A Behavior Sequence Analysis of Perceptions of Alcohol-Related Violence Surrounding Drinking Establishments

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Abstract

Alcohol-related violence surrounding the nighttime 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 behavior. 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 nighttime 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, fueled by predrinking 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

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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

Drinking culture surrounding pubs, bars, and clubs, collectively referred to as the nighttime 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 United Kingdom 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 (2002-2003) 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 (2013), the United Kingdom, 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 nighttime venues is a complex issue. Although some public policies and researchers have focused on reducing alcohol consumption (Keatley et al., in press; Lonsdale, Hardcastle, & Hagger, 2012), fewer studies have looked at the complex interaction of behaviors 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 hr 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 11:00 p.m. closing time. However, the success of such legislation is largely inconclusive. While small, nonsignificant decreases in the levels of serious violent crimes have been reported (Hough, Hunter, Jacobson, & Cossalter, 2008), a 4-year study of alcohol-related violent crime in Manchester, the United Kingdom, found no evidence to support the government-proposed hypothesis that flexible closing times would reduce levels of violent crime (Humphreys & Eisner, 2014). Although the introduction of

flexible opening hours demonstrates an attempt to deal with the underlying source of alcohol-related violent crime, evidence suggests it has not had a significantly large impact.

The binge-drinking culture present in the United Kingdom has been fueled by an increase in young people's drinking behavior. For instance, binge drinking and drunkenness is a common outcome for individuals socializing within the NTE. Such behavior is fueled by the normality of rapid consumption of alcohol prior to entering drinking establishments, referred to as *predrinking* or *preloading* (Caudwell & Hagger, 2015; Caudwell, Mullan, & Hagger, 2016). Previous research has demonstrated that, in comparison with individuals who did not consume alcohol prior to entering licensed premises, predrinkers reported higher levels of alcohol consumption during nights out and were over twice as likely to have had experience of a physical altercation while socializing within the NTE, during the past year (de Andrade, Homel, & Mazerolle, 2016; Graham et al., 2011; Hughes, Anderson, Morleo, & Bellis, 2008; Hughes et al., 2011).

In addition to individual difference variables, research surrounding alcohol-related violence consistently identifies environmental factors (i.e., the physical characteristics and social environment of drinking establishments) as influential in the production or triggering of aggressive behavior (Quigley, Leonard, & Collins, 2003). Research has also identified numerous characteristics of venues that may lead to violent episodes, such as poor layouts resulting in crowding and inefficient movement systems, and dimly lit and noisy establishments (Green & Plant, 2007; Homel & Clark, 1994; Leonard, Collins, & Quigley, 2003; MacIntyre & Homel, 1997).

The organizational practices of a drinking establishment are also considered to be triggers of violent activity (Green & Plant, 2007). For instance, the continued service for customers with high levels of intoxication is a strong predictor of aggressive and violent problems, within drinking establishments (Homel & Clark, 1994; Stockwell, Lang, & Rydon, 1993). Also, the type of security staff or bouncers employed by management may intensify delinquent behavior or the expectation of misbehavior (Leather & Lawrence, 1995). With or without intention, security or door staff may initiate violence with customers through the use of perceived unreasonable force and as such escalate violent situations rather than diffusing them (Wells, Graham, & West, 1998).

Therefore, although alcohol may be one cause of violent episodes, it is likely that a complex interaction of many risk factors, such as ineffective staff control and unfavorable establishment characteristics, also trigger violence. A method to investigate the complex progression of risk factors and the chain of events that lead to violent episodes is therefore needed to provide insight and understanding of the causes of violence in the NTE.

Behavior Sequence Analysis (BSA)

Alcohol-related violence in drinking establishments is a difficult topic to study using an experimental approach (Beale, Cox, Clarke, Lawrence, & Leather, 1998; Fossi, Clarke, & Lawrence, 2005; Keatley, Barsky, & Clarke, 2017). BSA applies mathematical models to cause and effect links, to further investigate the relationships between events. BSA investigates how events unfold over time and is based on the assumption that identifying the temporal order of events is advantageous for acquiring a more comprehensive understanding of issues like violence. BSA uses methodological eclecticism, applying a quantitative method to qualitative data, therefore providing in-depth knowledge within a scientific framework. As noted by Abbott (1995) and Keatley and colleagues (2017), sequence analysis methods provide researchers with a more effective way of analyzing real-world phenomena.

Unlike many data analysis approaches, sequence analysis assumes that events are interdependent, rather than independent of one another (Keatley, 2016; Zourbanos et al., 2015). As suggested by Harré (1977), breaking down social behavior into isolated events, and as such disregarding the sequential nature and interdependence of social interaction, results in analytic outcomes that do not reflect the true nature of that behavior. Discovering the order of events leading to a particular outcome allows researchers to anticipate and redirect potentially risky patterns of behavior. If understood appropriately, the maladaptive pattern of events, which result in violent incidents in drinking establishments, can be interrupted by initiatives introduced to steer sequences toward safer, less costly outcomes.

To conduct BSA, Clarke and Crossland (1985) identify and describe three main stages. First, *unitization*, refers to the division of behaviors/actions into distinct units. Second, events are *classified* into groups based on levels of similarity and functional relatedness. Finally, during *analysis*, transitional matrices are used to establish the frequency with which one event succeeds another. If the probability of one event following the other is above the level of statistical chance, then the events are considered to show a sequential pattern. Significant transitions between two events may then be visually represented in state transition diagrams.

Sequence analysis has previously been used to investigate the most common pathways resulting in violent incidents in drinking establishments (Beale et al., 1998; Levine, Best, & Taylor, 2007; Taylor, Jacques, Giebels, Levine, & Gendreau, 2008). Findings across studies indicate several significant transitions preceding violent behavior, including following directly from the initiating problem, once staff members had intervened or once individuals involved in the aggressive situation have exited the premises. While Beale

and colleagues' study retains ecological validity via the analysis of real-world reported incidents, the incidents were reported from the perspective of drinking establishment management and employees. Thus far, no research has utilized sequence analysis to investigate the patterns of behaviors from the perspective of a customer.

Present Study

The aim of the present study was to use sequence analysis to investigate participants' perceptions of the patterns of behavior resulting in violence within licensed premises. Based on previous research (see Beale et al., 1998), it was hypothesized that participants with experience of the NTE may have a more in-depth understanding of the processes leading to violent incidents and as such reveal how and where strategies aiming to reduce violent incidents could be effectively targeted. To investigate contextual differences in the progression and sequence of violent episodes, the current study focused on two different types of nighttime venues. The first (Condition A) was based in a brightly lit, aesthetically pleasing drinking establishment with a large seating area. The second (Condition B) was based in a dimly lit drinking establishment with limited seating availability and would be commonly referred to as a "nightclub." These venues were selected to give a general contrast between two popular nighttime venues. The main aim is to see whether similar patterns emerged and how this may be used to reduce violence in these venues.

Method

Participants

A convenience sample of participants was collected via email and by hand. In the first instance, participants were contacted via an online sign-up participation system; however, researchers also collected questionnaires by handing them out to people. Target participants were individuals above 18 years old in Nottingham, the United Kingdom, with customer experience of the modern NTE, and therefore the sample mostly consisted of undergraduate students. Participants were briefed that the study would ask them about perceptions of violent incidents in a nighttime venue (depending on the condition they were in); therefore, to participate, they should have previous experience of being out at night in that particular venue. The returned questionnaires consisted of an almost equal number of Condition A ($n = 78$, 56 females, 22 males, $M_{age} = 20.33$, $SD = 1.08$, range = 18-25 years) and Condition B ($n = 75$, 45 females, 30 males, $M_{age} = 19.88$, $SD = 1.61$, range = 18-25). Unfortunately, ethnic and

social economic status of participants was lost; however, all participants were undergraduate students, from a broadly White British background, and middle-SES (socioeconomic status). No financial incentive was offered to individuals for their participation. Ethical approval was gained from the University of Nottingham, the United Kingdom.

Sequence List development

Based on previous research (e.g., Beale et al., 1998) and discussion with individuals with experience of the modern NTE, a list of 47 events was produced as a starting point on which participants could develop and describe their sequences (see Supplementary Material 1). This list included typical events and behaviors previously highlighted in the literature. This method of eliciting sequences of behaviors has been supported in the literature (Keatley et al., 2017; Townsend et al., 2016). The events were placed in a random order to avoid influencing the sequences provided by participants.

Materials

Participants received a questionnaire booklet, relating to either Condition A or B. The booklets were comprised of an information sheet, consent form, picture sheet, task sheets, and debrief sheet. The only difference between the two questionnaires was the picture sheet, which instructed participants to study an image of either Condition A (the brightly lit bar) or Condition B (the nightclub). The pictures and description of the two conditions were assessed by 20 randomly selected participants. The results of the manipulation check confirmed the main differences between the establishments chosen to feature in the questionnaire were maintenance, ease of movement, and visibility.[1]

Procedure

Participants were sent emails with the questionnaire booklet attached or were given the questionnaire by hand. The booklet first informed participants about the content of the study, indicating that they should have experience of the NTE. Participants then gave full consent to participate. Participants were given either Condition A or Condition B questionnaires. First, participants in both conditions read the same short description of a violent incident occurring between two individuals. This description was based on a real life violent incident, reported by the *Daily Mail* (Sharp, 2013), which occurred between a male security staff member and a male customer outside a drinking establishment in Newcastle (a large city in the North of England, the United

Kingdom). Participants were then asked to study the image of the venue in their questionnaire and told that the scenario they had read occurred in that venue. Participants were then asked to use their own experience and knowledge to chronologically order a series of events that they believed to precede the violent outcome. Participants read a list of 47 possible behaviors and were asked to select which behaviors they thought would occur. Participants were then asked, of the behaviors they selected, and any others they thought might occur, to put them in sequential order. Participants could put the same behavior in multiple times, or just once. Participants were informed to use as many or as few behaviors 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 BSA 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 nighttime venues and differences between contexts to be investigated.

Frequency Analysis

The first stage of BSA is to understand the individual frequencies of particular behaviors 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 behaviors.

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 were selected as independent

Table 1. High Frequency Events Selected as Individual Events for Sequential Analysis.

Events	Condition A	Condition B
Enter drinking establishment	69	72
Left home after "pre-drinking"	64	71
Purchasing multiple alcoholic drinks for self in one transaction	57	71
Queuing	46	63
Dancing	40	64
Accidentally shoved/pushed	52	44
Behaving disruptively	52	38
Feels hot or frustrated	44	38
Consumption of alcoholic-caffeinated drinks	30	44
Subject to verbal abuse	37	25
Had drink spilt on clothes	31	30
Subjected to threatening/intimidating facial expressions	37	24
Other individual becomes involved in potentially violent situation	37	23
Purchase drinks on offer (e.g., 2-4-1)	29	31
Entered crowded environment	27	27
Forceful removal from premises by security/door staff	24	28

events, while the remaining events were allocated to three event groupings in order of decreasing frequency—moderately high frequency, medium frequency, and low frequency groupings. As a result, 19 events remained for the sequence analysis (the 16 individual high frequency ones and the three groupings). This is a standard practice in sequence analysis to reduce complexity of the data and diagrams (see Townsend et al., 2016).[2]

Chi-square tests were performed to determine whether a sequential pattern existed in each of the conditions. The chi-square value was significant for both conditions, indicating that transitions in the data had a sequential relationship at a level greater than expected by chance. For Establishment A, $\chi^2(324) = 2,612.26$, $p < .001$, for Establishment B, $\chi^2(324) = 2,897.85$, $p < .001$.

To establish the transition between behaviors, the standardized residuals for each possible event pair were calculated. This was performed individually for each condition (see Figure 1 for Condition A and Figure 2 for Condition B). Although Colgan and Smith's (1978) guidelines advocated 1.008 as a set threshold to identify significant transitions between events, a more stringent
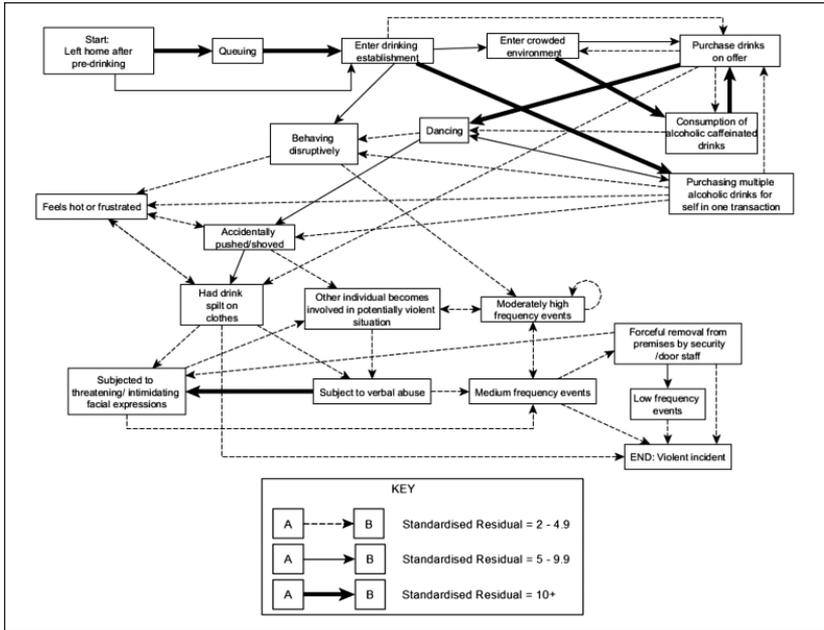
Figure 1. State transition diagrams of the sequence of events in Condition A—A well-lit bar.

Note. Position of boxes does not indicate temporal order. All transitions are significant (*p* < .05).

critical value of standardized residuals greater than 2 was used, which is closer to more recent guidelines (Klonek, Quera, & Kauffeld, 2015). This ensured that the subsequent state transitions diagrams, which were produced to visually illustrate the patterns of events in the sequences, were not too complex to follow and showed only the most common transitions.

State Transition Diagram

The state transition diagram shows links between pairs of behaviors (e.g., A → B; B → C; C → D). The diagram may give the impression that you can, therefore, read sequences as A → B → C; however, this is not the case.[3] The diagrams should be read in single-step increments. For instance, sequences in both conditions began with predrinking; from this, antecedent people in Condition A thought that either *queuing* or *enter drinking establishment* would follow. However, participants in Condition B thought that only *queuing* would follow.
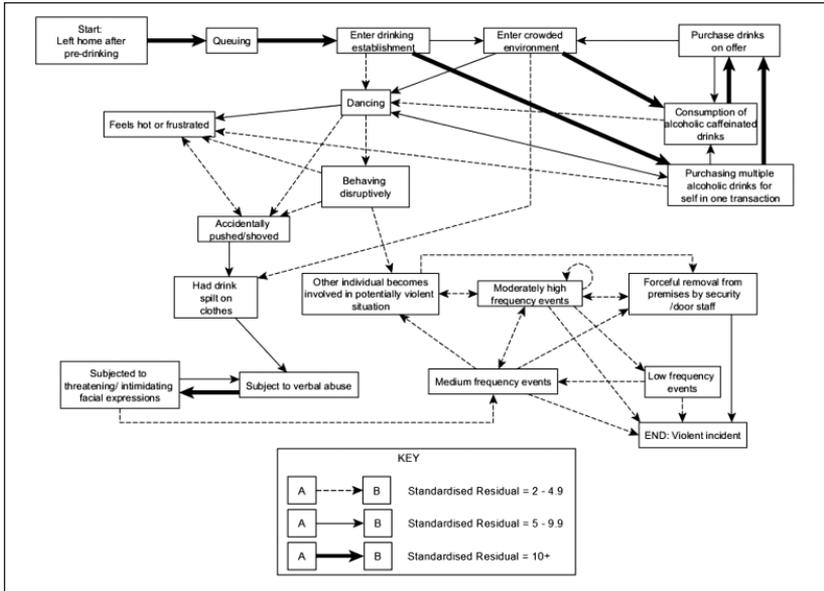
Figure 2. State transition diagrams of the sequence of events in Condition B—A nightclub.
Note. Position of boxes does not indicate temporal order. All transitions are significant ($p < .05$).

The first thing to note is that sequences were very similar for both conditions. By following the state transition diagrams, participants' perceptions of the progression between behaviors can be seen. Sequences show that immediately after entering the premises, participants thought that those involved in the violent situation would be likely to participate in a chain of *purchasing and consuming multiple alcoholic beverages*, often of the caffeinated-alcoholic variety. In both Figures 1 and 2, Conditions A and B, respectively, dancing occurred early in the sequences and was perceived to be followed by the protagonist *behaving disruptively* and *feels hot or frustrated*. In Condition A (Figure 1), having *drink spilt on clothes* was related to several other behaviors, including feelings of frustration, subjected to verbal abuse, and being threatened.

The sequences provided by participants showed significant transition from *accidentally pushed/shoved* and *behaving disruptively* and *others becoming involved in potentially violent situation*. This suggests that participants thought the addition of more people, attempting to either participate or intervene in the aggressive situation, might cause the situation to escalate.

Correspondingly, the events with the highest frequency within the medium and low frequency groups that immediately precede the violent incident were *supported by friends/partner/stranger in argument, group rivalry* and *becomes involved in preexisting fight* (see Supplementary Material 2). *Intervention fails* also had the highest frequency within the medium frequency event group, suggesting participants may have perceived the involvement of others, such as staff members or friends, as ineffective. Finally, in both conditions, *forceful removal from premises by security staff* was considered an event that preceded the violent incident.

Discussion

The aim of the present research was to use BSA to understand participants' perceptions of the progression of events and behaviors that lead to violence in and around different NTE venues. In particular, a well-lit bar and a dimly lit, crowded club were chosen as venues, and different groups of participants were asked to provide an account of the most likely sequence of events from leaving home to a violent incident occurring later that night. This research provides general support for a number of previous studies in the area (Beale et al., 1998; Levine et al., 2007; Taylor et al., 2008). In particular, the current research complements Beale and colleagues' findings, which investigated a similar topic, but from the perspective of management and venue owners. The current research indicates that it is not necessarily just intervention by staff that leads to violence, but several different antecedent behaviors.

The analysis of the sequences provided by participants offers a new method for mapping their perceptions of sequences that may lead to violence in and around the NTE. First, the sequences show that predrinking alcohol before setting out to go to a venue was frequently perceived to be an antecedent behavior leading to eventual violence. This supports research that shows predrinking is an increasing concern, especially among university students (Caudwell & Hagger, 2015; Caudwell et al., 2016). To tackle the combined effects of predrinking and venue drinking, the potentially irresponsible sale of alcohol could be discouraged by prohibiting the purchase of multiple alcoholic drinks in one transaction, or reducing the length of "happy hours," while also limiting the sale of discounted and caffeinated-alcoholic drinks, which have been linked to increased violence (Kuhns, Clodfelter, & Bersot, 2010).

To help tackle inebriation and violence, staff members could be provided with training in how to effectively refuse service to intoxicated customers and offer nonalcohol alternatives. Certain countries have introduced programmes aiming to promote the responsible service of alcohol, with

reasonable success (e.g., the Responsible Beverage Service Program in Canada). Although such interventions are likely to have a positive effect on reducing levels of alcohol-related violence in other countries, as of yet, the implementation of such initiatives is not common practice.

A comparative assessment of Condition A and B sequences revealed that there were an increased number of perceived transitions between alcohol purchase/consumption and frustration inducing events and disruptive behavior in Condition A. It may be that these transitions did not feature as much in Condition B sequences as such behavior is more expected and tolerated in enclosed, crowded layouts typical of nightclubs. Therefore, initiatives to improve the design of licensed premises, such as one-way pedestrian movement systems or lowering maximum capacity of establishments, may be effective in reducing the risk of violent activity within an establishment.

The current findings indicated that the forceful removal of individuals from licensed premises was often perceived as a final trigger before a violent incident. This finding supports previous research that showed how staff intervention can have a negative impact during conflict situations (Beale et al., 1998). Since publication of Beale and colleagues' research, U.K. legislation has introduced the requirement for security staff to hold a license from the Security Industry Authority, obtained by completing training in a range of areas, including health and safety at work, physical intervention, and conflict management. Effectiveness of current training may still be ineffective as recent customers of the modern NTE still view staff intervention as a risk factor for violent behavior. Although U.K. security staff have the right to respond with equal force when necessary, responsibility to customers and customer care should be paramount.

The analysis of results shows the perceived sequences of events leading to a violent incident based on the responses provided by a sample of both male and female students; however, the generalizability of this student sample to other populations is questionable. It is likely that the sequences produced by nonstudent populations or of those above 25 years of age may be different. Similarly, the majority of respondents were mainly White British male participants and it is acknowledged that the triggers for violent behavior and effects of alcohol consumption may be different for other ethnic and cultural groups and between males and females.

In addition, the violent scenario that participants were required to read was male orientated. As a result, the sequences produced by participants may represent the events which they thought would lead to a violent incident between two males. Although it is likely that a large proportion of violent incidents surrounding the NTE are male orientated, a rise in the number of females participating in binge drinks and antisocial behavior

may highlight the need for future research to investigate the causes of female–female violent incidents.

Conclusion

The general conclusion to be drawn from this research is that, from the perspective of a customer, there is often a series of interdependent events perceived to precede violent incidents that occur in, or within close proximity to drinking establishments. Applying the method of sequences analysis has allowed the integration of everyday experiences and scientific study, which is vital for issues with real-world applications, such as alcohol-related violent crime. The technique has allowed insight into how risk factors surrounding the NTE cumulate and highlights where appropriate measures could be implemented, such as queuing and staff removal strategies. Intoxication alone is not a clear predictor of violence, yet the combination of drunkenness and risk factors internal to the licensed premises may result in an increased propensity for violent behavior in certain individuals.

Declaration of Conflicting Interests

Funding

Notes

1. Results for manipulation check are available from correspondence author, on request.
2. Full transition matrices for all behaviors are available from the corresponding author, on request.
3. These *higher order* analyses are possible; however, they are very data consuming and the lag-one analysis provides a clear progression of behaviors. Original data sets are available from the corresponding author if anyone wishes to conduct higher order analysis.

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D. A. Keatley is a lecturer in forensic psychology at the University of Lincoln, the United Kingdom. He specializes in the areas of applied forensic psychology and sequence analysis. He is the cofounder and Director of Researchers in Behaviour Sequence Analysis (ReBSA). He started his career at the University of Nottingham, the United Kingdom, on an Economic and Social Research Council (ESRC) funded PhD studentship. He has worldwide collaborations and links with academics and stakeholders. He has multiple research articles published in international, peer-reviewed journals, and has presented at many international conferences.

D. D. Clarke is an emeritus professor of psychology and former head of school at the University of Nottingham, the United Kingdom. He holds doctorates from the Universities of Oxford and Cambridge, has given lecture courses at Oxford, Cambridge, and Nottingham, and has supervised 48 successful PhDs. Having started his career in medical sciences, he mainly researches pathways into and out of dangerous situations, using behavior sequence analysis to study road traffic collisions, evacuations, fights, rapes, relationship breakdowns, and mental disorders. He is cofounder of Researchers in Behaviour Sequence Analysis (ReBSA)—an international network of experts in the area of sequence analysis.