Introduction

It is almost 20 years since the World Health Organization declared violence a major public health problem. The declaration raised the importance of understanding violence and aggression more fully in order to assist in taking steps to reducing it (Huesmann and Kirwil, 2007). Over the past century, psychological theories of aggression have moved on from the 'frustration-aggression' theory (Dollard *et al.,* 1939), where frustration from thwarted goals was deemed to influence aggression. The revisions of Berkowitz (1989), and the work of Novaco (1975), saw the model changed to include anger as a mediating factor. The General Aggression Model (GAM, Anderson and Bushman, 2002) was then developed and drew from these early theories, emphasizing the role of cognitive and affective processes and the physiological effects of arousal in the outcome of aggression.

Cognition is pivotal in theoretical models describing the pathway to aggression or violence. In the GAM, cognition plays a crucial role in both the route (the present internal state, what the person is thinking about generally before a social encounter) and outcome process (the appraisal of the social encounter, the way a person interprets an event). Contemporary models of violence (e.g. Catalyst Model; Ferguson, Rueda, Cruz, Ferguson, Fritz & Smith, 2008) also indicate the importance of violent cognitions in the pathway towards violence. Anderson and Bushman (2002) suggest that cognition plays a part in violence and aggression through a combination of hostile thoughts and scripts. Hostile thoughts relate to accessible aggressive thinking drawn from the memory of the individual, these thoughts and the process of

25 rumination means that they become more readily, or chronically accessible. Scripts

26 are slightly different, in that they may be less of a conscious activity and are developed

27 through exposure and experience. It is argued that the greater level and frequency of

28 exposure to violence, the stronger the associated scripts will become (Huesmann,

29 1998). So, individuals who have chronically accessible hostile thoughts are more likely

30 to attribute a hostile intention from an ambiguous encounter; those who have been

31 more exposed to violence, may automatically anticipate (or 'short cut') to violence

32 being an appropriate response. These approaches to thinking are also referred to as

33 'hostile attribution bias' by Crick and Dodge (1994). A set of expectancies and

34 explanations for the behavior of others which become cognitive 'short-cut' processes

35 in pathway towards aggression and violence. This style of thinking in the GAM trigger

36 the affect and arousal stimuli in the anticipated way, creating negative affect and

37 increasing arousal.

38

39 Within psychological interventions, the importance of identifying and treating

40 cognitions has been demonstrated by meta-analysis (Pearson *et al*., 2002), where

41 interventions that failed to address cognitive elements were shown to be less

42 effective. Collie *et al.,* (2007) added further evidence in their review of violence

43 interventions reporting the importance of focusing on cognition in order to enhance

44 the effectiveness of interventions. This leaves the clinician with the dilemma of

45 knowing cognition is important to include in intervention work, but with limited

46 means of assessing violent thinking. Sexual offending research has addressed this

47 issue and there are many validated measures of thinking available to be used with

48 sexual offender populations (e.g. Abel *et al*., 1989; Bumby, 1996; Burt, 1980). The

49   measures of cognition in the treatment of sexual offending feed directly in to the

50   design and evaluation of the sexual offender treatment programs offered in justice

51   settings in England and Wales. There is a need for violence offending research to

52   'catch up'.

53

54   Walker (2005) noted that, although theories recognize the importance of cognition,

55   there has been little progress in 'measuring' violent thinking. He argued that whilst

56   there are numerous measures for anger (e.g. Novaco, 1994; 2003), hostility,

57   impulsivity, empathy and paranoia, there are a paucity of measures to adequately

58   identify the type of thinking that is related to violence specifically, rather than more

59   general antisocial or criminal thinking styles. Bowes and McMurran (2013) conducted

60   a systematic review that found only two measures of violent thinking that were

61   psychometrically robust, reliable and valid for use with forensic populations; The

62   Maudsley Violence Questionnaire (MVQ) (Walker, 2005) and the EXPAGG (Campbell

63   et al., 1992). The MVQ has also demonstrated predictive validity (Walker & Bowes,

64   2013) which informed our choice to use it in this study.

65

66   The MVQ explores violent thinking measuring two factors, 'Machismo' and

67   'Acceptance'. Machismo relates to embarrassment over backing down from violence

68   or confrontations, justifying violence as a means of responding to threats or attacks

69   and violence as part of being a man (macho). Example items include; 'Sometimes you

70   have to be violent to show that you are a man.', 'If I don't show that I'm tough and

71   strong, people will think I'm weak and pathetic.' Acceptance includes enjoying

72   violence (e.g. in films or sport) as well as recording those who have an objection to

73   violence, or reject violence as an acceptable behavior. Example items include; 'It is

74   OK (or normal) to hit someone if they hit you first.' 'Fighting can make you feel alive

75   and 'fired up'.'

76

77   The MVQ was originally developed for use with young people (16-18 years) in the UK

78   (Walker, 2005). It has also been used with adults. Warnock-Parkes, *et al.*, (2008)

79   demonstrated that violent thinking related to both self-reported and officially

80   recorded violence in a secure health setting with a sample of mentally disordered

81   offenders. Walker and Bowes, (2013) demonstrated that violent thinking was

82   predictive of self-reported violence with an offender sample and with a small sample

83   of adult males with no offending history.

84

85   In addition to cognition, we know that alcohol has a significant role in criminal

86   violence. Around half of all violent crimes are alcohol-related (Flatley *et al.*, 2010) and

87   73% of prisoners require intervention for their alcohol use (Bowes *et al.*, 2009).

88   Alcohol (mis)use alone does not explain violence, but it has an important contributory

89   role, with meta-analyses suggesting it accounts for 25% of the variance of aggressive

90   behavior (Exum, 2006).   McMurran et al. (2006) set out that there are numerous

91   explanations for alcohol-related aggression. They suggest that there are 11 major

92   areas, including; alcohol altering cognitive functioning, exacerbated trait aggression,

93   context, outcome expectancies and alcohol as an excuse for violence. All of these

94   issues have a significant overlap with violent thinking, the cognitive and emotional

95   experiences of individuals.

96

97 In Novaco's angry aggression system, (Robins and Novaco, 1999) aggression is

98 explained by the interaction of external and internal factors including; perceived

99 provocation, cognitive appraisals, physiological arousal and learned behavioral

100 responses. The internal factors are particularly pertinent to this study and to violent

101 thinking. Individual factors including hostile attributions, anger arousal, alcohol

102 outcome expectancies of aggression and impulsivity in social problem solving have all

103 been shown to be influential on aggression (Dodge *et al*., 1990; Novaco, 2011;

104 McMurran *et al*., 2002; Ramadan and McMurran, 2005). Alcohol mis-use and violent

105 thinking are important to consider when exploring violent behavior.

106

107 The Alcohol Use Disorders Identification Test (AUDIT, Babor *et al*., 2001) is a reliable

108 and valid measure of harmful alcohol use. The AUDIT can be used as a screening tool

109 to explore whether participants would be suitable for intervention and what level of

110 intervention may be required.

111

112 The current study explored the roles of alcohol misuse and violent thinking on self-

113 reported violence in an adult (non-offender) population. It was expected that both

114 factors (thinking and alcohol misuse) would demonstrate a positive associate with

115 self-reported violence.

116

117   **Method**

118

119 **Participants**

120   The sample is comprised of 808 adult participants, 569 female and 239 male

121   participants. The samples were drawn from student populations from one UK

122   University (School of Health Sciences) and received credits for participating in research

123   activities as they contributed to the final year dissertations of three students (Lewis,

124   Hughes and Hyde). The mean age of the sample was 23.13yrs (SD 6.10, range 18-62).

125   Ethnicity was reported by 377 (45.90%) of the participants; 340 (41.36%) reported

126   their ethnicity to be White, 10 (1.21%) Asian, 4 Black, 2 Mixed race and 21 Other.

127   Participants engaged in the study by completing the measures using a web-based tool

128   called 'Qualtrics' which included both consent and debriefing sections. Data were

129   analysed using SPSS v23.

130

131   **Measures**

132   Maudsley Violence Questionnaire (MVQ, Walker, 2005)

133   The MVQ is a reliable and valid (Walker, 2005; Walker and Bowes, 2013) 56 item self-

134   report questionnaire that measures violent thinking. Participants rate whether the

135   statements on the questionnaire are generally "true" or 'false'. The MVQ has two

136   subscales: Machismo (42 items) and Acceptance (12 items). Alpha coefficients

137   measuring the reliability of the MVQ range from 0.74 to 0.93 (Walker, 2005; Walker

138   and Bowes, 2013).

139

140   **Self-Report Violence Scale**

141   This scale is an adaptation of the Australian validated Self-Reported Delinquency Scale

142   (Mak, 1993; Carroll *et al*., 1996) and uses only the items related to violence from this

143   scale. It is a nine item scale where participants are asked to report how frequently

144   they have engaged in a range of violent behaviors over the past 12 months using a five

145   point Likert scale to rate the frequency ranging from 'Never' to 'More than once a

146   Month'. The scale asks respondents to assess the frequency they have engaged in a

147   number of violent behaviors ('Purposely hurt or beaten someone up?' 'Used a weapon

148   of some sort, e.g. knife, stick, chains or a bottle in a fight'). This scale has been used in

149   a number of studies in the UK (e.g. Walker, 2005; Walker and Bowes, 2013). The self-

150   report scale has also been used together, with officially recorded violence in previous

151   studies (Warnock-Parkes et al., 2008, Walker and Bowes, 2013) and correlated with

152   officially recorded violence, allaying some concerns over self-reported data.

153

154   **Alcohol Use Disorder Identification Test (AUDIT, Babor *et al*., 2001).**

155   The AUDIT is a reliable, valid and widely used method of screening for excessive

156   drinking (Reinert and Allen, 2007). It is a 10 item questionnaire where participants are

157   asked to rate the frequency of their drinking behavior (for 6 items), using a 5 item

158   Likert scale ranging from 'Never' to 'Daily or almost daily' (scoring 0-4). For the other

159   items, participants are asked to rate frequency and amount of alcohol use and then,

160   whether they have experienced injuries or concern from others about their drinking,

161   with three possible responses. The AUDIT records a score of 0-40 depending on the

162   responses from participants with a variety of clinical interventions recommended

163   depending on the scores of participants. For this study, we were interested as to

164   whether the AUDIT was related to self-reported violence and used the score as an

165   incremental scale for analysis.

166

167 Ethical approval for the studies comprising this article was provided by the Cardiff

168 School of Health Sciences.

169

170 **Statistical analyses**

171 The current, relatively large sample study explores the reliability of the measure

172 associated with self-reported violence with a general adult population (male and

173 female). A power analysis from a previous study (Warnock-Parkes *et al*., 2008)

174 identified that a sample size of 59 is appropriate to identify significant correlations

175 (r=<0.35) with self-reported violence at the 0.05 level. As this study uses regression

176 analysis, the larger sample size for the potential variables is appropriate and exceeds

177 the recommendations from the previous power analysis. Forced enter logistic

178 regression analyses is conducted to explore the best model for predicting the

179 dependent variable, self-reported violence using the variables MVQ scores, gender,

180 age and alcohol (mis)use. Separate regression analyses are presented for males and

181 females in the study.

182

183   **Results**

184 **Reliability**

185 The MVQ factors internal consistency for this study demonstrate a Cronbach alpha of

186 0.92 for the Machismo factor and 0.82 for Acceptance. When separated by gender,

187 the Machismo factor demonstrated a Cronbach alpha of 0.91 for women and 0.92 for

188 men. Acceptance demonstrated a Cronbach alpha of 0.78 for women and 0.77 for

189 men. Mean scores are reported in Table 1. Comparisons of mean scores from

190 previous studies are included.

191

192 Table 1: Mean and standard deviation (SD) scores for MVQ factors and self-reported

193 violence, AUDIT and Pearson's R correlations with Self-reported violence.

194
195   Table 1 about here

196

197 The AUDIT scores in Table 1 are presented continuously, though the scores relate to

198 clinical categories for diagnostic purposes when using the tool. The AUDIT identifies

199 three categories of alcohol problems, low (7 or less), medium (8-15) and high level of

200 alcohol problems (16 or more). DeMartini and Carey (2012) indicated that, when

201 using the AUDIT with college students, a cut-off of 7 for males and 5 for females would

202 be more appropriate. The mean scores above indicate that our sample fell in to the

203 'medium level of alcohol problems' (scores 8-15) and scores above 8 are

204 recommended as indicators of hazardous and harmful alcohol use. However, as the

205 majority of our sample are college students, these scores, being above 7, indicate 'at-

206 risk' drinking (DeMartini and Carey, 2012).

207

208 **Self-reported violence findings.**

209 There were significant differences between male and female participants on their

210 levels of self-reported violence, with males reporting more violence (t=5.33, df=754,

211 p<0.001). There were significant correlations between all the measures and self-

212 reported violence, the results of the Pearson's correlations are shown in Table 1.

213

214 **Regression**

215   For the regression analysis, we identified one item that did not relate to a criminal act

216   of violence (item 8, 'Have you been involved in bullying another person?') whereas all

217   the others did. We therefore excluded this item. Levels of self-reported violence

218   (SRV) across the sample were low and as a result our data was skewed which impacted

219   on options for using traditional regression. We considered the most appropriate

220   method to analyze the data (transform, mean/median split) and decided to select

221   categorical data analysis.   We categorized participants into those who had been

222   violent 'any violence' and those who had not been violent (no violence). The variable

223   was recoded and logistic regression was used. Separate regression models were used

224   for male and female participants, both conducted using forced enter logistic

225   regression models with the any violence/none groups as dependent variables and the

226   factors identified as significant from the correlation analysis as covariates (MVQ

227   Machismo, MVQ Acceptance and MVQ Audit). Results are presented in Table 2.

228

229   Table 2: Regression models by gender.

230
231   Table 2 about here
232

233

234   For the male participants, whilst all the variables were significant, only MVQ

235   Machismo remained in the final regression model (R^2=0.36, standard error=0.05,

236   β=0.29, x^2=68.8, p<0.00).   Neither MVQ Acceptance nor the AUDIT significantly

237   improved this model. The Nagelkerke R Squared value indicates that Machismo

238   accounted for 36% of the variance. The Hosmer and Lemeshow test was, as desired,

239   not significant (p=0.45). The classification table indicates that the model was 72.3%

240   accurate. The ExpB was 1.33, so for every 3 points a participant increased their score

241   on the MVQ Machismo scale, they were twice as likely to report violence.

242

243   For women, whilst all the variables were entered, only MVQ Machismo was significant

244   (x^2=46.61, df=1, p<0.001). The Nagelkerke R Squared indicates that Machismo

245   accounts for 11.5% of the variance. The Hosmer and Lemeshow test was again, not

246   significant (p=0.34) and the classification table indicates that the model was 62.9%

247   accurate. The ExpB was 1.19.

248

249

250   **Discussion**

251   This study provides strong evidence that MVQ Machismo is an important factor in self-

252   reported violence for both men and women. According to our study, Machismo is a

253   unique predictor of self-reported violence. Alcohol is an important factor within this

254   sample. Young, British people of both genders who report hazardous drinking also

255   report more self-reported violence. Whilst our study failed to demonstrate that

256   alcohol misuse was predictive of self-reported violence, the strong correlation

257   between alcohol misuse and violence warrants further exploration, with both

258   genders.

259

260   Machismo has previously been identified as a significant factor associated with male

261   violence (e.g. Walker and Bowes, 2013; Warnock-Parkes *et al*., 2008) and this study

262   with a large, adult sample provides further evidence for the importance of 'Macho'

263   thinking in male violence. In this study Machismo accounted for a little over a third of

264   the variance in self-reported violence scores. The regression analysis also indicated

265   that the MVQ was a good measure in terms of accuracy and, that for every three point

266   increase in scores on Machismo, the likelihood of self-reporting violence doubles (over

267   the previous 12 months).

268

269   The finding that Machismo, and not acceptance, was significant in female violence is

270   not consistent with previous studies, where MVQ Acceptance had been shown to be

271   more influential (Walker, 2005). Machismo accounted for a small proportion of the

272   variance (11.5%) of self-reported violence, indicating the need for further research to

273   identify the factors that are important in female violence. One problem with the MVQ

274   (which was originally developed with violent males) is that several items use male

275   gender specific terms related to 'manliness'. These items may be more difficult for

276   women to identify with and respond to.   Whilst this study demonstrates that

277   Machismo is a factor in female violence, there is more work to be done to explore the

278   thinking patterns that are salient to female violence.

279

280   Overall, the study provides some support for the theoretical models of aggression and

281   violence that highlight violent thinking as relevant; violent thinking is indeed pivotal

282   to the behavioral outcome (violent behavior). The findings of the study also have

283   some practice implications: There is now good evidence that the MVQ is a reliable

284   measure of violent thinking and this allows clinicians to both measure the extent

285   violent thinking is pertinent to service users and to help them design interventions to

286   address violent thinking and therefore, violent behavior. The factors in the MVQ could

287   also be helpful in work with service users to formulate their use of violence and to

288   guide both the assessment and treatment work that follows.

289

290   The implications of this study have societal implications too. There are many

291   interventions considered to address problems associated with alcohol misuse,

292   including those aimed at addressing alcohol-related violence (e.g. the Cardiff Model,

293   Sheppard, 2007). These have been shown to be effective at an environmental level in

294   reducing the problems associated with alcohol-related violence. This study suggests

295   that there is also a need to address, at an individual level, the thinking associated with

296   violence, in order to reduce violence, more generally and, in order to reduce alcohol-

297   related violence.

298

299   The study has some limitations related to the self-selected sample and that the study

300   did not check the official criminal histories of participants, therefore there is an

301   assumption that the sample is representative of an adult, non-offender population.

302   The measures rely on the self-report and memory of participants in rating both their

303   thinking and behavior. The study did not employ a female specific measure of violent

304   thinking for women, although this is because the authors have been unable to find

305   such a measure in the literature. This is problematic because the majority of the

306   sample was female. Lastly, we do not have the ethnicity data for all the sample

307   (missing data) and the data we have indicates that >90% of the sample was white.

308   This may impact on the generalizability of the findings across different ethnic groups.

309

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