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RUNNING HEAD: Death by police shooting in Australia

Death by police shooting in Australia: Understanding lethal force decisions through a
sequence analysis of behaviour

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Abstract

Police officers' use of lethal force is scrutinised to determine the appropriateness of the decision to shoot. However, surprisingly little research has systematically examined the sequence of behaviours that leads to this decision. This study content analysed coronial reports of 58 deaths by police shooting in Australia, coding behavioural and situational features. A novel sequence analysis method – the proximity coefficient (Taylor, 2009) – was used to determine the proximities of police and subject behaviours to interpret how police firearm presentation and discharge may be influenced by preceding actions. Theoretical implications and practical applications for preventing fatal outcomes, are discussed.

Key words: Police shooting, officer involved shooting, lethal force, fatal force, police firearms, suicide by cop

Death by police shooting in Australia: Understanding lethal force decisions through a sequence analysis of behaviour

Police shootings provoke public scrutiny, with questions raised over the reasonableness of the decision to use lethal force. Binder & Scharf (1980) highlighted that decisions to shoot should be understood in the context of a sequence of actions, and not just in the final moments of pulling the trigger. Since then, surprising little research has endeavoured to study use of force interactions as a sequence. The present study adopts a method for exploring the behaviour of both the officer and subject throughout the course of an interaction in cases of fatal shooting by police. The paper aims to shed light on the decision to shoot, including the level of force used relative to subject resistance, the escalation of resistance and force, and characteristics of events that lead to fatal outcomes.

Literature Review

Bolger (2015) conducted a meta analysis of 19 studies of police use of force and concluded that “encounter characteristics” were the strongest correlates of force decisions, suggesting that “the primary focus for future theories of use of force decisions should be on what happens during the encounter” (p466). While that meta-analysis was not constrained to lethal force, Wheeler, Phillips, Worrall, & Bishop (2017) compared police shootings and firearm presentations and concluded that situational factors of whether the suspect was armed and an officer was injured were the best predictors of the decision to shoot.

Indeed, a number of studies have explored characteristics associated with officer involved shootings, which identify some consistent important factors, particularly regarding the circumstances of the incident and the behaviour of the victim. Miller (2015), in his review of the literature on deadly force, notes that “potential deadly force encounters” occur in situations resulting either from a call for service or officers witnessing a crime in progress. In Australia, Kesic, Thomas, and Ogloff, (2012) analysed 45 coroners reports representing

investigations of fatal police shootings in the state of Victoria, Australia, between 1980 and 2008. The authors found that police officers most commonly became involved with the purpose of arresting the deceased person in an unplanned operation, and that decedents were aggressive and resisted arrest. In the majority of cases the deceased person was armed. Few cases involved 'less than lethal' tools (11%), such as baton or spray (with the sampled cases occurring before the introduction of Tasers). A third of cases involved communication attempts beyond issuing commands but few involved attempts to negotiate.

In the sample of Australian cases analysed by Kesic et al. (2012) the vast majority had a history of offending and violent behaviour. A mental disorder was present in over half of decedents and substance use disorder was also common. These findings are consistent with studies in other countries. Parent (2011) analysed 30 cases of deadly force in BC Canada, deriving data from coroners' reports, finding that a quarter showed evidence of mental illness/suicidality. In the US, Saleh, Appelbaum, Liu, Stroup, & Wall (2018) found that almost a quarter of those killed by police had a mental illness, and those with a mental illness were more likely to be armed with a knife.

Further, Kesic et al. (2012) identified that one third of the police shootings met criteria for a provoked shooting, or 'suicide by police'. These cases were more likely to involve the person threatening police with a weapon, refusing to drop the weapon when commanded to do so, and advancing towards officers with a weapon. Miller (2015) states that around 10% of US police shootings constitute 'suicide by cop' and these most frequently occur during a police response to armed robbery or domestic disturbance; some planned and some spontaneous. Dewey, et al. (2013) further delved into the nuances of suicide by cop in the US through cluster analysis of 85 cases. Three clusters were identified and distinguished by mental illness, criminality and domestic problems. The mental illness and criminality clusters were slightly more frequent and there was strong overlap between these two groups.

Binder and Scharf (1980) and Scharf and Binder (1983), however, recognised that lethal force decisions should be considered as a series of decisions and actions by both parties that influence the likelihood of a violent outcome. Binder & Scharf (1980) detail four phases of ‘anticipation’, ‘entry and initial contact’, ‘information exchange’ and ‘final phase’. In each phase, specific factors are said to shape and restrict choices. For example, during the anticipation stage, the information available to officers and how/why they are drawn into the encounter are relevant. During entry and initial contact, Scharf and Binder (1983) note that an officer must weigh new information against any received earlier, and “position himself to control the situation” (p124). Informational exchange includes verbal communication but also receipt of nonverbal cues. The final phase, or final frame, comprises the final moments before the shooting decision and is said to be influenced by all the stages that have come before.

Fridell & Binder (1992) compared shootings with ‘averted shootings’, using data from retrospective interviews with involved officers. Bivariate comparisons of details organised into each of the four phases of the Binder-Scharf model led the authors to conclude that shootings were “characterized by ambiguity and surprise” in that officers knew little or nothing about who they were facing, and had difficulty reading the situation as a “possible deadly encounter” (p.397). Indeed, Johnson, Cesario and Pleskac (2018) found that prior information and experience effects decisions to shoot, through the application of data modelling techniques in laboratory studies.

There have been a small number of more recent attempts to explore use of force interactions as a sequence. Terrill (2005) used observational data of police interactions in the US to explore police force relative to suspect resistance. While initially breaking down interactions into sequence pairs of action and response, these were then aggregated to determine whether the interaction as a whole involved officers using less, commensurate, or more force than suspects. Terrill’s analysis focused on predictors of an overall inclination in

relative force, rather than specific sequences of officer and suspect behaviour. The data did not include uses of lethal force. Kahn, Steele, McMahon and Stewart (2017) coded narratives from 139 US use of force case files to similarly break down interactions into sequences of action-response dyads, but again no lethal force cases were included. Multi-level modelling of the dyads showed suspect race affected when police force was used and how quickly it escalated. Willits & Makin (2018) conducted temporal sequencing of 174 use of force incidents (not including shootings) from BWC footage and used the sequences to model time to force, duration of force and level of force. Suspect resistance predicted time to force and duration of force, although force was also used more quickly against black suspects and males. In terms of lethal force, James, James, and Vila (2018) used multiple branching scenarios (laboratory simulations) that had the potential for either a peaceful or violent outcome, depending on the police officer participant's behaviour. Multi-level modelling showed that a confrontational suspect demeanour, rather than suspect race, predicted a deadly outcome. Lord (2014) used data from the US National Violent Death Reporting System to explore police use of lethal force, separating suicide by cop and non-suicide by cop deaths. For each subsample, a number of individual and situational factors were tested regarding whether they predicted the use of lower levels of police action before shooting, compared to shooting without trying lower-level actions. Lord noted that the majority of decedents refused to comply or surrender, but officers were more likely to use commands or warnings before shooting in cases of SbC. Finally, Longridge, Chapman, Bennell, Clarke and Keatley (2020) analysed pairs of (antecedent and sequitur) behaviours in 40 publicly accessible BWC videos, separating lethal force incidents and non-lethal force incidents. For each subsample, they explored the significant associations between antecedents and sequiturs. They found the most significant associations were between officer behaviours (for example, relationships between drawing, pointing and firing lethal or non-lethal weapons). However, officer firearm

discharge was a significant sequitur of a subject charging at officers, while officers discharging a non-lethal weapon was a significant sequitur of a subject resisting. They concluded that “encounters need to be analysed as a complex sequence of events” (p.6).

The Present Study

There have been few attempts to explore how prior actions influence the escalation of police use of force encounters, particularly to the use of lethal force. In other areas of police behaviour, application of a ‘proximity coefficient’ (Taylor, 2006) has proved useful for examining cue-response patterns across interaction sequences. For example, Giebels & Taylor (2009) applied this method to 25 crisis negotiation transcripts to explore the use and reciprocation of persuasive arguments between negotiators and hostage takers, while Beune, et al. (2010) explored proximity coefficients between behaviours in 27 police interviews to examine how officer behaviour influenced suspects to provide information. A particular advantage of the proximity coefficient is that it enables analysis of the relationships between all behaviours in a sequence, not just adjacent cue-response pairs. The present study applies the proximity coefficient to understand the use of fatal force by police officers. Using data derived from coronial inquest reports of police shootings in Australia, the use of fatal force, that is the act of discharging a firearm, by officers is understood through both its proximity to earlier subject behaviours, and also through the proximity of subject behaviours to various police actions throughout the encounter. By doing so, the analysis sheds light on how encounters unfold and the circumstances that precipitate a fatal shooting.

Method

Sample

The sample consisted of 58 cases (incidents) in Australia where a death by police shooting was determined by a coroner. Each incident involved only one person shot and

killed by police. All Australian states and territories were represented in the sample with cases occurring in Queensland (n=19), New South Wales (n=12), Victoria (n=10), South Australia (n=8), Northern Territory (n=3), as well as two in each of Western Australia, Tasmania and the Australian Capital Territory. The deaths occurred between 1995 and 2019. It should be noted that a wide date range was retained to increase the sample size (see below for explanation of data availability), but that a number of changes to relevant policies, training and legislation may have occurred over this time. However, some ‘landmark’ events occurred just prior to the majority of the sampled cases. For example, several ‘high profile’ shootings led to at least two states conducting use of force reviews in the mid 1990’s (e.g. Project Lighthouse in Queensland and Project Beacon in Victoria), and subsequent roll out of OC spray (pepper spray) as a non-lethal force option for officers in these, and other, states. In 1996, a mass shooting occurred in Tasmania that instigated restrictions on gun ownership in all states and territories. Notably, in the present sample, only one case occurred prior to these events (one case in 1995; the remaining cases are from 1999-2019), with 50% occurring between 2010 and 2019.

All but one of the deceased were male, age was given for 52 of the 58 deceased persons and ranged from 15 to 65 years (*mean* = 35.21; *s.d.* = 10.97). Country of birth was specified in 42 cases. Fourteen were born outside Australia and 28 born in Australia with three of those specified as indigenous Australians. At the time of death, the deceased was married or in a de facto relationship in 24 out of the 53 cases for which relationship was detailed. Frequently the deceased had a history of criminal offending (n=41), including a high proportion with domestic violence offending (n=19). A high proportion also had a specified history of assaulting, obstructing or distrusting police (n=22). A history of mental health issues was also very common (n=37), including diagnoses of depression (n=26), anxiety (n=18) and psychosis (including drug-induced psychosis) (n=25); as well as a history of

suicide attempts or threats (n=22) and self harm attempts of threats (n=14). A history of drug abuse (n=32) and alcohol abuse (n=20) was also commonly cited.

The cases included the coroner's ruling as to whether the use of lethal force was justified or reasonable in the circumstances. Only two cases were considered unjustified/unreasonable. However, four were considered justified/reasonable in the final frame but preventable in the sense that alternative actions earlier could have led to a different outcome.

Data Collection

The study utilised publicly available coronial findings reports, consistent with prior studies on deaths from officer involved shootings Kesic, et al. 2012; Parent, 2011). Cases were initially sought from the University of Queensland deaths in custody database (<https://deaths-in-custody.project.uq.edu.au/>); a publicly available online resource that has compiled electronically available coronial inquest findings reports into a searchable database. The availability of findings differs across the eight Australian states and territories, with records for the Australian Capital Territory going back as far as 1997 while records for New South Wales and Western Australia only available since 2012 (dates for other states/territories lie in between). This therefore effects the frequency with which cases are identified, with frequencies not geographically comparable. A search of the UQ database for cases under the parameter of "cause of death = shot by police" yielded 47 cases. In addition the case listings on the websites of each state/territory coroners court were also searched by keyword where possible (not all websites have keyword searchability). Key words included "police shooting", "shot by police" and "shooting" which yielded an additional 11 cases.

In Australia, all deaths related to police operations are subject to a coronial inquiry. The role of the coroner in these cases is not just to establish the cause of death or determine legality, but to consider the circumstances and actions involved in, or potentially contributing to, the death more broadly with a view to making recommendations that may prevent future

deaths. As such, matters are often discussed in great detail, including the characteristics and background of the deceased, events leading up to the shooting, an account of the actions of those involved in the shooting.

Data Coding

Data coding in the form of content analysis comprised two ‘sets’ of variables; descriptive variables and behavioural sequences. Descriptive variables coded features of the case, characteristics of the deceased and contextual features of the incident. With the exception of age (in years) of the deceased and the year of the death, variables were coded at the nominal level.

Behavioural sequence coding focused on the actions of the police and subject during their interaction. Behaviour sequences were coded using an adapted version of the Force Factor categories of officer force and suspect resistance (see appendix). Hine et al.’s (2016a) version of the relative Force Factor model was the starting point for the current coding scheme. Within that framework, officer force and suspect resistance each comprise six levels, from no force/resistance to the discharge of firearms. The present study refined the categories further, both to incorporate more description/examples and, where force/resistance was used (levels 2 to 6) to distinguish behaviours within the same levels. For example, level 5 resistance in Hine et al. (2016a) comprised displaying a weapon, threatening to use a weapon and/or using a weapon other than a firearm against officers. The current study distinguished each of these as three separate sub-categories for coding and added a fourth sub-category of ‘advancing towards officers with a weapon’. Thus, the current coding scheme provides greater descriptive nuance within levels. Inter-rater reliability of the coding framework was assessed utilising a second coder to code five of the cases. The two coders were in agreement in 97.5% of assigned codes. Discrepancies were discussed and agreed and resulted in further refinements to the coding framework.

Each narrative description of the interaction between the officers and the subject was coded as a sequence of alternating turns. The interaction was taken to begin when the officers arrived at the same location as the subject and either made or attempted to make visual and/or verbal contact with the subject. The interaction sequence ended when the subject person was no longer responsive or removed him/herself from the scene. Thus, while all sequences start with a police behaviour, the last behaviour in the sequence could be performed by the police or the subject. A 'turn' was taken to be a discrete action outlined in the coding framework.

In the majority of incidents, more than one police officer was present either at different points throughout the incident, or at the same time. The police response was aggregated at each turn. For example, during a sequence, officer A may interact with the subject at the start, but this may change to officer B at the end, but each action is simply coded in the sequence as a 'police' action. Where several officers were present at the same time but behaving in different ways, the higher level of force was coded. Each incident involved only one deceased person who was the subject of the interaction (and the subject of the coronial inquest) and whose actions were coded. One exception to this is a case where shots fired by police missed the intended person (the primary subject of the interaction) and hit a third party. In this instance, the behaviour of the intended target was coded.

A total of 273 behaviours were coded across the 58 cases (58 sequences). Sequences ranged from 3 turns to 29 turns with a mean of 12.47 turns (*s.d.*=6.60). The majority (*n*=53) of sequences ended with a police action. Five sequences ended with a suspect behaviour.

Analysis

The frequencies of the descriptive variables were calculated and are presented to describe the sample and to give context to the events. The force and resistance behaviours coded in the sequences were also explored through frequency analyses to determine how often behaviours occurred over all and the most frequently occurring behaviours at each turn

in the sequence.

The behavioural sequences were analysed using the software ProxCalc 2010 to calculate Proximity Coefficients (Taylor, 2006) between the police and suspect behaviours. ProxCalc “measures interrelationships among behaviors as a direct function of their intrinsic organization within a sequence” (Taylor, 2006, p.42). The relationship between each behaviour in a sequence is expressed through a coefficient of between 0 and 1, which represents the mean proximity, or closeness, between those behaviours across the sequence (or a number of sequences). The lower the proximity coefficient between two behaviours, for example A and B, the further apart the behaviours are in the sequence; a coefficient of zero shows that the A only occurs once at the beginning and B once at the end, and so are the furthest apart possible. In contrast, the higher the coefficient, the closer two behaviours (e.g. A and B) appear in the sequence; a coefficient of 1 shows that, when B follows A, it always does so immediately (with no intervening behaviours). Coefficients between 0 and 1 then represent different degrees of proximity between behaviours. A coefficient above .5 between two behaviours (A and B) means that, once A occurs, one does not need to move through more than half a sequence length in order to find an instance of B. The impact of certain cues on responses can therefore be inferred by the proximity coefficient; the higher the proximity between cue and response behaviours, the stronger the relationship. Taylor (2006) explains the proximity coefficient in detail, as well as discussing its relationship to other sequence analysis methods, such as sequential association measures, lag sequence analyses, gamma and phase analyses, and optimal matching. Taylor (2006, p.49) concludes that “(t)he coefficient is a general, computationally simple measure that avoids the arithmetic manipulations and extrinsic assumptions about the breadth of relations made by many existing techniques” and which also allows a variety of comparisons, including across different sequence sections. Indeed, the coefficient boasts “an efficient use of data” allowing

measurement of the relationships between all behaviours in a sequence.

The 58 behaviour sequences were analysed to produce mean proximity coefficients for the relationships between behaviours for the data set. Proximity coefficients were produced for all codes (behaviours) with each other and themselves (i.e. since the same behaviour can occur multiple times in a sequence). However, of interest to the present paper are the coefficients that represent the proximity of police actions to subject actions, and the proximity of subject actions to police actions. These are presented and discussed. Proximity coefficients that represent the proximity of police actions to other police actions and subject actions to other subject actions were calculated in the analysis but are not presented.

Results

Descriptive Frequencies: Contextual Features

Before looking at the behaviour and interaction sequences, some descriptive (situational) features are presented to provide context for the cases. Police contact with the subject was most commonly initiated via a call for service (n=35) (table 1). Calls for service most frequently involved reporting harm or fear of harm to others (n=19), an armed person (n=17) and/or violent behaviour (n=13). In one case the subject entered the police station and confronted officers. There was evidence that police were aware the subject had a history of violence in 19 cases and in nine cases police were aware of the subject's history of mental health issues (including self-harm/suicidality).

[Insert table 1 about here]

The subject had a weapon in 57 of the 58 cases. Weapons were most commonly edged weapons. In 15 cases the subject had a firearm, although in three of these cases it was a 'convincing' replica. Two cases involved the subject driving a car directly at/into an office.. In one case the subject had accessed and used the officer's OC spray. In one case the subject was not armed with a weapon of any kind, but was an accomplice in an armed robbery

attempt (where his accomplice had a non-firearm weapon).

In 49 of the 58 cases, officers made some verbal attempt to get the subject to put the weapon down. Most frequently this was in the form of shouting commands (n=32). However, in nine cases officers attempted a more pacifying approach of asking or pleading with the subject to relinquish the weapon and using rapport building/negotiating techniques, and a further eight cases involved protracted negotiation attempts. Indeed, in 11 cases specialist personnel were present at the time of the shooting, including trained negotiators, mental health crisis team members, or special emergency response teams. In 12 cases (all male), the subject specifically asked/told police to shoot him.

Toxicology results, with comment on both the presence of substances and the likely degree of resulting impairment, were given in 50 of the 58 cases. In total, 33 cases (57%) were believed to have involved some impairment, particularly that use of substances would have impacted judgment, decision-making and/or behaviour; drugs (n=18), alcohol (n=8) and both alcohol and drugs (n=7).

The majority (n=31) of shootings occurred at a residence, either outside (n=22) or inside (n=9). The remaining 27 cases occurred in public places; 24 of these were outside in roadways (n=14), parks (n=3) or other areas (n=6). Three cases occurred at a pub/hotel and one occurred in a police station. Bystanders were present and directly at risk from the subject at the time of the shooting in 17 cases. However, of the 41 cases where bystanders were not directly at risk at the time of the shooting, 35 cases occurred outside, such that a potential risk to bystanders could be a factor, if the person was not contained. In total 46 cases (79%) occurred outside.

Behaviour Frequencies

Table 2 shows the most frequent behaviour displayed at each police and subject turn in the sequences. Tables 3 and 4 show the proximity coefficients for 'subject cues-police

response' and 'police cues–subject response', respectively, as well as the total frequencies of each behaviour. Each behaviour can occur multiple times across cases, as each case is coded according to a series of actions and responses. Thus, tables 3 and 4 provide the frequency with which each behaviour was coded and contextualises this as a proportion of codes and the proportion of cases that exhibited the code.

[Insert Table 2 about here]

'No force' was the most frequently recorded police behaviour, coded 116 times, representing 16% of codes and appearing in 91% of cases (table 3). Indeed, table 1 shows that 91.4% of the cases began with police using no force; for example, police presence, providing information (identification as a police officer, stating the purpose of the contact), giving routine verbal instructions, such as asking a person to provide information. No force was also the most frequent second police action, although the frequency at turn 2 dropped substantially to 41.4%. The most frequent police behaviours at turns 3 and 4 are firearm presentation, showing that the most frequent level of force used increased from level 1 to level 5 in one turn, and by turn 5, the most frequent police behaviour is firearm discharge at nearly 40%). Table 2 shows that firearm presentation and discharge are the next most frequent police behaviours coded (after no force). Since the sample comprises cases of police shootings, all 58 cases (100%) involved police discharge of a firearm, although this was coded 83 times, indicating multiple instances within some cases. Firearm presentation was coded more frequently (n=98) than firearm discharge, showing that firearms were presented at more points in time than they were fired. However, firearms were presented in only 86% of cases. As previously explained in the method section, a firearm could be discharged without first presenting it and this appears to have occurred in 8 cases (14%).

In comparison, the most frequent subject behaviour at nearly every turn constituted level 5 resistance (table 1). Just over a quarter of subjects began the interaction displaying a

weapon and almost a quarter advanced towards officers with a weapon at turn two. Indeed, advancing with a weapon was the most frequent subject behaviour in the majority of subject behaviour turns. This is borne out in the frequencies in table 3, which show that advancing with a weapon was the most frequent subject behaviour coded in the data, with 101 instances appearing in over two-thirds of cases. Half of the cases involved the subject displaying a weapon, and 37% of cases involved threats with a weapon. Also frequent, though, was the subject fleeing or retreating (37% of cases).

[Insert table 3 & 4 about here]

Behaviour Proximities

Police Response To Subject Behaviour

Table 3 shows the mean proximity coefficients for the subject cues and police response. The range of coefficients (from .120 to 1) shows that behaviours do not occur consistently throughout interactions, but that some behaviours tend to occur early and others tend to occur late; meaning that some police behaviours are close responses to certain subject behaviours while others are much less proximal. In addition, the absence of coefficients for some relationships denotes that some behaviours occurred only in discrete parts of the interaction (towards the beginning or end).

Police discharging a firearm very closely followed the subject discharging a firearm (.817) and the subject advancing with a weapon (.777), firearm discharge also somewhat closely followed the subject threatening to assault (.667), using a weapon (.648) or threatening to use a weapon (.631). Interestingly, firearm discharge was less proximal (more than half a sequence length away, on average) to merely displaying a weapon. This shows that officers engaged in intervening behaviours between a subject displaying a weapon and choosing to shoot the subject. Indeed, where subjects displayed a weapon, this was followed particularly closely by less lethal force options such as use of a baton (.926), police dog

(.889) (although this was only one case), and presenting a CEW (.846), as well as presenting a firearm (.816). Firearms were discharged in low proximity to low levels of subject resistance (levels 1-3), meaning a greater number of intervening behaviours between these lower levels of resistance and police discharging a firearm.

As noted above, officers drew their firearm closely after subjects displayed a weapon (.816), but also in close proximity after subjects advanced towards them without a weapon (.815). Further, in the one case where police firearm presentation followed a violent struggle, it immediately followed this action. For context, it should be noted that this was an operation to arrest the subject for a serious offence.

In the one case where police presentation of a CEW followed no resistance, the presentation was immediate. On further examination of this case, the subject's compliance was already in response to the presentation of the CEW (the officer kept the CEW aimed at the subject while his partner moved in to arrest and secure the subject). Indeed, CEW presentation quickly followed threats with a weapon (.909) and displaying a weapon (.846), while actual use (deployment) of the CEW was particularly proximal to the subject using a weapon (.941). OC spray closely followed assaults on police (.963), while a baton closely followed displays of a weapon (.926), but also a subject fleeing/retreating (.914).

Subject Reactions To Police Behaviour

Table 4 shows the mean proximity coefficients for the police cues and subject response. The range of coefficients (from .069 to 1) again shows that behaviours do not occur consistently throughout interactions, but that some subject behaviours are close responses to certain police behaviours while others have much less proximity to each other. Absent coefficients for some relationships are also informative regarding the placing of behaviours in the interaction (towards the beginning or end). For example, with a few exceptions, subject resistance levels 1 to 4 only occur after police force levels 1 to 4, while police force levels 5

and 6 are typically only followed by subject resistance levels 5 and 6, showing a reciprocation of relative behaviour. However, coefficients off this 'reciprocal diagonal' show that low levels of police force were also met with much higher levels of subject resistance.

Whilst the lowest level of police force – no force – was very closely followed by no resistance (.922) or low level resistance in the form of non-compliance (.893), higher levels of resistance such as advancing towards the officer (unarmed) (.907), assaulting the officer (.852) and displaying a weapon (.834) were also very proximal reactions. Similarly, subjects advancing on officers with a weapon had a very close proximity to police use of strong directive language (.925). These relationships suggest that events often escalated quickly from low levels of police force to high levels of subject resistance.

When exploring the proximity of subject behaviours that followed attempts at using non-lethal force tools, it can be seen that subjects fleeing (.981) and exhibiting non-compliance (.889) were proximal to baton use, but so too was the higher level of resistance of using a weapon (.806). Similarly, fleeing (.811) and advancing with a weapon (.863) were proximal to attempts to use OC spray. This shows that in some cases batons and spray seem to have prompted the subject to attempt retreat, while in other cases they seem to have escalated the incident by provoking a more violent response. Neither of these responses was the intended one of incapacitation/compliance.

In contrast, with the exception of the one case that initially complied when officers presented a CEW, CEW presentation and deployment was met only with level 5 resistance (indicated by the absence of coefficients for these police actions with all other subject response options). Particularly, threats with a weapon closely followed CEW presentation (.909) while advancing towards officers with a weapon closely followed CEW deployment (.918). Indeed, it should be noted that CEW's were ineffective when used, due to faults (failure to fire), misfires (missing the target completely), or probes not adequately connecting

to the subject (for example, catching in loose clothing instead of contacting the skin).

When police drew a firearm, this was met with a range of subject responses, as indicated by coefficients of this police action with all but two of the subject response options. Most proximal was a violent struggle, but this only occurred in one case, hence its coefficient of 1. Firearm presentation was very closely followed by the subject advancing with a weapon (.858) as well as shooting a firearm (.948).

It is notable that some subject behaviours did follow the discharge of a police firearm, although coefficients are low. Thus, not all incidents ended immediately after an officer discharged a firearm. Where subjects did respond, most proximal was returning fire (.496). Indeed, when subjects discharged a firearm, this most closely followed police presenting a firearm (.948), but also closely followed low levels of police force: use of strong directive language (.788) and no force (.754).

Discussion

It is recognised that officers' decisions to use lethal force are impacted by the behaviour of the subject (Bolger, 2015), and authors have highlighted that incidents should be understood as a sequence of actions and reactions that can influence that final decision (Binder & Scharf, 1980; Longridge, et al. 2020). However, few empirical studies explore use of force in this way. The present study applied Taylor's (2006) proximity coefficient to data from Australian coronial reports of fatal police shootings to understand the interactions that culminate with officers' decisions to discharge their firearms. Analysis showed that police discharge of a firearm was most proximal to the subject discharging a firearm, and also highly proximal to a subject advancing towards officers with a weapon. However, the proximity coefficients also allow examination of the relative positioning of police firearm discharge to other actions, as well as interpretation of how police and subject actions/responses played out. Contextual features were also explored and highlighted a high

frequency of police presence in response to a call for service, with subjects who were armed and often impaired by drugs, alcohol or both. A large number occurred in the context of a risk (or potential risk) of harm to bystanders and one in five cases involved the subject asking to be shot by police. These factors are consistent with prior literature on officer-involved shootings, such as Kesic, et al. (2012), Dewey et al. (2013) and Parent (2011).

Analysing the cases as a series of actions by the police and the subject showed that officers were often quickly met with high levels of 'resistive' behaviour, particularly with weapons. Whilst similar observations were made by Kesic, et al (2012) in their Victoria sample, the focus on the sequence in the present paper identified that, in around a quarter of incidents, the first action of the subject was displaying a weapon, with similar proportions advancing with a weapon as the second subject action in the sequence. However, the proximity coefficients showed that firearm discharge was, on average, over half a sequence length away from displaying a weapon (as well as most levels of resistance to which it would be considered commensurate or lower). This suggests officers engaged in interceding behaviours between seeing the subject's weapon and discharging their firearm.

Indeed, there were cases of officers presenting or using non-lethal tools (baton, spray, Taser), most closely in response to displays, threats and uses of weapons by subjects, but these tools were ineffective. However, the proximity and contextual results suggest the typical police response to displays of a weapon appear to be presenting a firearm, alongside some verbal attempts to get the subject to relinquish the weapon. This was most closely followed by subjects advancing, or continuing to advance, with a weapon, or discharging a firearm. In turn, this seems to have been most closely followed by police discharging a firearm. The application of the proximity coefficient, therefore, has enabled understanding of how the decision to employ lethal force (discharge a firearm) may be influenced by earlier behaviour throughout that interaction. Particularly, that officers tended to abstain from using

lethal force, and attempted lower than lethal levels of force.

The behavioural coding framework used in the present study was adapted from the force factor, which allows consideration of relative force and whether officers were responding with force that might be considered commensurate (typically recognised as being either the same level or one level higher than subject resistance, see Hine, et al, 2016a). The proximity coefficients suggest some evidence of officers using higher relative levels of force. For example, while officers drew their firearm closely after subjects displayed a weapon (commensurate force), firearm presentation also closely followed a subject advancing toward them *without* a weapon. Similar patterns can be seen in cases of using a baton closely after a subject flees or retreats, and drawing or using OC spray soon after non-compliance. While it is not the intention of this analysis to draw conclusions about reasonableness of force, these disparities in level of force compared to resistance raise questions over officer decision-making. The frequency analysis of contextual features and subject background provides some insight into the officers' decision-making, with officers sometimes responding to incidents where they were aware the subject had a history of violence, was suspected of a violent crime, and may have been armed. This suggests that officers' prior knowledge – in Binder & Scharf's (1980) terms, the anticipation stage – may impact officers' force decisions. Indeed, Johnson, et al. (2018) found that prior information impacted shooting decisions. The current study suggests that this could potentially be through the influence of that knowledge on officers' behaviour early in the interaction, rather than just the final decision to shoot.

In contrast, there is some evidence of officers using lower levels of force than the subject's resistance, as well as subjects escalating quickly to using higher levels of resistance in response to officer force. Indeed, Hine et al. (2016a) found officers (from Queensland Australia) most commonly used commensurate or lower relative levels of force, and that officers tended to avoid using higher relative force with suspects who were physically

aggressive. The authors suggested that officers may sometimes underestimate risk and Hine et al. (2016b) supported this, showing lower relative force predicted officer injuries. In the present sample, the majority of subjects were armed, most commonly with an edged weapon, at the time they were shot. Substantial proportions (over half) had consumed drugs, alcohol or both that likely influenced their thinking and behaviour. In contrast, a much smaller proportion of cases showed evidence that officers were aware the subject had a history of violence, and in even fewer cases were officers aware of a history of mental illness. In light of the discussion above, a lack of prior information could potentially have led to an under-estimation of risk, although officers still need to decide how to act on information. For example, the coroner specifically noted in one case that, “One of the officers candidly acknowledged that reports of armed offenders are so frequent he may have become complacent.” (Barnes, 2010, p.16). The anticipation stage would therefore seem important for officers to gather information and plan and communicate their response, and be aware of and take seriously the possibility that incidents could escalate to lethal force.

Unlike the study by Kesic, et al. (2012), it was not the intention of this study to identify cases of ‘suicide by cop’ as a subset. However, around one-fifth of the cases involved a specific request to be shot by police. Further, around two thirds involved subjects advancing at police with a weapon, often early in the encounter, and particularly proximal to officers having presented a firearm. Such behaviour has been characterised as showing a desire to be shot by police (Kesic, 2012). In addition, the high rates of mental illness and prior offending, including domestic violence, in the sample echo Dewey et al.’s (2013) subtypes of suicide by cop. Indeed, there was a proportion of cases involving arrest operations or serving of warrants where the subject was trying to avoid custody, with fear of returning to prison a factor. It may be fruitful for future research to explore and compare proximity coefficients between subtypes of shootings. Differences in proximity coefficients

across subtypes might shed further light on how these incidents unfold.

In addition to adequate risk assessment that may be aided by information gathered prior to the incident, Kesic et al. (2012) discuss the role of time and space in fatal force outcomes; particularly that a shooting might be averted if officers can maintain a safe distance from a subject, which in turn affords more time for de-escalation and risk assessment. The present study accords with this view, as the majority of cases involved short-range rather than long-range weapons, many escalated quickly as officers were advanced upon and attempts to shout 'traditional' commands to drop weapons were ignored. This highlights the importance of ensuring first response officers are adequately trained in communication and de-escalation techniques, particularly in the context of individuals with edged weapons who may be influenced by drugs, alcohol and/or mental illness.

However, the present study also found that a proportion of cases did involve specialist personnel and protracted negotiation attempts, but still ended with a fatal shooting. In contrast, Kesic & Thomas (2017) identified that potential provoked shootings (cases that met criteria for suicide by police but where a shooting was averted) were most frequently resolved through verbal communication, less-lethal force tools and containment. Further research comparing the sequences of interaction in shootings versus averted shootings would help elucidate what may influence positive versus negative responses to police actions.

Limitations

There are limitations with the study that should be noted, including some alluded to above. The source of the data, being coronial reports, limits the sample to shootings that have resulted in a fatality. Since officers in Australia are trained to shoot to stop the threat, it is unlikely that fatal shootings would differ from non-fatal shootings. Thus, it is argued the sample is adequate for exploring the circumstances leading to discharging a firearm.

However, as noted above, the sample lacks a comparative element. It was not the intention of

the study to explore the existence of subsamples, but this may be an avenue for further research. Particularly, though, comparison of proximity coefficients of shootings with potential or averted shootings would be a fruitful avenue of research to shed further light on behaviour that may escalate or de-escalate incidents. While such data may not be publicly available (like coronial reports), data may be available through police agencies, where events could be matched based on defined criteria. Proximity coefficients could be compared to identify differences in proximities of particular actions and responses, and at what points in the sequence these differences occur. This would shed light on whether there are particular approaches police could adopt early in an interaction to encourage a positive outcome.

Additionally, prior research using the proximity coefficient has utilised transcripts of conversations to explore verbal interactions, allowing the researchers access to a complete, first-hand record of the interaction of interest. The present study extends the use of the proximity coefficient to explore behavioural sequences from narrative descriptions. These narratives were not constructed for the purpose of systematically sequencing interactions. Part of the purpose of these narratives is, however, to probe police actions and how these may have contributed to the death. Thus, while the majority of cases provided sufficient detail for the exploratory purposes of the present study, there were challenges in applying the method, in terms of identifying and coding specific turns of behaviour. The use of a coding framework that distilled behaviour to somewhat broad categories of action, rather than fine grained detail (while still retaining some of the nuances of cases) mitigated this to a certain extent. Researchers could consider whether more detailed forms of data may be available, for example through videos of interactions that capture both parties (police body worn video may provide a useful record but can also be limited in capturing details due to obstruction or point of view; for example, primarily capturing the subject's behaviour rather than viewing the officer). Video data could also allow further refinement of the coding framework to capture

greater nuance at each level of behaviour.

Conclusion

Despite some noted limitations in data and scope, the present study has provided a novel analysis of sequences of behaviour in interactions that led to the use of lethal force by police. Exploring the proximity coefficients between police behaviour and subject behaviour has allowed interpretation of patterns of action and reaction, leading to a deeper understanding of how interactions unfold. As one officer was reported to say at inquest, “Nobody wants to shoot somebody; that decision isn’t made until the threat is upon you or one of your colleagues” (Barnes, 2008, p.6). The present study sought to contextualise these decisions as a culmination of a sequence of actions and responses. The application of the proximity coefficient has contributed to our understanding of how, and often how quickly, incidents escalate and the importance of context in shaping behaviour.

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Appendix: Coding Dictionary adapted from Hine et al. (2016)

Hine, K.A. Porter, L.E., Westera, N.J. & Alpert, G.P. (2016). Too much or too little?

Individual and situational predictors of police force relative to suspect resistance, *Policing and Society*, DOI: 10.1080/10439463.2016.1232257

Score	Officer Behaviour	Score	Subject Behaviour
1	No force. Officer presence/used typical verbal commands/negotiation. Also includes following/chasing and retreating.	1	No resistance. Subject was cooperative and followed all verbal instructions.
2	Slight force. Officer used A) strong directive language and/or B) minimal physical force to encourage the subject to cooperate and follow directions (and use of road spikes).	2	Slight resistance. Subject A) resisted the officer's actions, directions/verbal commands (non-compliant) or B) fled or retreated away.
3	Attempt to Gain control of offender with hands. A) Open Hand, Closed Hand Tactics and B) Restraining Accoutrement.	3	Moderate resistance. Subject A) impeded officer's movement or B) resisted cuffing or placement in a car. C) Or advanced towards officers (without weapon)
4	Attempt to Gain control of offender using methods including accoutrements. A) Officer deployed (used) a baton (or some other blunt object e.g. butt of gun) or B) presented (drew) or deployed (discharged) OC Spray at subject or C) presented a CEW.	4	Assaultive or high resistance. The subject A) violently struggled, B) physically assaulted (or attempted to) or C) threatened to assault (with apparent means)
5	Discharged a Conducted Energy Weapon. A) Officer deployed (discharged) a CEW or B) presented (drew) a firearm at subject. C) drove vehicle at subject (intention to intercept/hit with car), D) deployed police dog	5	Displayed, threatened or used a weapon. Subject A) displayed a weapon to officers, B) threatened to use a weapon (including firearm; includes verbal threats, pointing a firearm at officers, raising an edged weapon), or C) Advanced towards officers with a weapon (including firearm and driving at) D) used a weapon (other than a firearm; includes attempts to stab) against officers (or third person, or self).
6	Discharged service firearm. Officer deployed (discharged) a service-issued firearm at the subject.	6	Discharged firearm. Subject deployed (discharged) a firearm at officers.

Notes: Officers frequently discharged firearms more than once. If shots were

described as fired in quick succession, or simultaneously by more than one officer, this was coded as one turn or police discharging a firearm. Separate turns of discharging a firearm were only coded if there was specific mention of a time lapse between shots (for example officers reassessing the suspect between shots) and where the turn (behaviour) of the subject during that time was described. One further note on coding is the distinction between the two actions of presenting a firearm and discharging a firearm. If an officer was described as drawing and firing in one motion – for example with no time to aim, issue any warning, or hold the firearm in the correct firing position towards the subject, etc. – then this was coded only as a firearm discharge and not two separate actions of a firearm presentation, which could evoke a response, followed by a separate turn of firing.

Table 1: Frequencies of contextual features

	Frequency	Percentage
Initial Contact		
Call for service	35	60%
Proactive police action	18	31%
Investigating suspected or reported criminal activity	12	21%
Arrest/serve a warrant	6	10%
Routine patrol/stop	5	9%
Subject initiated	1	0%
Call for service reason		
Harm or fear of harm to others	19	33%
Violent behaviour	17	29%
Armed person	13	22%
Fear of harm to the subject (self-harm/suicide)	6	10%
Bizarre behaviour	3	1%
Damage to, or theft of, property	3	1%
Weapon	57	98%
Knife/machete	34	59%
Firearm	15	26%
Sword	2	0%
Car	2	0%
Axe	1	0%
Metal bar	1	0%
OC Spray	1	0%

Table 2: Most frequent police and subject behaviours at each turn in a sequence

Turn	Police Behaviour				Subject Behaviour				Turn
	N	f	%	Behaviour	Behaviour	f	%	N	
1	58	53	91.4	1 No force	5A Display Weapon	16	27.6	58	1
2	58	24	41.4	1 No force	5C Advance Weapon	14	24.6	57	2
3	57	23	40.4	5B Firearm Present	5C Advance Weapon	22	42.3	52	3
4	52	15	28.8	5B Firearm Present	5C Advance Weapon	17	38.6	44	4
5	43	17	39.5	6 Firearm discharge	5B Threat Weapon	7	22.6	27	5
					5D Used Weapon	7	22.6		
6	28	9	32.1	5B Firearm Present	5C Advance Weapon	10	41.7	24	6
7	24	8	33.3	6 Firearm discharge	5C Advance Weapon	7	35.0	20	7
8	20	12	60	6 Firearm discharge	5C Advance Weapon	4	30.8	13	8
9	12	4	33.3	6 Firearm discharge	5B Threat Weapon	3	30.0	10	9
10	10	5	50	6 Firearm discharge	2A Noncompliance	2	33.3	6	10
					5C Advance Weapon	2	33.3		
11	6	4	66.7	1 No force	5C Advance Weapon	4	66.7	6	11
12	6	2	33.3	5B Firearm Present	5C Advance Weapon	2	40.0	5	12
		2	33.3	6 Firearm discharge					
13	5	3	60	4B OC Spray	5C Advance Weapon	2	40.0	5	13
					5D Used Weapon	2	40.0		
14	5	2	40	6 Firearm discharge	5C Advance Weapon	2	50.0	4	14
15	4	4	100	6 Firearm discharge					

Table 3: Mean Proximity coefficients for subject cues–police response

Subject behaviour	Police Response													f	% of codes	% of cases
	1 No Force	2A Strong Verbal	2B Slight Force	3A Open/Closed	3B Cuffs	4A Baton	4B OC Spray	4C CEW Present	5A CEW Deploy	5B Firearm Present	5C Drove at	5D Police dog	6 Firearm discharge			
1 No resist	.885	.616	.460	.431	—	.200	.391	1	.733	.599	—	—	.337	13	1	17
2A No comply	.760	.810	.988	.413	—	.751	.858	.636	.621	.580	.765	.333	.375	25	3	24
2B Fled	.544	.636	.667	.791	.222	.914	.473	—	.538	.667	1	—	.452	36	4	37
3C Advance No Weapon	.857	.852	—	—	—	—	.794	—	—	.815	—	—	.418	2	0	3
4A Viol Struggle	—	—	—	—	—	—	—	—	—	1	—	—	.500	1	0	1
4B Assault	.778	.963	—	.741	—	.815	.963	—	—	—	—	—	.531	3	0	1
4C Threat Assault	.500	—	—	—	—	—	—	—	—	.778	—	.556	.667	2	0	3
5A Display Weapon	.266	.711	—	.174	.556	.926	.620	.846	.776	.816	—	.889	.469	50	6	50
5B Threat Weapon	.468	.609	—	.500	—	.793	.731	.909	.561	.682	.304	—	.631	49	6	37
5C Advance Weapon	.120	.578	—	.374	.778	.481	.653	.641	.755	.691	—	—	.777	101	13	68
5D Used Weapon	.275	.484	—	.714	1	.481	.539	—	.941	.508	—	—	.648	35	4	29
6 Firearm Discharge	.464	.575	—	—	—	—	—	—	—	.542	.647	—	.817	18	2	10
Frequency	116	29	5	9	1	6	24	5	8	98	3	1	83			
% of codes	16	4	0	1	0	0	3	0	1	13	0	0	11			
% of cases	91	36	6	12	1	5	25	6	12	86	3	1	100			

% of codes = Total code count/all codes count; % of cases = Number of cases code appears/number cases

Table 4: Mean Proximity coefficients for police cues–subject response

Police behaviour	Subject response												f	% of codes	% of files
	1 No resistance	2A Non comply	2B Fled	3C Advance NoWeap.	4A Viol Struggle	4B Assault	4C Threat Assault	5A Display Weapon	5B Threat Weap.	5C Advance Weapon	5D Used Weap.	6 Firearm discharge			
1 No force	.922	.893	.790	.907	—	.852	.753	.834	.787	.692	.656	.754	116	16	91
2A Strong Verbal	.375	.704	.500	.704	—	.901	.432	.474	.512	.925	.635	.788	29	4	36
2B Slight Force	.222	1	.862	—	—	.889	.222	.736	.750	.572	.296	—	5	0	6
3A Open/ Closed	.185	.500	.167	—	—	.852	.704	.683	.875	.295	.694	—	9	1	12
3B Cuffs	—	—	—	—	—	—	—	—	—	—	—	—	1	0	1
4A Baton	.426	.889	.981	—	—	.778	.603	.389	.500	.748	.806	—	6	0	5
4B OC Spray	.235	.432	.811	.444	—	.630	.481	.446	.682	.863	.689	—	24	3	25
4C CEW Present	1	—	—	—	—	—	—	—	.909	.812	.860	—	5	0	6
5A CEW Deploy	—	—	—	—	—	—	—	.384	.333	.918	.333	—	8	1	12
5B Fire. Present	.121	.281	.409	.389	1	—	—	.569	.623	.858	.701	.948	98	13	86
5C Drove	—	—	.346	—	—	—	—	—	1	—	—	—	3	0	3
5D Dog	—	—	—	—	—	—	—	—	—	—	1	—	1	0	1
6 Firearm discharge frequency	—	—	.136	—	—	—	—	.069	.130	.150	.279	.496	83	11	100
% of codes	13	25	36	2	1	3	2	50	49	101	35	18			
% of cases	1	3	4	0	0	0	0	6	6	13	4	2			
	17	24	37	3	1	1	3	50	37	68	29	10			

% of codes = Total code count/ All codes count; % of cases = Number of cases code appears/ number cases