questions covering five moral themes (Gibbs, Basinger
195   and Fuller, 1992). SRM has good concurrent validity, r =.69 and test retest reliability r = .88 (Gibbs
196   et al., 1992).

197   **2.3.2 Video game play**

198   Video game play was developed and adapted from previous research, into a questionnaire to include
199   a greater range of response options for game play, than has been used in previous research including
200   number of favorite games (Bajovic, 2013). Questions included: favorite games (up to five), number
201   of years playing video games, length of time per week playing video games and number of genres
202   played. The following content variables were extracted from the favorite games listed: Playing Grand
203   Theft Auto (GTA) (Rockstar, 1997- 2015) and Call of Duty (COD) (Activision, 2005-2015), Violent,
204   Mature, Moral narrative and Content Rating (mean ESRB and PEGI rating of favorite games; see
205   Table 7, Appendix A). Table 4 shows a sex difference for the categorical game play variables. Chi-
206   Squared analysis suggest a significant sex difference for Violent content, Mature content, GTA,
207   COD, Moral narrative (p > 0.001), and gaming status (p > 0.01). Males were between 7 to16 times
208   more likely to have to these variables in their game play.
209
210   **2.3.3 Game Engagement Questionnaire (GEQ)**

211   This measure consisted of 19 questions regarding how the participant usually feels when playing a
212   video game and a score is given to represent the level of engagement (Yes = 2 Maybe = 1 and No =
213   0). The maximum score on the measure is 38 α = .85 (Brockmyer et al., 2009).

214   **2.4   Data**

215   Participants' responses for each question were categorised into a stage of development and moral
216   type, A or B. The eleven questions are split by themes: questions 1 to 4 Contract and Truth; questions
217   5 and 6 Affiliation (related to helping family and friends); questions, 7 and 8 Life questions, 9 and 10

218 Property and Law and finally question 11, Legal Justice. There are four stages of development (1-4)
219 with three transitional stages in between each stage. A response is scored by matching the response
220 to the appropriate Criterion Justification (CJ). The CJ are responses grouped by moral concepts, such
221 as; empathic role taking, intrapersonal approval and prosocial intentions and include sample
222 responses listed below to assist matching; for example "you may become friends" (Gibbs et al., 1992,
223 p71). The authors argue that the language used to represent moral reasoning changes with
224 development. For example reasoning starts with absolute notions like 'this will happen' and later
225 change to a more relative notion like 'this could happen'. Transition stages represented participants
226 starting to develop into the next stage but not fully and still have lower reasoning; for example
227 understanding other behaviour (empathic role-taking) but still pragmatic regarding the consequences
228 (advantages). More mature reasoning will start to understand societal implications of actions. Moral
229 B components exist within some of the Moral A CJs. Once the response had been matched to a CJ
230 the highest stage was used and a score was derived by calculating the mean of the highest stage from
231 the eleven questions. This gave an average score of development ranging from 1-4. This score could
232 then be matched to a stage (known as a global stage). It should be noted that not all responses could
233 yield a score and were unscorable, such as if the responses were not moral or contained tautologies[2].

234 3 Results

235 This study aims to examine the relationships between moral development, video game play and
236 moral scores (SRM) (Hodge et al., 2015).

237 3.1 Moral development

238 Table 2 shows the SRM stages of the sample. The majority of the sample (67.8%) had immature
239 morality and were in stage 2. Only 31.6% participants had mature morality (stage 3 and above).

240 Table 2. *The SRM development of the sample*
241
242 Figure 1. SRM scores of participant by chronological age. A line graph plotting the SRM scores of
243 moral development and age of adolescents, 11 -18 years old. Adolescents aged 15-18 were grouped
244 together due to low numbers in the sample.
245
246 Figure 1 shows the SRM scores for each of the age groups and suggests that overall moral
247 development is gradual and in the immature. Only the 17 year olds had mature morality into stage
248 three. However 18 year olds were slightly lower and classed as immature but this is likely to be an
249 artefact of the small sample size. There does seem to change between the ages of 12 and 13 years
250 (see Figure 1). A one- way ANOVA[3] supported this $F(4,132) = 7.06$, $p < .001$ $\omega^2 = .16$, small effect
251 .Gabriels[4] post hoc tests in particular show a change between 12 and 14 years ($p = .002$).

252 3.2 Video game play

253 Table 3 shows there is a sex difference for the video game play variables. Note the large SD for
254 length of time and engagement suggests a lot of variance in these variables. Independent t–tests
255 showed a significant sex difference for years playing, number of genres played, Content Rating and

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[2] Thirty-three participants produced unscorable SRM responses

[3] Due to low number in the age groups these groups were merged 15 -18 for ANOVA

[4] This test was chosen as the group sizes were uneven.

256 Length of time ($p < .01$) with medium to large effect sizes but not significant for engagement ($p >$
257 .05).

258 Table 3. *Descriptive statistics for Sex and video game play variables.*

259 **3.3   Moral development and video game play**

260 Table 5 also suggests that males had higher moral scores than females: males reaching a higher
261 developmental Global stage. This difference was significant $t(131)$ 2.34 $p = 0.02$ $r = 0.2$. The
262 findings for gaming status suggested that participants who played games were a Global stage higher
263 than those who do not play video games. However the non-gaming group (N= 9) was small in
264 comparison to the gaming group (N = 124)

265 Table 5. *SRM scores, sex and gaming status.*

266 Table 6 reports the results of the regression to which found that moral type, sex and genre
267 significantly predicted moral scores. Moral type B significantly predicted higher SRM\ scores than
268 type A. Males significantly predicted higher SRM scores than females. Playing more genres of video
269 games significantly predicted higher SRM scores. Although not significant playing violent game had
270 a positive correlation with higher moral scores whereas mature content, years playing video games,
271 engagement, moral narrative, Grand Theft Auto, Call of Duty, and length of time playing video
272 games had a negative relationship and therefore, lower moral scores (See Table 8, Appendix B).

273 Table 6. *Predictors of SRM scores*

274 **4   Discussion**

275 This study examined moral development (SRM scores) and video game play. A significant change in
276 moral development was evident in the sample between the ages of 12 and 14. Additionally, it was
277 found that secondary and sixth form students' moral development is immature and still developing.
278 Interestingly males were found to have higher moral scores than females, in contrast to much
279 previous research which has found that females within this age group have higher levels of moral
280 reasoning (Gibbs et al 1992). Males were found to play video games for longer than females, and
281 also be more likely to play higher rated and more violent video games. In addition a group of
282 adolescents seemed to be playing video games for an excessive length of time. Although the non-
283 gaming group was small the majority of adolescents did play video games, with the following
284 variables; moral type, sex, and video game genre, found to be significant predictors of moral scores
285 in the regression model.

286 **4.1   Implications**

287 As expected moral type was shown to predict moral scores; moral B predicted higher moral scores.
288 The sex difference in video game play that was found could be connected to the sex difference in
289 morality or alternatively other factors could be of influence. The sex differences were similar to those
290 found by Bajovic (2012) in that females played video games in general less and violent games
291 specifically less often than males, which is consistent with previous research (Gentile et al., 2011;
292 Hartmann et al., 2015). Ferguson et al. (2015) found sex differences with adolescent females,
293 showing they experience more stress from video game play than males. In addition to sex difference
294 this demonstrates the importance of gathering more data about video game play and representing
295 both sexes in research. Individuals who play video games should be categorized by how, what and

296 when they play games. For example it could be the difference between comparing casual game use
297 like Candy Crush and a PC or console title like GTA (Rockstar, 1997- 2015); Ferguson (2014) also
298 highlights the importance of this. The prevalence of video game play was further represented by the
299 small number of participants that reported not playing video games (N=9), showing that a high
300 majority of the sample were playing video games, further demonstrating the importance of gathering
301 these data. Conversely, the engagement variable was not significantly different for males and
302 females; this could suggest that the sex difference in video game play could be closing as both were
303 similarly engaged with the game played. Additionally, it could suggest this experience does not differ
304 between the sexes.
305

306 The number of genres of video games played was shown to be a significant predictor of higher SRM
307 moral scores. This suggests that certain aspects of game play could have a positive relationship with
308 moral development such as playing a variety of genres of video games. Furthermore, some gaming
309 variables had negative relationships but none were significant predictors of lower moral scores,
310 including; years playing video games, mature content, engagement, moral narrative, GTA, COD, and
311 length of time playing video games. These non-significant variables could suggest that video game
312 play and content may not have a direct relationship with morality. Nevertheless the finding that males
313 had higher video game play consumption and displayed higher moral scores, suggests that video
314 game play could potentially be supporting of moral development, Khoo (2012) argues that playing
315 video games has the potential for individuals to learn skills such as working in teams and could be a
316 tool to assist in moral education. Khoo (2012) applies Kohlberg's (1971) moral development theory
317 to video games as some games include guilds which require cooperation. The results of this study
318 connect to this as it could be that guilds and community could stimulate higher moral reasoning,
319 transition stage 3 and stage 4 when individuals start to consider societal implications for reasoning
320 (Gibbs et al., 1992). Alternatively, video games tend to reward certain behaviours (Heron and
321 Belford, 2014), which connects to immature reasoning as right and wrong is determined by reward
322 and punishment. Another explanation is that that those with higher moral scores, more mature moral
323 reasoning may also be more proficient at morally disengaging through justification, e.g. it is just a
324 game. This is supported by previous research that found that moral disengagement took place in
325 video game to avoid conflicts with enjoyment of the game and with in-game decision making
326 (Hartmann and Vorderer, 2010; Hartmann 2012). Furthermore, of all the moral disengagement
327 components, moral justification was found to have a very high prevalence in game play (Hartmann et
328 al., 2014). Overall, if video games could be morally stimulating and this is connected to moral
329 development will open many avenues, for future research. For example, if games with a moral
330 narrative activate morality, not only could this be a potential means to get individuals to think about
331 morality in the short term but also activate morality in the long term. Both short term and long term
332 effects of media consumption has been suggested by the Model of Intuitive Morality and Exemplars
333 (Tamborini, 2011). Firstly this could explain the sex difference in moral scores, as games that include
334 a moral narrative were more popular among the males in the sample. Secondly this has implications
335 for how moral development and education for adolescents could be supported.

4.2   Video game content

337 Further research also is needed to examine the trend of violence having a positive relationship with
338 SRM scores and mature content having a negative relationship with SRM scores. This could suggest
339 different types of content have different influences, and perhaps mature content could be of more
340 concern to moral development than violent content. This is interesting as normally games with

341 mature content also contain violent content. Furthermore, violent content was encountered frequently
342 in this study with 68.9%[5] of the sample listing at least one violent game among their favourites.
343 Bajovic (Bajovic, 2012) reported that 86% of participants play violent video games. Kocurek (2012)
344 proposed that violence is a fundamental part of the video game medium. The opposite trend was
345 found in this study with players of violent games having higher moral scores compared to players
346 who only play non-violent titles Bajovic (2012). This is interesting as violent content has been the
347 focus of the media rhetoric on video games, so could it be the case that individuals are desensitised to
348 the violent content and not to the mature content (Carnagey et al., 2007). Additionally this has
349 implications for the other potential content effects of video games and consequently the rating
350 systems (ESRB, 2015; PEGI, 2015).
351
352 The SRM measure has a sub heading of reasoning that includes 'prosocial intentions', research into
353 violent video games and the relationship with prosocial behavior is of current debate (Prot et al.,
354 2014; Ferguson, 2015). Thus it is of note that violent content had a positive relationship with moral
355 scores and mature content had the negative relationship with moral scores. It suggests the potential
356 different effects from types of content such as violent and mature. However due to the non-
357 significant findings in this study more research is needed to support this. This is particularly since
358 the adolescents in the study were playing video games with a rating higher than their chronological
359 age; this could be influencing moral scores as well as the issue of adolescents playing these games to
360 begin with.

4.3   Limitations of design

362 While a cross-sectional design allowed for the data to be collected within the time frame, the
363 limitations are that participants are compared to each other, rather than their own development.
364 Therefore, cause and effect cannot be determined, but used to identify trends for future research. Also
365 only one school was used for data collection; Brugman et al. (2003) found that norms of development
366 are influenced within the school classes and can become similar. The SRM was developed from the
367 constructivist approach, which suggests that environment relates to moral development, hence it is
368 acknowledged that other environmental factors can both contribute and mediate moral development
369 (Gibbs et al., 1992). Some of the unscorable data could be due to participants making quick intuitive
370 moral decisions and as suggested by Haidt and Joseph (2004) this measure may not be sensitive to
371 these types of moral decisions. The number of participants was lower for years 10 and 11 due to
372 parental consent forms not being returned and due to time restrictions and personal choice, the
373 gaming information contained some missing cases. Ethnicity was not considered as the majority of
374 the sample reported a white British Ethnicity. Also one rater was used to code SRM data, it would
375 have been better to have more than one rater to compare coding of the SRM, confirming inter-rating
376 reliability. The GEQ was created to focus on violent video games and could have been restrictive for
377 a general measure of engagement other measures could be considered in future research.
378 Furthermore, emotional experiences and emotions in video games were not measured in this study,
379 and could interact with moral development. Hence, it is suggested how emotions in video game play
380 relate to moral reasoning could be explored in future research,

4.4   Future research and conclusion

382 For moral development, future research could examine finding that of females in secondary and sixth
383 form displayed lower moral scores. In addition, an exploration of whether a change occurs in moral

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[5] This is the percent from number of participants that responded to the question

384 development between the age of 12 and 14 (years 7 and 9) is needed. The results in general suggest,
385 in support of previous studies, that the relationship between morality and video games is a complex
386 one. Further research in this area is needed to gather in-depth gaming information from participants
387 and to investigate variables such as years playing. In addition, the group of adolescents playing video
388 games for an excessive length of time needs further investigation; to examine the role of high game
389 play on development and whether this can become a pathological level of use. These results have
390 broader implications for video game rating systems, moral development and education but also
391 specific implications for parents and the adolescents' video game play.   In sum the results suggested
392 a mixed relationship between video game play and moral development. With further longitudinal
393 research the relationship between moral development and video game play could be discerned.

394 **5   Conflict of Interest**

395 The authors declare that the research was conducted in the absence of any commercial or financial
396 relationships that could be construed as a potential conflict of interest.

397 **6   Author Contributions**

398 SH contributed to the conception, design, data collection and analysis. All authors contributed to the
399 manuscript revision, read and approved the submitted version.

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401 The secondary school and participants involved with the research project. This research project
402 formed part of the first author's PhD thesis which is not archived online.

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525 **9   Data Availability Statement**

526 The raw data supporting the conclusions of this manuscript will be made available by the authors,
527 without undue reservation, to any qualified researcher.

528 **10   Appendix**

529 **10.1 Appendix A**

530 Table 7. Rating Scale of video game content from ESRB and PEGI

Scale	ESRB	PEGI
0	Early childhood	N/A
1	Everyone	3
2	Everyone +10	7
3	Teen	12
4	Mature	16 -18
5	Adult only	N/A

531 **10.2 Appendix B**

532 Table 8. Correlations matrix of SRM scores, demographics and game play variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. SRM	-												
2. Moral type	0.29 ***	-											
3. Sex	-0.20 *	0.00	-										
4. Age	0.36 ***	0.19 *	-0.20 *	-									
5. Years playing	0.26 **	0.24 **	-0.47 ***	0.51 ***	-								
6. Genre	0.38 ***	0.19 *	-0.32 ***	0.24 **	0.57 ***	-							
7. Content rating	0.08	-0.05	-0.48 ***	0.13	0.15	0.28 **	-						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8. Violent	-0.11	0.08	0.55***	-0.21*	-0.31**	-0.47***	-0.76***	-						
9. Mature	-0.06	0.07	0.53***	-0.20*	-0.28**	-0.44***	-0.76***	0.98***	-					
10. Engagement	-0.05	0.17	-0.17	-0.20*	0.30*	0.34**	0.18	-0.10	0.09	-				
11. GTA	0.02	0.03	0.36***	-0.14	-0.16	-0.18*	-0.27**	0.44***	0.45***	0.10	-			
12. Moral Narrative	-0.06	0.13	0.45***	-0.22*	-0.19*	-0.34***	-0.62***	0.71***	0.73***	0.02	0.55**	-		
13. COD	0.12	-0.01	0.44***	0.07	-0.02	-0.22*	-0.54***	0.58***	0.59***	-0.26*	0.24*	0.29**	-	
14. Amount of time	0.12	0.20*	-0.41***	-0.11	0.36***	0.46***	0.27**	-0.26**	-0.24**	0.38**	-0.11		-0.26**	0.04
15. Gaming status	-0.04	-0.12	0.26**	0.10	-0.36***	-0.14	-0.28**	0.00	0.00	-0.38***	0.00		0.00	0.00

*p<.05 ** p <.01 ***p <.001

10.3 List of tables

Table 1. *SRM norms of Moral A adapted from Gibbs, Basinger and Fuller (1992).*

School Age UK (American)	Age	Global Stage	Score boundary of Global stage	Maturity
Year 5 (Fourth Grade)	10.05	2	1.75 - 2.25	Immature
Year 7 (Sixth Grade)	12.06	2(3)	2.26 - 2.49	Immature
Year 9 (Eighth Grade)	14.11	3(2)	2.50 – 2.74	Immature
Sixth form (High School)	17.30	3	2.75 – 3.25	Mature
University	19.18	3	2.75 – 3.25	Mature
Adult	50.66	4(3)	3.50 – 3.74	Mature

Note. Adapted from "N, MEAN SRM-SF, MEAN GLOBAL STAGE, AGE, AND SES BY SAMPLE" by Gibbs, J. C., Basinger, K. S., & Fuller, D. (1992). *Moral maturity: Measuring the development of sociomoral reflection* p.40 Copyright 1992 Lawrence Erlbaum Assoicates, Inc.

Table 2. *The SRM development of the adolescent sample.*

Global stage	Score boundary of Global stage	Maturity	Frequency (n = 133)	Percent %
1	1.00 - 1.25	Immature	0	0
1(2) upper 1	1.26 - 1.49	Immature	0	0

2(1) lower 2	1.50 - 1.74	Immature	1	0.8	
2	1.75 - 2.25	Immature	32	24.1	
2(3) upper 2	2.26 - 2.49	Immature	29	21.8	
3(2) lower 3	2.50 - 2.74	Immature	28	21.1	
3	2.75 - 3.25	Mature	39	29.3	
3(4) upper 3	3.26 - 2.49	Mature	3	2.3	
4(3) lower 4	3.50 – 3.74	Mature	1	0.8	
4	3.75 - 4.00	Mature	0	0	

Note. Adapted from "Using the SRM-SF" by Gibbs, J. C., Basinger, K. S., & Fuller, D. (1992). Moral maturity: Measuring the development of sociomoral reflection p.43-57 Copyright 1992 Lawrence Erlbaum Assoicates, Inc.

Table 3. *Descriptive statistics for Sex and continuous video game play variables.*

Gaming variables continuous		N	M	SD	t	df	r
Years playing*** Range = 0-17	*Male*	56	8.12	3.35			
	Female	52	4.75	2.94			
	Total	108	6.50	3.57	5.53	106	0.47
Genre*** Range = 0-19	*Male*	58	8.64	5.37			
	Female	55	5.47	4.14			
	Total	113	7.10	4.94	3.60	108.08	0.33
Content Rating*** Range = 0-5	*Male*	58	2.95	0.67			
	Female	47	2.09	0.92			
	Total	105	2.57	0.90	5.38	81.51	0.51
Length of time*** Range = 0-37.5	*Male*	56	19.37	11.51			
	Female	58	9.19	11.05			
	Total	114	14.19	12.34	4.82	112	0.41
Engagement Range = 0 - 38	*Male*	38	20.18	7.51			
	Female	34	16.65	12.42			
	Total	72	18.51	10.21	1.44	53.05	0.19

Note. r is the effect size reported. *p<.05 ** p <.01 ***p <.001

Table 4. *Descriptive statistics for Sex and categorical video game play variables.*

Gaming variables categorical		Yes	No	Total	$\chi^2(1)$	Odds ratio
Gaming status**	Male	63	0	63		
	Female	61	9	70		
	Total	*124*	*9*	*133*	8.69	9.29

Violent***	Male	53	5	*58*		
	Female	18	27	*45*		
	Total	71	32	*103*	31.24	15.82
Mature***	Male	52	6	*58*		
	Female	18	27	*45*		
	Total	71	33	*103*	28.70	12.94
GTA***	Male	26	32	*58*		
	Female	5	39	*44*		
	Total	31	71	*102*	13.24	6.23
COD***	Male	36	22	*58*		
	Female	8	36	*44*		
	Total	44	58	*102*	19.65	7.45
Moral Narrative***	Male	45	13	*58*		
	Female	15	30	*45*		
	Total	60	43	*103*	20.41	6.92

547 *Note.* Odds ratio is the effect size reported. *p<.05 ** p <.01 ***p <.001
548
549 Table 5. *SRM scores, sex and gaming status.*

		N	M	SD	Global stage
Sex*	Males	63	2.62	0.38	3(2)
	Females	70	2.47	0.35	2(3)
Gaming status	Yes	124	2.55	0.38	3(2)
	No	9	2.49	0.27	2(3)

550 *Note.* The parentheses for Global stage indicates if the score is in the upper or lower score boundary,
551 see Table 2. *p<.05
552
553 Table 6. *Predictors of SRM scores.*

Variable[a]	B	SE B	β
Constant	1.34	0.56	
Moral Type	0.27	0.13	0.27*
Sex	-0.27	0.13	-0.37*
Age	0.04	0.03	0.21
Years playing	-0.03	0.02	-0.27
Genre	0.04	0.01	0.51**
Content rating	0.06	0.08	0.15
Violent	-0.58	0.45	-0.72
Mature	0.64	0.45	0.81
Engagement	-0.04	0.05	-0.11
GTA	0.08	0.11	0.10
Moral narrative	0.05	0.15	0.07
COD	0.24	0.13	0.32
Length of time	-0.01	-0.01	-0.16

R^2	0.42**
ΔR^2	0.25**

554   *Note.* Forced entry method was used as no hierarchy was applied to the input of the gaming variables.
555   Preliminary analysis suggested no significant difference for SRM scores with ethnicity and SES and
556   was not included in further analysis.[a] Gaming status was removed by SPSS from the model due to
557   missing cases. Data labels: Moral Type 1 = A; 2 = B. Gender 1 = Male; 2 = Female, Gaming Status,
558   Violent, Mature, Moral Narrative 1 = Yes; 2 = No. *$p<.05$ ** $p <.01$