

## **Script representation of alcohol-related aggression in underage drinkers**

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### **OVERVIEW AND AIMS OF STUDY:**

Interpersonal violence is one of the primary causes of morbidity and mortality in young people (Downing, Cotterill & Wilson, 2003; Potenza, Hoyt, Coimbra, et al, 2004), and the UK shows the highest rates of violence amongst young people in the EU (van Dijk, Manchin, van Kesteren, Nevale et al., 2005). Much of the burden of violent crime is related to alcohol. For example, crime statistics suggest a greater incidence of assaults in drinking areas (Gruenewald & Remer, 2006) and at drinking times (Nelson, Bromley & Thomas, 2001); and surveys show correlations between alcohol consumption and violence proneness (Quigley & Leonard, 2006), as do case control (Navis, Brown & Heim, 2008) and observational studies (Graham, Bernards, Osgood, Wells, 2006). Causal links are also demonstrated in placebo-controlled experimental studies, where alcohol ingestion leads to aggressive behaviour in laboratory tasks (Bushman, 1997).

The UK government places an urgent priority upon the problem and has responded with legislative, media, support and enforcement programmes (Home Office, 2008a).

Although there has been an overall reduction in the level of alcohol-related violence in the UK, 947,000 incidents of alcohol-related assault (45% of all assaults) were reported in the British Crime Survey, England and Wales, 2007-8 (Home Office, 2008b). One commonly cited reason for the persistence of alcohol-related violence is that both are closely tied into common, culturally transmitted, representations of what is considered to be normal and acceptable behaviour (e.g., Wells, Graham & Tremblay, 2007). One example of this is 'lad' culture, where alcohol and aggression are tied together within a rubric of distorted, but powerful masculine values emphasising status, hardness and power (Benson & Archer, 2002; Graham & Wells, 2003). Young people may offer a good target for prevention activities, as normative influences are often only weakly

established and may be vulnerable to interventions that challenge them (Bushman & Huesmann, 2006). Thus, it is important to understand and change harmful cultural influences that affect young people before they engage in legal public drinking.

One way to do this is to better understand the ways in which social and cultural ideas relating to alcohol and aggression are understood by young people. A social script is a mental representation of a social situation, specifying a temporal series of events, contextually appropriate responses and personal and social reward contingencies (Huesmann, 1988). This provides a plausible mode for the transmission of social representations about alcohol and aggression. The current study is a cross-sectional pilot study, which assesses: (1) script structures and links between scripts and motivations and values, and media influences; and (2) aggressive behaviour in two laboratory tasks after priming with alcohol images. The specific aims are to:

- 1) Test whether coherent alcohol/aggression scripts exist in a sample of young people;
- 2) Explore links between script content and attitudes, beliefs and values concerning alcohol-related aggression; and
- 3) Investigate possible social and media influences on scripts.

## **THEORETICAL BACKGROUND**

Placebo-controlled studies demonstrate pharmacologically-based links between alcohol administration and aggression (Bushman, 1997). However, placebo conditions or the mere presentation of alcohol-related stimuli also increase aggression in adults (Friedman, McCarthy, Bartholow & Hicks, 2007), suggesting that personal representations about alcohol also have a role in aggression. The notion of a social script provides a means of understanding these representations and their transmission. An example could be a script denoting that aggression is a feasible, appropriate and socially-rewarded response to provocation in male drinking contexts. Guided by evidence that brief presentations of alcohol-related stimuli can induce aggressive responding (Bartholow & Heinz, 2006; Friedman, et al. 2007), Anderson and Bushman (2002) suggest that contextual alcohol cues trigger such scripts, which then predispose aggressive responding. A key

implication of script theory is that scripts become established through social influences such as peers, family and media, without direct experience of either drinking or aggression (Anderson & Bushman, 2002). Research has established that young people possess highly developed script representations of both drinking (Thrush, et al., 2008) and aggression (Bushman & Huesmann, 2006), but it is not known how the two scripts interact to predict behaviour.

Similar to much social behaviour (Bargh & Chartrand, 1999), decisions to engage in aggression can be largely automatic, in the sense that they are reflexively responsive to context and performed with little introspection or effortful thought (Huesmann, 1988). Scripts can also show automated qualities (Anderson & Bushman, 2002). The principle of spreading activation posits that knowledge is stored in discrete semantically-linked memory modules. Activation of one module will activate linked modules, depending on the existing strength of those links. Automation involves the strengthening of these semantic links by practice or observation, such that accessing one construct (e.g., alcohol) makes linked constructs more easily accessible (e.g., aggressive thoughts). Such scripts appear to increase the likelihood of behaviour consistent with their content, particularly under conditions of diminished executive control such as cognitive load, stress or intoxication (Thrush et al., 2008). Implicit measures provide insight into memory structures that underlie scripts by measuring the extent to which presentation of alcohol-related stimuli makes aggressive cognitions more readily available. For example, several studies have shown prediction of drinking behaviour by the speed of association between drinking related stimuli and lexical judgements on words denoting positive mood (Thrush et al., 2008; Stacy, Leigh & Wengardt, 1994).

The implication for behaviour is that highly automated scripts provide powerful and immediate cues to behaviour that can bypass conscious decision-making (Bargh & Chartrand, 1999; Thrush et al, 2008). This is particularly the case with scripts that are associated with powerful motivations such as excitement or anger. The alcohol-aggression literature supports this idea. Using implicit measures, Lange (2002) showed links between words connoting positive expectancies of alcohol-related aggression and other aggressive behaviour. Bartholow et al. (2006) showed that priming with alcohol related stimuli caused people to make faster lexical decisions regarding aggression-

related words and to make more hostile attributions in a laboratory task. The latter effect was greater amongst participants with faster access to aggression related content after alcohol priming. In this study, we, investigate whether young people possess these automated alcohol/aggression scripts. We do this using (1) content analyses of essays written in response to ambiguous alcohol stimuli, where we anticipate that young people will show some aggression-related themes; (2) a implicit task, where the young people are primed for alcohol and speed of response to aggression cues is measures. Here, an interaction between the prime and nature of the target word is expected, where shorter lexical decision times are observed in the alcohol prime/aggression word group; and (3) a laboratory aggression task where, after exposure to alcohol versus non-alcohol pictures, participants complete the CRT, a procedure that allows participants to blast other participants (nonexistent) with varying noise intensities. It is expected that alcohol-based primes will be associated with greater aggression. More importantly, we predict that the above effect will be greater in participants who show stronger links between alcohol and aggression in the implicit and explicit script measures. In addition, we investigate whether media exposure to alcohol use is associated with young people's alcohol/aggression scripts.

## **METHOD**

### Participants

161 young people (M = 35% of sample) aged between 11-14 years took part in the study. These children were from high schools in the North West of England. There was no exclusion criteria, except self or parental exclusion from the study.

### Measures

Values and Beliefs towards Drinking Questionnaire: Participants were asked to indicate their own alcohol consumption and the age that they had their first drink. They were also asked to indicate their attitudes to alcohol-related aggression. Current attitude research is qualitative, and quantitative scales do not exist. Wells, Graham and Tremblay (2007) present a theoretical model, based largely on the theory of planned behaviour that summarises this work and delineates key dimensions relating to alcohol and aggression. We developed items relating to perceived consequences (pros and cons) and perceptions of normal and acceptable social behaviour. Participants were asked to imagine the

‘typical’ person who gets into fights after drinking. Pros were assessed using the items ‘This person gets respect from others for fighting after they have been drinking’, ‘This person gets a buzz from fighting after they have been drinking’, ‘This person feels powerful for fighting after they have been drinking’ and ‘This person is seen as being hard for fighting after they have been drinking’. Cons were assessed using the items ‘Others think that this person looks like a fool for fighting after they have been drinking’, ‘This person gets physically hurt from fighting after they have been drinking’, ‘This person is unpopular for fighting after they have been drinking’ and ‘This person gets into trouble for fighting after they have been drinking’. Each item was assessed with a 7 item likert scale anchored by the statements ‘do not agree at all’ and ‘totally agree’. Score ranges were 4-28 and Cronbach alphas; Pros 0.58 and Cons 0.69.

Perceptions of normal and acceptable social behaviour were asked using descriptive and injunctive social norms (Reno et al., 1993) using young people that the participant knows and young people ‘in general’ as reference groups. The two descriptive norms questions asked for estimates of the proportion of young people who would get into a fight after drinking and the two injunctive norms questions sought estimates of the proportion who would disapprove of getting into a fight after drinking. Possible responses were ‘All young people’, ‘Almost all’, ‘Most’, ‘About half’ ‘About a quarter’, ‘About one in ten’, ‘About one in twenty’, ‘Almost none’ and ‘None at all’.

Externalizing behavior was measured using delinquency-related items from the Child Behavior Checklist-Youth Self-Report (CBCL-YSR, Achenbach, 1991), with sample items including: (a) “I lie or cheat” and (b) “I steal things from other places than home.” Responses ranged from 1 (*not true*) to 3 (*very true or often true*), with higher scores representing higher levels of delinquency.

Qualitative Measure of Script. Explicit script measures use content analyses of short essay tasks (Schank & Abelson, 1977). These allow the participant to idiosyncratically express script content. In this study, participants completed three sections of a booklet in which they were to describe situations in which groups of young people go out drinking. For section 1, participants were instructed to read the beginning of a short story, and to think about what might happen to the people concerned. The start of the story was as follows: ‘A group of young people decided to have fun by going out and getting drunk on

Saturday night. They hadn't planned anything in particular, but were just going to go into the centre of the city and start drinking at a large popular pub. We want you to think about what may happen to them?'

For section two a photograph of a group of young men was presented and participants were asked to look at the picture and describe what they saw. Participants were prompted with the questions, a) who are they and what do they look like, b) how well do you think they will get on with each other and other people, c) how do you think they may feel and what may they be thinking and d) what might happen to them. Section 3 asked the same questions in reference to a photograph of a group of young women.

Content analysis was used to investigate the amount of aggression and violent outcomes mentioned in each of the three sections. These were broken down into the following categories: (1) Physical aggression intergroup (eg conflict with someone outside the group); (2) Physical aggression intragroup (eg conflict with someone inside the group); (3) Physical aggression unknown; (4) Verbal aggression intergroup (eg conflict with someone outside the group); (5) Verbal aggression intragroup (eg conflict with someone inside the group); (6) Verbal aggression unknown; (7) Undifferentiated aggression intergroup, i.e. fight or ambiguous aggression terms (eg conflict with someone outside the group); (8) Undifferentiated aggression intragroup (eg conflict with someone inside the group); (9) Undifferentiated aggression unknown; (10) Police involvement/arrest; (11) Vandalism; (12) Intentional aggression; (13) Victim of aggression; (14) Perpetrator of aggression; (15) Other delinquent behaviour. 10% of the scripts were coded by two independent raters to determine reliability of the coding scheme. Percentage agreement between the codes was good ranging from 87% (perpetrator of aggression ) to 100% (physical aggression/intragroup; physical aggression/unknown; verbal aggression/intergroup; verbal aggressive/intragroup; verbal aggression/unknown; undifferentiated agg/intergroup; undifferentiated agg/intragroup; undifferentiated; Police involvement; vandalism; intentional aggression; victim of aggression).

The implicit task. The implicit task was run using E-Prime software on a laptop. Primes of five alcohol (cider, beer, lager, whisky, vodka) and five beverage-related words (water, coffee, juice, cola, soda) were presented for 40ms, and presented with backward and forward masks (XXXXX) each presented for 1 second. The primes were followed by

the target words. Target words fell into three categories, i) aggression (fight, hit, assault, bash, attack), ii) neutral words (bank, watch, spread, balance, reach) and iii) non-words (fark, bazt, hig, aggnop, annilt), which were matched on syllable number and sound.

Participants made a lexical decision about a target word (whether it is a real English word or not) by pressing a computer key. Participants were informed that the task measured speed of language comprehension and instructed to be as quick but accurate as possible. Participants initially completed five practice trials, in this case the prime was a series of the same letter, i.e. aaaaaa, followed by a target word which were neutral (desk, aspect, next, printer) and non-words (dasg, trashk, beeg, prantee). Participants needed to be correct on three of these trials to move onto the task, and if they were not a further practice trial was run.

100 trials were run in total, and fixed prime/target pairs (Table 1) were presented in the a random order for each participant. 30% of the trials included an aggressive word, 30% neutral, and 40% non-word.

Table 1: Prime and target pairings

Alcohol prime	Beverage prime	Aggressio n	Non-Aggression	Non-Words
Beer	Juice	Fight	Watch	Fark
Vodka	Water	Bash	Bank	Bazt
Lager	Cola	Hit	Spread	Hig
Cider	Soda	Attack	Balance	Aggnop
Whisky	Coffee	Assault	Reach	Annilt

Accuracy and reaction times were recorded for each pairing of words. All participants who were correct on less than 80% of the trials were removed from the analyses and all correct reactions times between the range of 80ms and 2000ms were analysed: all reaction times outside of this rage were deemed unreasonable. Remaining participants and correct reaction times within this range were analysed for dispersions and all reaction times 2SD above and below the mean reaction time were eliminated.

Computer Reaction Time Task (CRT). The CRT was used to measure physical aggression after viewing alcohol primes during the implicit task (e.g., Bushman, 1995; Taylor, 1967). In this study, participants were first exposed to an alcohol prime

(consisting of several pictures of alcohol) or control prime (consisting of several pictures of non-alcoholic beverages), and then completed the CRT. The task involves 25 trials. In each trial, participants are led to believe that they are competing against an opponent, and have to be the first to push a button on a computer. The loser of each trial supposedly receives a blast of noise through their headphones. The outcome of each trial is pre-set by the computer, and participants “win” on about half the trials. Before each trial, participants are required to set a level of noise (from 0 to 105 decibels) and duration (from 0 to 5 seconds) that their opponent will be blasted with should she lose the trial. In winning a trial, the participant is also shown the loudness and duration of the blast of noise they would have received should they have lost. For this study, participants were told that they would be playing the game against another player in the room. Such a paradigm has been shown to be a reliable measure of aggression (e.g., Anderson & Bushman, 1997; Giancola & Zeichner, 1995), and has been described as the laboratory equivalent of giving participants a controlled weapon to harm others (Bushman, Ridge, Das, Key, & Busath, 2007).

Media exposure. Participants were asked to indicate their media preferences and the amount of time spent using differing media (televisual, music and computer games). Specifically, they were asked to list their three favourite television programmes and how frequently they viewed each, using a Likert scale of 1 (never) to 7 (frequently) (see Huesmann, Moise, Poldoski, & Eron, 2003). They were also asked to estimate the amount of alcohol use that was portrayed in each program (again on a 7 point Likert scale). Ratings for each program were multiplied by the frequency viewed to give participants a total media preference score (with a maximum of 49 for any given program): Thus, programs viewed more frequently had greater weight in the subsequent analyses (Anderson, Gentile, & Buckley, 2007). The scores for the three programs were then averaged to create an overall media exposure score.

Procedure: The qualitative exercise, implicit task, and CRT task were separated by a gap of at least two days each. The order of these tasks was counterbalanced at the level of school. The qualitative exercise was completed in class during registration. The implicit task and CRT were completed in groups of 8 using several laptop computers



programmed with the appropriate software. Group administration was important for the CRT as we wanted participants to think they were competing against each other.

## RESULTS

### Research Question 1: Do coherent alcohol/aggression scripts exist in a sample of young people

This question was assessed in two ways. First, through the qualitative analyses of stories. Thus, do the stories of young people include aggressive content when they are primed using using non-directive verbal and pictorial stems? Second, the implicit task was designed to assess the extent to which priming with alcohol-related stimuli reduced time taken to access aggression schemas.

Responses to scenario tasks. The majority of participants did not make attributions to the type of aggression in the scenario responses. Thus occurrences of physical, verbal and undifferentiated aggression were combined into a general aggression category for each scenario. Frequencies of aggression for each scenario are provided in Table 2.

*Table 2. Frequencies of Physical or Verbal Conflict in Scenario Responses*

	0 times	1	2	3	4+	Percent t 1+
<b>Scenario 1 Essay</b>						
Intergroup conflict	71	62	7	1	1	50.0
Intragroup conflict	112	24	6	0	0	21.1
Undifferentiated conflict	61	56	21	3	1	57.0
Total conflict	25	44	44	23	6	82.4
Police involvement	101	36	5	0	0	28.9
Premeditated aggression	135	7	0	0	0	4.9
Perpetrate aggression	121	20	1	0	0	14.7
Victim of aggression	113	18	9	1	1	20.4
General delinquency	46	48	29	10	9	67.6
<b>Scenario 2 - Males</b>						
Intergroup conflict	101	37	4	0	0	28.9
Intragroup conflict	121	18	3	0	0	14.7
Undifferentiated conflict	105	31	4	1	1	26.1

Total conflict	66	46	23	6	1	53.5
Police involvement	112	27	3	0	0	21.1
Premeditated aggression	137	5	0	0	0	3.5
Perpetrate aggression	133	9	0	0	0	6.3
Victim of aggression	131	8	1	2	0	7.7
General delinquency	72	51	15	3	1	47.3
Scenario 2 - Females						
Intergroup conflict	118	21	3	0	0	16.8
Intragroup conflict	121	18	3	0	0	14.7
Undifferentiated conflict	122	17	3	0	0	14.0
Total conflict	94	29	13	5	1	34.2
Police involvement	135	7	0	0	0	5.5
Premeditated aggression	141	1	0	0	0	0.7
Perpetrate aggression	139	3	0	0	0	2.1
Victim of aggression	115	20	4	3	0	18.9
General delinquency	74	52	13	3	0	47.6

A mean of 158.56 ( $SD=65.36$ , range 39-360) words were used to describe the three scenarios. Table 2 suggests that reports of conflict were relatively common. Some conflict was reported in 116 responses to scenario 1, as were 95 instances of other delinquent behaviours. Figures for scenario 2 (group of male drinkers) were 85 and 69 and scenario 3 (group of female drinkers), 47 and 67. These suggest that participants are, in many cases, aware of the potential for conflict during and after drinking. However, participants were not specific about the nature of conflict, describing few instances of planned aggression, perpetration or being a victim, or, as previously mentioned, whether conflict was verbal or physical. It is unclear as to whether participants representations of likely events were imprecise, or they did not communicate these representations. There were no gender differences in reports of conflict, police involvement or general delinquency.

Implicit measures. Response times in milliseconds are presented in Table 3. These are generally similar to those obtained in comparable semantic recognition priming studies. Also similar to comparable studies was the longer latency to respond to non-words. These findings provide confidence that the priming and responding techniques that we used are appropriate and that participants were engaged in the task.

*Table 3. Response Times in Milliseconds to Aggression and Non-Aggression Related words and Non-Words Using alcohol or Beverage Primes.*

	Target Word		
	Aggression	Word	Non word
Alcohol Prime	762.09 (176.92)	727.14 (154.15)	856.77 (196.96)
Beverage Prime	752.06 (158.67)	716.95 (148.42)	843.47 (187.72)

We hypothesised that alcohol primes would stimulate lower RTs to aggression than non-aggression words. This was tested by examining the interaction between prime and target words. A 2x2x3x2 (prime x target x grade level x gender) mixed ANOVA was conducted. No direct or interaction effects were observed for grade level or gender. Main effects were observed for target, where responses to aggression words were slower ( $F(1,129)=18.27, p<.01$ ), and prime, where alcohol primes were slower ( $F(1,129)=5.43, p<.05$ ). No interaction ( $F(1,129)=, p=.557$ ) was observed, suggesting that alcohol primes have no differential effect on RTs to aggression words.

If RTs and conflict responses to scenarios are both indicators of script content, they should be correlated. We calculated the difference between the RTs for aggression words for alcohol and beverage primes by subtracting the latter from the former. This adjusts for confounding by participants speed in recognising aggression words. The two putative indicators of alcohol aggression scripts were uncorrelated. Point-biserial correlations between alcohol prime/aggression target RTs and binomial (zero versus one or greater) scenario aggression scores were 0.08 (scenario 1), -.14 (scenario2) and -.03 (scenario 3).

Research Question 2. What are the associations between script content and attitudes, beliefs and values concerning alcohol-related aggression?

Relationships between RTs in the alcohol prime/aggression target condition, binomial scenario aggression scores and attitudes, values and social norms were evaluated using Pearson and point biserial correlations. Table 4 shows few correlations between possible

script indicators and attitudes and social norms. Participants who provided aggressive content in response to scenario 3 (group of girl drinkers) tended to be those with a higher estimation of the pros of fighting after drinking, a lower estimate of the cons and who perceived that people in general disapproved.

*Table 4. Correlations Between Attitudes and Perceived Social Norms and Implicit RTs and Binomial Scenario Scores*

	Implicit RT	Aggressio n Scenario	Aggression Scenario 2	Aggressio n Scenario 2
Personal Drinking	-.08	-.02	-.02	-.08
Friends Drinking	-.06	-.09	-.09	.16
Parental drinking	-.15	.03	.03	.11
Pros	-.02	.01	.01	.17*
Cons	-.05	-.07	-.02	-.17*
People you know fight	.03	-.04	-.04	.06
People general fight	-.02	-.09	-.09	.06
People you know disapprove	-.14	-.15	-.15	-.05
People general disapproval	-.16	-.04	-.04	-.17*

A binomial logistic regression analysis was conducted to examine multivariate predictors of whether aggression was reported in scenario 3, controlling respondents' grade level, gender, drinking behaviour and the number of words used to describe the scenarios. Control variables were entered at the first step, followed by predictor variables. The overall equation was not a significant predictor ( $\chi^2(9)=16.60$ , 63% correct prediction,  $p=.055$ ), but the step containing the predictor variables added a significant contribution to explained variance ( $\chi^2(9)=16.60$ ,  $p<.05$ ). Participants' estimates of the proportion of young people they knew that would disapprove of fighting after drinking were negatively related to aggression being reported in scenario 3 (Odds Ratio=0.733, 95%CI=0.57,0.95), but positively to an estimate of the proportion of young people that they believed would disapprove (Odds Ratio=1.31, 95%CI=1.044,1.65).

Research Question 3: Are there social and media influences on alcohol/aggression scripts.

Frequency of drinking and alcohol/aggression scripts. As we were interested in how experience with drinking influenced the alcohol/aggression script, participants were split into three groups: those who never consumed alcohol, those who consumed alcohol rarely (less than once a month), and those who consumed alcohol frequently (several times a week). Table 5 shows the means and standard deviations for noise intensity (with higher scores reflecting higher intensity levels) for the three groups.

*Table 5: Means and standard deviations for noise intensity.*

	Priming Condition			
	Beverage		Alcohol	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Frequency of alcohol use				
Never	6.83	2.75	7.60	2.08
Rarely	6.73	1.58	7.20	1.74
Frequently**	5.88	1.29	7.54	1.50
TOTAL*	6.54	2.06	7.39	1.72

\* $p < .05$ ; \*\* $p < .01$

A 2 (condition) X 3 (drinking status) ANOVA was conducted on the mean noise intensity. There was no effect of drinking status,  $F(2, 86) = .47, p = .63, \eta^2 = .01$ . However, a significant main effect for condition was found, with those exposed to the alcohol prime engaging in more aggression than the control prime,  $F(1, 88) = 5.71, p < .05, \eta^2 = .06$ . Though a significant interaction between alcohol and drinking status was not revealed in the overall analysis,  $F(1, 88) = .80, p = .45, \eta^2 = .02$ , the means seemed to suggest further analysis. A series of independent samples t-tests were conducted separately by drinking status. There was no effect of condition for individuals who never drank alcohol,  $t(25) = .79, p = .43$ , or who only rarely drank alcohol,  $t(37) = .83, p = .41$ . However, there was a significant effect for those who frequently drink alcohol,  $t(26) = 3.02, p < .01$ . Specifically, for this group only, those who were exposed to the alcohol

primes were significantly more aggressive than those exposed to the non-alcoholic primes.

On the whole we found that exposure to alcoholic primes increased aggressive behavior, but only for those individuals who drink alcohol frequently. Individuals who frequently drink alcohol may have highly connected cognitive pathways between alcohol and aggression. Accordingly, when alcohol related scripts were activated, aggression related scripts may have also been activated, leading to a higher likelihood of engaging in aggressive behavior.

This effect can be better understood by examination of variables that may moderate it. Table 6. shows correlations between the laboratory aggression task and attitudes, social norms, response times in the implicit task and data from the qualitative exercise. Based on Baron and Kenny (1986), moderation analyses were conducted by comparing differences in the unstandardised beta weightings between CRT conditions. Although several correlations approached significance, none were found to be so. No significant moderating effects were found.

*Table 6. Correlations Between Attitudes and Perceived Social Norms and CRT Scores*

	CRT	CRT Alcohol	CRT Beverage
	Aggression	Prime	Prime
	(Full Sample)		
Personal Drinking	-.06	-.09	-.06
Friends Drinking	-.11	-.07	-.23
Parental drinking	-.02	-.04	-.01
Pros	.17	.18	.14
Cons	.00	.03	.05
People you know fight	.19	.23	.18
People general fight	.11	.17	.04
People you know disapprove	-.14	-.13	-.12
People general disapproval	-.17	-.10	-.27
TV Preferences			
Music Preferences			
Games Preferences			
Scenario 1	-.11	-.02	-.20
Scenario 2	-.06	.07	-.16
Scenario 3	-.06	.11	-.30
Implicit RT	.12	.13	.18

Media Exposure. We wanted to investigate whether exposure to alcohol use on television influenced reaction to primes in the implicit task and CRT. Table 7 shows that there was no significant correlations between exposure to alcohol use on TV and reaction to the six different primes in the implicit task and or aggressive responding after playing the CRT.

Table 7: Correlations between TV substance use, priming, and aggressive behavior

	Alcohol prime/ aggressio n target	Alcohol l prime/ word target	Alcohol prime/ nonwor d target	Beverage prime/ aggression target	Beverage prime/ word target	Beverage prime/ nonword target	Aggressive behavior (CRT)
Alcohol use on TV	.08	.10	.09	.14	.17	.12	.18

We were also interested in whether exposure to alcohol use on television influenced attitudes to aggression after drinking. Table 8 shows the associations between drinking experience, alcohol use on TV, positive attitudes to drinking, negative attitudes towards drinking, and externalising behaviour. As can be seen, experience with drinking was positively correlated with externalizing behaviour (such as stealing, swearing, etc), and negatively correlated with having a negative attitude towards a person who gets into fights after drinking. Exposure to alcohol use on television was positively correlated with having a positive attitude toward a person who engages in aggression after drinking alcohol. Finally, externalizing behaviour was positively correlated with having a positive attitude, and negatively correlated with having a negative attitude toward someone who fights after drinking.



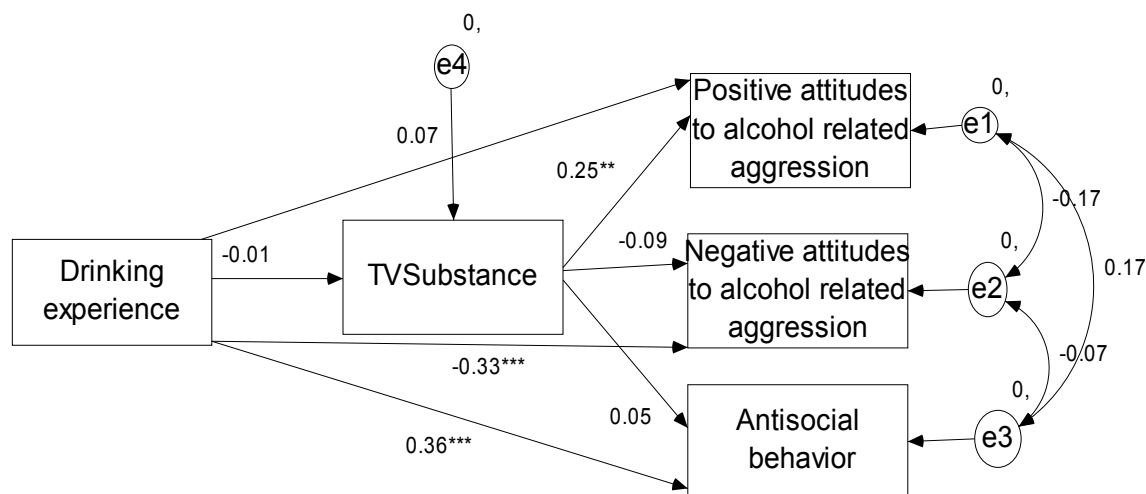
Table 8. The intercorrelations between drinking experience, alcohol use on TV, positive attitudes to drinking, negative attitudes towards drinking, and externalising behaviour.

	1.	2.	3.	4.	5.
1. Drinking experience	--				
2. TV Substance use	.00	--			
3. Positive attitudes	.07	.25**	--		
4. Negative attitudes	-.33***	-.10	-.20*	--	
5. Externalizing behavior	.36***	.05	.18*	-.18*	--

A series of multiple-group, multivariate multiple regressions were conducted with the Analysis of Moments Structure (AMOS) software (Arbuckle & Wothke, 1999). The purpose of the regressions was to assess the impact of exposure to alcohol use on television after controlling for drinking experience. The model was run using full information, maximum likelihood estimation in order to account for any missing data. Fit statistics are not reported as the model was a fully saturated model. Figure 1 shows the model, with path estimates (standardized) noted. The model shows that exposure to alcohol use on television predicts positive attitude toward someone who behaves aggressively after drinking. Other paths from alcohol TV exposure (defined as TV substance use in the diagram) are not significant; so, it is not the case that exposure to alcohol on TV predicts antisocial behaviour or negative attitude to fighting after drinking.

The model also shows that for our data, drinking experience predicts antisocial behaviour.

Figure 1: Path analysis



Overall, our findings shows a small, but significant relationship between viewing alcohol use on television and feeling positive about someone who engages in fighting after drinking. In addition, our findings show that exposure to TV alcohol use was not related to drinking alcohol or engaging in antisocial behavior. Rather, it appears to influence the attitudes a person has about other individuals who would engage in alcohol related aggression.

## DISCUSSION

Examination of links between mental representations of alcohol and aggression in young people below drinking age provides the opportunity to assess social and cultural representations in people who have yet to gain a great deal of personal experience in alcohol use. We examined the extent to which adolescents, aged below the legal drinking age, possessed mental representations of links between alcohol and aggressive behaviour, social antecedents and correlates and behavioural implications of these links. When asked to write short descriptive stories based on a verbal prompt, and stimulus photographs of

intoxicated males and females, 82% mentioned physical or verbal conflict for the verbal prompt, 53% for male and 34% for female photographs. The CRT task provided other evidence for participants' representations of links between alcohol and aggressive behaviour, with participants providing a greater intensity of punishment in a laboratory aggression task after priming with an alcohol stimulus. A word recognition task did not show evidence of implicit semantic priming effects of alcohol-related words on physical aggression words. Frequent drinkers showed comparatively greater aggression after priming than non-drinkers or infrequent drinkers. There was no evidence that participants' attitudes, perceptions of social norms or media preferences were associated with representations of alcohol and aggression.

The high prevalence of scenario responses containing some form of conflict appears to suggest that participants are aware of links between alcohol and aggression. As we did not assess any non-alcohol scenarios, we cannot say whether conflict is greater than that which would be generated by a non-alcohol scenario. Participants chose to use terms such as 'get into a fight', which do not discriminate between verbal or physical conflict, although we suspect that many of these meant physical conflict. Responses to scenario 1 were often specific, outlining whether inter- or intragroup conflict was experienced, whether conflict was provoked and whether police intervened. Scenarios 2 and 3 carried both less detail and less aggressive behaviour, but it is not known whether this is a consequence of familiarity effects created by the use of photographic prompts or order effects associated with the scenario being the first presented. Interestingly, very few participants mentioned premeditation, suggesting that aggression may be seen as a product of situational factors.

The alcohol prime elicited greater noise intensity than the beverage prime. This provides evidence that not only can alcohol prime aggressive thoughts, but that it can prime aggressive actions in a laboratory context. This, with the frequent occurrence of aggressive content in the scenario tasks, provides some evidence that links exist between representations of alcohol and aggression in adolescents.

However, this research is not informative of the qualitative nature of these links. Our measures of attitudes, social environments and media preferences were uncorrelated with scenario or CRT scores. One explanation of this is that links between representations of

alcohol and aggression are diffuse and exist in different ways for different people. Participants who perceive that aggression is possible when young people drink do not necessarily condone it. Indeed, these representations may be more prominent in those who disapprove. This may explain the paradoxical finding that participants' estimates of the proportion of young people that they believed would disapprove were positively related to the likelihood of them reporting aggression in scenario 3. Thus, the use of aggressive themes in the scenarios appears to constitute an awareness that aggression can follow drinking, but this script does not necessarily connote any evaluation of the merits or acceptability of this behaviour.

Scenario and CRT scores were largely uncorrelated with each other. A potential explanation is that links between representations of alcohol and aggression exist at different levels for different people. More simply put, links between alcohol and aggression tapped by scenarios may pertain to participants' awareness of the issue, whereas priming effects in the CRT may pertain to specific behavioural activation processes. One way to conceptualise this is to use theoretical models where cognition and behavioural activation are posited as separate processes (e.g., Gollwitzer, 1999).

Cognition involves processes of contemplation and consideration, whereas behavioural activation is influenced by habitual mechanisms that are controlled by internal and external stimuli and can be influenced by processes such as learning from external feedback or cognitive rehearsal. Thus, it may be the case that participants who used aggressive themes in the scenarios may have been responding to information from a diffuse range of social sources. Those who showed aggression after presentation with an alcohol prime may be exhibiting a form of learned behaviour. Further research may be helpful in testing and elaborating upon this distinction.

Participants did not show evidence of implicit schematic links between alcohol and aggression. This contrasts with Bartholow and Heinz (2006) who found that priming with alcohol cues reduced response times to access aggressive content. It is too early to suggest that our failure to detect alcohol priming effects in this population means that they do not exist. We used alcohol word primes whereas Bartholow and Heinz used images. Also, our 40ms presentation of the prime, based on Friedmen et al. (2007), may have been too short. With regard to the latter point, it needs to be borne in mind that this

level was set at the point where we and the participants were able to perceive most of the priming words. We suggest that it is too early to reject the idea that alcohol and aggression concepts are schematically linked in this group until a range of prime presentation formats and exposure times has been attempted.

One notable feature of the research is the prominence of the link between alcohol use and aggression in these young people. This is manifest in two ways. First, most participants described some form of physical or verbal conflict in their scenario responses. Second, estimates of the number of young people, in general, who engaged in fighting after drinking was high, with a quarter of participants estimating a half or more.

Overestimation is suggested by the fact that estimates for young people in general were notably greater than those for young people that participants actually knew. Perkins et al., (2005) suggest that people may be encouraged to engage in behaviour if they overestimate the number of comparable others who do so, and show that presenting them with corrective normative information can reduce engagement. Thus, research could focus on why young people have an expectation that aggression is likely to occur after drinking and why they believe that many other young people engage in this. We did not find links to participants' preferred media. However, the link between alcohol and violence is a prominent print and electronic media topic, and there is some evidence that a broad media focus on an issue may contribute to beliefs about the prevalence of specific events (Carlyle, Slater & Chakroff, 2008; Escobar-Chavez et al., 2005; Slater, Goodall & Hayes, 2009).

The limitations of this investigation lie in the extent to which we can make inferences based on the design and the instruments used. First, the design of the study is cross-sectional, and we are unable to observe developmental sequences in this sample. Second, there are limits to the measures used. Schanck and Abelson (1977) suggest that cognitive scripts can be assessed by asking participants to complete a story from a non-directive stem. We used three versions of this technique. However, participants' responses were both short and vague, and we are unable to ascertain whether this is due to representations of alcohol-related aggression being vague or that participants simply showed limited interest in recording the extent of their representations.

We have provided some evidence for the idea that scripts containing links between alcohol and aggression are possessed by adolescents below drinking age. Future directions for this research focus on two issues. First, this idea would receive more secure support if implicit links can be demonstrated. Future research could concentrate on establishing whether differing presentation formats or exposure times would produce an effect. Second, we found no support for the idea that media preferences are linked to the variables used in this study. Some research (Carlyle, Slater & Chakroff, 2008; Escobar-Chavez et al., 2005; Slater, Goodall & Hayes, 2009) suggests that, rather than preferred media, young people may be subject to more diffuse media influences. These could include media reporting and presentation of mainstream news and other programming. Also, we used measures of general media violence rather than measures specific to violence specific to alcohol consumption. Measures of the latter may be more effective.

### **SUMMARY AND IMPLICATIONS OF FINDINGS**

In sum, we have found evidence that adolescents under the legal drinking age possess linked representations of the relationship between alcohol use and aggression. These involve some level of expectation that drinking in young people can lead to aggression and the finding that alcohol-related stimuli can prime laboratory aggression. These two findings are statistically separate to each other and suggest that links in mental representations of alcohol and aggression can occur at differing levels. Both effects are statistically independent of participants' attitudes and perceptions of social norms. Thus, it is difficult to understand the meaning that young people attach to these links.

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