Abstract

Alcohol-related violence surrounding the night time economy puts increased pressure and workload on security and police forces. Research surrounding alcohol-related violence consistently identifies risk factors, such as the organizational practices and physical characteristics of drinking establishments, as influential in the generation of violent behaviour. The current research uses sequence analysis to investigate dynamic patterns of events perceived to lead to a violent incident. The research was collected using questionnaires across university students with customer experience of the modern night-time economy. The findings show perceptions of maladaptive patterns of events that may lead to violent incidents in different environments (a brightly-lit bar and a nightclub). Analysis demonstrated that participants thought those involved in a violent incident would have consumed large amounts of alcohol throughout the night, fuelled by pre-drinking and irresponsible serving practices of staff. Frustration inducing events were also common stages in the sequences leading to a violent outcome. Finally, staff intervention in violent situations was also considered to be an important predictor of violence, with forceful removal of individuals from premises often considered to be the final event preceding a violent incident. The present sequences analysis supports the suggestion that the organizational practices and physical characteristics of a drinking establishment influence the risk of violent activity and helps identify where initiatives aiming to reduce levels of violence could be effectively targeted.

Keywords: Sequence analysis; alcohol; violence; drinking establishments; security staff

A Sequential Analysis of perceptions of alcohol-related violence surrounding drinking establishments.

Drinking culture surrounding pubs, bars, and clubs, collectively referred to as the night-time economy (NTE), has led to increased levels of alcohol-related violence around these venues (Povey & Allen, 2003; Smith & Allen, 2004). Recent Home Office statistics in the UK estimate that one fifth of all violent crimes per year occur in, or within close proximity to drinking establishments, with 80% of these assaults relating to alcohol consumption. Similarly, the British Crime Survey (2002-3) reported that 44% of violent crime victims thought the individual who attacked them to be intoxicated. In addition, recent statistics from the North East Alcohol Office, UK (2013), suggest over a third of police officers are asked during most shifts to provide extra support for the policing of the NTE, which demonstrates a considerable strain placed on the services responsible for dealing with the problem. Alcohol-related violence and incidents surrounding night-time venues is a complex issue. While some public policies and researchers have focused on reducing alcohol consumption (Keatley et al., 2015; Lonsdale, Hardcastle, & Hagger, 2012), fewer studies have looked at the complex interaction of behaviours that precede violent episodes around the NTE.

In an attempt to tackle the 'binge drinking' culture in the United Kingdom, the Licensing Act of 2003 introduced flexible opening times for licensed premises, providing management with the option to serve alcohol 24 hours a day. This Act also attempted to minimize public disorder, thought to be instigated by rapid alcohol consumption and mass congregation of intoxicated customers at the 11pm closing time. However, the success of such legislation is largely inconclusive. Whilst small, non-significant decreases in the levels of serious violent crimes have been reported (Hough et al., 2008), a four year study of alcohol-related violent crime in Manchester,

1 UK found no evidence to support the government-proposed hypothesis that flexible

2 closing times would reduce levels of violent crime (Humphreys & Eisner, 2014).

3 Although the introduction of flexible opening hours demonstrates an attempt to deal

4 with the underlying source of alcohol-related violent crime, evidence suggests it has

5 not had a significantly large impact.

6   The binge drinking culture present in the United Kingdom has been fuelled by

7 an increase in young people's drinking behaviour. For instance, binge drinking and

8 drunkenness is a common outcome for individuals socializing within the NTE. Such

9 behaviour is fuelled by the normality of rapid consumption of alcohol prior to entering

10 drinking establishments, referred to as pre-drinking or pre-loading (Caudwell &

11 Hagger, 2015; Caudwell, Mullan, & Hagger, 2016) Previous research has

12 demonstrated that, in comparison to individuals who did not consume alcohol prior to

13 entering licensed premises, pre-drinkers reported higher levels of alcohol consumption

14 during nights-out and were over twice as likely to have had experience of a physical

15 altercation whilst socialising within the NTE during the past year (de Andrade, Homel,

16 Mazerolle, 2016; Graham et al., 2011; Hughes, Anderson, Morleo, & Bellis, 2008;

17 Hughes et al., 2011).

18   In addition to individual difference variables, research surrounding alcohol-

19 related violence consistently identifies environmental factors (i.e. the physical

20 characteristics and social environment of drinking establishments) as influential in the

21 production or triggering of aggressive behaviour (Quigley, Leonard, & Collins, 2003).

22 Research has also identified numerous characteristics of venues that may lead to

23 violent episodes, such as poor layouts resulting in crowding and inefficient movement

24 systems, dimly lit, and noisy establishments (Green & Plant, 2007; Homel & Clark,

25 1994; Leonard et al., 2003; MacIntyre & Homel, 1997).

1   The organizational practices of a drinking establishment are also considered

2   to be triggers of violent activity (Green & Plant, 2007). For instance, the continued

3   service for customers with high levels of intoxication is a strong predictor of

4   aggressive and violent problems within drinking establishments (Stockwell et al.

5   1993; Homel & Clark, 1994). Also, the type of security staff or bouncers employed by

6   management may intensify delinquent behaviour, or the expectation of misbehaviour

7   (Leather & Lawrence, 1995). With or without intention, security or door staff may

8   initiate violence with customers through the use of perceived unreasonable force and

9   as such escalate violent situations rather than diffusing them (Wells, Graham, & West,

10   1998).

11   Therefore, while alcohol may be one cause of violent episodes, it is likely

12   that a complex interaction of many risk factors, such as ineffective staff control and

13   unfavourable establishment characteristics, also trigger violence. A method to

14   investigate the complex progression of risk factors and the chain of events that lead

15   to violent episodes, is therefore needed to provide insight and understanding of the

16   causes of violence in the night-time economy.

17   **Behaviour sequence analysis (BSA)**

18   Alcohol-related violence in drinking establishments is a difficult topic to

19   study using an experimental approach (Beale et al., 1998; Fossi, Clarke, & Lawrence,

20   2005). Behaviour sequence analysis (BSA) applies mathematical models to cause and

21   effect links, in order to further investigate the relationships between events. BSA

22   investigates how events unfold over time and is based on the assumption that

23   identifying the temporal order of events is advantageous for acquiring a more

24   comprehensive understanding of issues like violence. BSA uses methodological

25   eclecticism, applying a quantitative method to qualitative data, therefore providing in-

26   depth knowledge within a scientific framework. As noted by Abbott (1995), sequence

1 analysis methods provide researchers with a more effective way of analysing real-

2 world phenomena.

3   Unlike many data analysis approaches, sequence analysis assumes that events

4 are interdependent, rather than independent of one another (Keatley, 2016; Zourbanos

5 et al., 2015). As suggested by Harré (1977), breaking down social behaviour into

6 isolated events, and as such disregarding the sequential nature and interdependence of

7 social interaction, results in analytic outcomes that do not reflect the true nature of that

8 behaviour. Discovering the order of events leading to a particular outcome allows

9 researchers to anticipate and redirect potentially risky patterns of behaviour. If

10 understood appropriately, the maladaptive pattern of events, which result in violent

11 incidents in drinking establishments, can be interrupted by initiatives introduced to

12 steer sequences towards safer, less costly outcomes.

13   To conduct behaviour sequence analysis, Clarke and Crossland (1985)

14 identify and describe three main stages. First, *unitization*, refers to the division of

15 behaviours/actions into distinct units. Second, events are *classified* into groups based

16 on levels of similarity and functional relatedness. Finally, during *analysis*, transitional

17 matrices are used to establish the frequency with which one event succeeds another. If

18 the probability of one event following the other is above the level of statistical chance,

19 then the events are considered to show a sequential pattern. Significant transitions

20 between two events may then be visually represented in state transition diagrams.

21   Sequence analysis has previously been used to investigate the most common

22 pathways resulting in violent incidents in drinking establishments (Beale et al., 1998;

23 Levine, Best, & Taylor, 2007; Taylor et al., 2008). Findings across studies indicate

24 several significant transitions preceding violent behaviour, including following directly

25 from the initiating problem, once staff members had intervened, or once individuals

26 involved in the aggressive situation have exited the premises. Whilst Beale and

1   colleagues' study retains ecological validity via the analysis of real-world reported

2   incidents, the incidents were reported from the perspective of drinking establishment

3   management and employees. Thus far, no research has utilized sequence analysis to

4   investigate the patterns of behaviours from the perspective of a customer.

5   **Present study**

6   The aim of the present study was to use sequence analysis to investigate

7   participants' perceptions of the patterns of behaviour resulting in violence within

8   licensed premises. Based on previous research (see Beale et al., 1998) it was

9   hypothesised that participants with experience of the NTE may have a more in-depth

10   understanding of the processes leading to violent incidents and as such reveal how and

11   where strategies aiming to reduce violent incidents could be effectively targeted. In

12   order to investigate contextual differences in the progression and sequence of violent

13   episodes, the current study focused on two different types of night-time venues. The

14   first (Condition A) was based in a brightly-lit, aesthetically pleasing drinking

15   establishment with a large seating area. The second (Condition B) was based in a

16   dimly-lit drinking establishment with limited seating availability and would be

17   commonly referred to as a 'nightclub'. These venues were selected to give a general

18   contrast between two popular night time venues. The main aim being to see whether

19   similar patterns emerged, and how this may be used to reduce violence in these

20   venues.

21   **Method**

22   **Participants**

23   A convenience sample of participants was collected via email and by hand. In

24   the first instance, participants were contacted via an online sign-up participation

25   system; however, researchers also collected questionnaires by handing them out to

26   people. Target participants were individuals over 18 years old in Nottingham, UK,

1   with customer experience of the modern night-time economy, and therefore the sample

2   mostly consisted of undergraduate students. Participants were brief that the study

3   would ask them about perceptions of violent incidents in a night time venue

4   (depending on the condition they were in); therefore, to participate, they should have

5   previous experience of being out at night in that particular venue. The returned

6   questionnaires consisted of an almost equal number of Condition A (N = 78, 56

7   females, 22 males, M_{age} = 20.33, SD = 1.08, range = 18-25 years) and Condition B (N

8   = 75, 45 females, 30 males, M_{age} = 19.88, SD = 1.61, range = 18-25). Unfortunately,

9   ethnic and social economic status of participants was lost; however, all participants

10 were Undergraduate students, from a broadly white-British background, and middle-

11 SES. No financial incentive was offered to individuals for their participation. Ethical

12 Approval was gained from the University of [REMOVED FOR ANONYMOUS

13 REVIEW].

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15 **Sequence List development**

16   Based on previous research (e.g., Beale et al., 1998) and discussion with

17 individuals with experience of the modern night-time economy, a list of 47 events was

18 produced as a starting point on which participants could develop and describe their

19 sequences (See supplementary material 1). This list included typical events and

20 behaviours previously highlighted in the literature. This method of eliciting sequences

21 of behaviours has been supported in the literature (Townsend et al., 2016). The events

22 were placed in a random order to avoid influencing the sequences provided by

23 participants.

24 **Materials**

25   Participants received a questionnaire booklet, relating to either condition A or

26 B. The booklets were comprised of an information sheet, consent form, picture sheet,

1   task sheets and debrief sheet. The only difference between the two questionnaires was

2   the picture sheet, which instructed participants to study an image of either Condition A

3   (the brightly-lit bar) or Condition B (the nightclub). The pictures and description of the

4   two conditions were assessed by twenty randomly selected participants. The results of

5   the manipulation check confirmed the main differences between the establishments

6   chosen to feature in the questionnaire were maintenance, ease of movement, and

7   visibility[1].

8   **Procedure**

9   Participants were sent emails with the questionnaire booklet attached, or were

10 given the questionnaire by hand. The booklet first informed participants about the

11 content of the study, indicating that they should have experience of the night-time

12 economy. Participants then gave full consent to participate. Participants were given

13 either Condition A or Condition B questionnaires. First, participants in both conditions

14 read the same short description of a violent incident occurring between two

15 individuals. This description was based on a real life violent incident, reported by the

16 Daily Mail (Sharp, 2013), which occurred between a male security staff member and a

17 male customer outside a drinking establishment in Newcastle (a large city in the North

18 of England, UK). Participants were then asked to study the image of the venue in their

19 questionnaire and told that the scenario they had read occurred in that venue.

20 Participants were then asked to use their own experience and knowledge to

21 chronologically order a series of events that they believed to precede the violent

22 outcome. Participants read a list of 47 possible behaviours and were asked to select

23 which behaviours they thought would occur. Participants were then asked, of the

24 behaviours they selected, and any others they thought might occur, to put them in

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[1] Results for manipulation check available from correspondence author, on request.

sequential order. Participants could put the same behaviour in multiple times, or just once. Participants were informed to use as many or as few behaviours as they thought necessary to give a full description of the timeline of events.

Results

Data Collation

Participants' data were coded into strings of sequences, and input into a behaviour sequence analysis program in SPSS. Separate sequence chains were produced by individuals who were in condition A or B. This allowed separate analyses to be conducted between the two night time venues and differences between contexts to be investigated.

Frequency Analysis

The first stage of behaviour sequence analysis is to understand the individual frequencies of particular behaviours or events (see Table 1). Table 1 shows the frequencies of individual events for Condition A (well-lit, open bar) and Condition B (dimly-lit, crowded nightclub). Results indicated that the majority of participants selected 'Enter the establishment', 'pre-drinking' and 'purchasing multiple drinks at once' were the most frequently occurring individual behaviours.

Sequence Analysis

Sequence analysis was then conducted to show the progression of events that participants perceived to result in a violent outcome. Using SPSS, transitional frequency matrices were produced for each condition to establish whether one event (the *sequitur*) was preceded by another event (the *antecedent*), at a level higher than expected by chance alone. However, as 47 events would result in a lag-one transition table containing 2,209 cells, the number of events was reduced to allow for effective analysis and understanding of the data. The 16 events with the highest frequency

1   were selected as independent events, whilst the remaining events were allocated to

2   three event groupings in order of decreasing frequency; Moderately-High Frequency,

3   Medium Frequency, and Low Frequency groupings. As a result, 19 events remained

4   for the sequence analysis (the 16 individual high frequency ones, and the 3

5   groupings). This is a standard practice in sequence analysis to reduce complexity of

6   the data and diagrams (see Townsend et al., 2016)[2].

7   Chi-squared tests were performed to determine whether a sequential pattern

8   existed in each of the conditions. The chi-square value was significant for both

9   conditions, indicating that transitions in the data had a sequential relationship at a

10   level greater than expected by chance. For Establishment A, $\chi^2(324) = 2612.26$, $p <$

11   .001, for Establishment B, $\chi^2(324) = 2897.85$, $p < .001$.

12   To establish the transition between behaviours, the standardised residuals for

13   each possible event pair were calculated. This was performed individually for each

14   condition (see Figure 1 for Condition A, and Figure 2 for Condition B). Although

15   Colgan and Smith's (1978) guidelines advocated 1.008 as a set threshold to identify

16   significant transitions between events, a more stringent critical value of standardised

17   residuals greater than 2 was used, which is closer to more recent guidelines (Klonek,

18   Quera, & Kauffeld, 2015). This ensured that the subsequent state transitions

19   diagrams, which were produced to visually illustrate the patterns of events in the

20   sequences, were not too complex to follow and showed only the most common

21   transitions.

22   **State Transition Diagram**

23   The state transition diagram shows links between pairs of behaviours (e.g.,

24   A→B; B→C; C→D). The diagram may give the impression that you can, therefore,

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[2] Full transition matrices for all behaviours are available from the corresponding author, on request.

1   read sequences as A→B→C; however, this is not the case[3]. The diagrams should be

2   read in single-step increments. For instance, sequences in both conditions began with

3   pre-drinking; from this antecedent people in condition A thought that either *queueing*

4   or *enter drinking establishment* would follow. However, participants in condition B

5   thought that only *queuing* would follow.

6   The first thing to note is that sequences were very similar for both conditions.

7   By following the state transition diagrams, participants' perceptions of the progression

8   between behaviours can be seen. Sequences show that immediately after entering the

9   premises, participants thought that those involved in the violent situation would be

10   likely to participate in a chain of *purchasing and consuming multiple alcoholic*

11   *beverages*, often of the caffeinated-alcoholic variety. In both figures 1 and 2, condition

12   A and B respectively, dancing occurred early in the sequences and was perceived to be

13   followed by the protagonist *behaving disruptively* and *feels hot or frustrated*. In

14   condition A (figure 1), having *drink spilt on clothes* was related to several other

15   behaviours, including feelings of frustration, subjected to verbal abuse, and being

16   threatened.

17   The sequences provided by participants showed significant transition from

18   *Accidentally pushed/shoved* and *Behaving disruptively* and *Others becoming involved*

19   *in potentially violent situation.* This suggests that participants thought the addition of

20   more people, attempting to either participate or intervene in the aggressive situation,

21   might cause the situation to escalate. Correspondingly, the events with the highest

22   frequency within the Medium and Low Frequency groups that immediately precede the

23   violent incident were *Supported by friends/partner/stranger in argument*, *Group*

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[3] These *higher-order* analyses are possible; however, they are very data consuming and the lag-one analysis provides a clear progression of behaviours. Original data sets are available from the corresponding author, if anyone wishes to conduct higher-order analysis.

1 *Rivalry'* and '*Becomes involved in pre-existing fight* (see supplementary material 2).

2 *Intervention Fails* also had the highest frequency within the medium frequency event

3 group, suggesting participants may have perceived the involvement of others, such as

4 staff members or friends, as ineffective. Finally, in both conditions, *Forceful removal*

5 *from premises by security staff* was considered an event that preceded the violent

6 incident.

7 **Discussion**

8   The aim of the present research was to use behaviour sequence analysis to

9 understand participants' perceptions of the progression of events and behaviours that

10 lead to violence in and around different night-time economy venues. In particular, a

11 well-lit bar and a dimly-lit, crowded club were chosen as venues, and different groups

12 of participants were asked to provide an account of the most likely sequence of events

13 from leaving home to a violent incident occurring later that night. This research

14 provides general support for a number of previous studies in the area (Beale et al.,

15 1998; Levine et al., 2007; Taylor et al., 2008). In particular, the current research

16 complements Beale and colleagues' findings, which investigated a similar topic, but

17 from the perspective of management and venue owners. The current research indicates

18 that it is not necessarily just intervention by staff that leads to violence, but several

19 different antecedent behaviours.

20   The analysis of the sequences provided by participants offers a new method

21 for mapping their perceptions of sequences that may lead to violence in and around

22 the night time economy. Firstly, the sequences show that pre-drinking alcohol before

23 setting-out to go to a venue was frequently perceived to be an antecedent behaviour

24 leading to eventual violence. This supports research that shows pre-drinking is an

25 increasing concern, especially among University students (Caudwell & Hagger, 2015;

26 Caudwell et al., 2016). To tackle the combined effects of pre-drinking and venue

1 drinking, the potentially irresponsible sale of alcohol could be discouraged by

2 prohibiting the purchase of multiple alcoholic drinks in one transaction, or reducing

3 the length of 'happy hours', whilst also limiting the sale of discounted and

4 caffeinated-alcoholic drinks, which have been linked to increased violence (Kuhns,

5 Clodfelter & Bersot, 2010).

6   To help tackle inebriation and violence, staff members could be provided

7 with training in how to effectively refuse service to intoxicated customers and offer

8 non-alcohol alternatives. Certain countries have introduced programmes aiming to

9 promote the responsible service of alcohol, with reasonable success (e.g., the

10 Responsible Beverage Service Program in Canada). Although such interventions are

11 likely to have a positive effect on reducing levels of alcohol-related violence in other

12 countries, as of yet, the implementation of such initiatives is not common practice.

13   A comparative assessment of condition A and B sequences revealed that

14 there were an increased number of perceived transitions between alcohol

15 purchase/consumption and frustration inducing events and disruptive behaviour in

16 condition A. It may be that these transitions did not feature as much in condition B

17 sequences as such behaviour is more expected and tolerated in enclosed, crowded

18 layouts typical of night-clubs. Therefore, initiatives to improve the design of

19 licensed premises, such as one-way pedestrian movement systems or lowering

20 maximum capacity of establishments, may be effective in reducing the risk for

21 violent activity within an establishment.

22   The current findings indicated that the forceful removal of individuals from

23 licensed premises was often perceived as a final trigger before a violent incident. This

24 finding supports previous research that showed how staff intervention can have a

25 negative impact during conflict situations (Beale et al., 1998). Since publication of

26 Beale and colleagues' research, UK legislation has introduced the requirement for

1   security staff to hold a license from the Security Industry Authority, obtained by

2   completing training in a range of areas, including health and safety at work, physical

3   intervention, and conflict management. Effectiveness of current training may still be

4   ineffective as recent customers of the modern night-time economy still view staff

5   intervention as a risk factor for violent behaviour. Although UK security staff have the

6   right to respond with equal force when necessary, responsibility to customers and

7   customer care should be paramount.

8   The analysis of results shows the perceived sequences of events leading to a

9   violent incident based on the responses provided by a sample of both male and

10   female students; however, the generalizability of this student sample to other

11   populations is questionable. It is likely that the sequences produced by non-student

12   populations or of those above 25 years of age may be different. Similarly, the

13   majority of respondents were mainly white British male participants and it is

14   acknowledged that the triggers for violent behaviour and effects of alcohol

15   consumption may be different for other ethnic and cultural groups and between males

16   and females.

17   In addition, the violent scenario that participants were required to read was

18   male orientated. As a result, the sequences produced by participants may represent the

19   events which they thought would lead to a violent incident between two males.

20   Although it is likely that a large proportion of violent incidents surrounding the NTE

21   are male-orientated, a rise in the number of females participating in binge drinks and

22   anti-social behaviour may highlight the need for future research to investigate the

23   causes of female-female violent incidents.

24   **Conclusions**

25   The general conclusion to be drawn from this research is that, from the

26   perspective of a customer, there is often a series of interdependent events perceived to

1 precede violent incidents that occur in, or within close proximity to drinking

2 establishments. Applying the method of sequences analysis has allowed the

3 integration of every day experiences and scientific study, which is vital for issues

4 with real world applications, such as alcohol-related violent crime. The technique has

5 allowed insight into how risk factors surrounding the night-time economy cumulate

6 and highlights where appropriate measures could be implemented, such as queuing

7 and staff removal strategies. Intoxication alone is not a clear predictor of violence, yet

8 the combination of drunkenness and risk factors internal to the licensed premises may

9 result in an increased propensity for violent behaviour in certain individuals.

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