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# Video-Based Interaction Ethology of Policing in Action: An Ethogram Approach to Describe, Quantify and Compare Behaviour Across Policing Situations

Hans Myhre Sunde, Lisa van Reemst, Camilla Bank Friis, Peter Ejbye-Ernst, Lasse Suonperä Liebst & Marie Rosenkrantz Lindegaard\*

## Abstract

*Police research increasingly uses videos to study policing situations. This has several benefits: it allows researchers to capture behaviour in a reliable way, is cost-efficient and reduces or removes observer reactivity. In this article, we argue that using videos can improve our understanding of policing action and address some of the limitations of systematic social observation (SSO). We propose capturing behaviours by using a methodological tool from behavioural biology known as the ethogram method. The ethogram method offers a measurement instrument that focuses on describing rather than interpreting behaviour, by separating the measurement of behaviour from the outcome of behaviour, by involving intercoder reliability tests of the measurement instrument before applying it for analysis rather than after and by an overall ambition to compare across cases, contexts and splices. To demonstrate the value of ethograms in police research, we present examples from own work illustrating how we developed and applied ethograms to code and analyse policing behaviours. We discuss benefits and challenges of using ethograms and offer concrete insights into how research could investigate behaviours of police officers to make research more unobtrusive, efficient and reliable. These insights can push the field forward with a novel and ground-breaking approach to study policing in action that allows for comparative studies and theory development. Where biologists have species- and behaviour-specific ethograms, police researchers do not. This is a call for precisely such effort across the field.*

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## 1 Introduction

Police-citizen encounters are widely researched, and the interactional dynamics within them are of major importance to understand how and why some turn conflictual, forceful or violent while others do not. Different methodologies have been used to study this, such as ethnographic fieldwork (e.g. Muir, 1977), interviews (e.g. Noppe, 2020), experiments (e.g. Ariel et al., 2015), vignette studies (e.g. Nix et al., 2019) and surveys (van Reemst et al., 2020). Perhaps the most prominent methodology, however, is the systematic social observation (SSO), where researchers ride alongside officers to observe, code variables, take field notes and write up narrative accounts about police-citizen encounters.

SSO was developed as an in-person observational approach; however, in recent years, the emergence of new technologies has provided researchers a new way to observe and analyse interactions up-close via video footage. Through video-analytical approaches, observational researchers have been able to, sometimes literally, zoom in on the action in a way that was previously impossible. Video data allow for observation of disputes, conflicts and, sometimes, violence in “the wild”. Studies within microsociology, social psychology and criminology have used video footage when researching the dynamics of conflicts between ticket inspectors and passengers (e.g. Friis et al., 2020), robbers and victims (e.g. Mosselman et al., 2018; Nassauer, 2018), bouncers and patrons (e.g. Liebst et al., 2020), as well as the role of bystanders in conflicts in public space (e.g. Ejbye-Ernst, 2022; Levine et al., 2011; Philpot et al., 2020). Fortunately, the use of videos in policing research is on the rise, with more researchers investing time and resources into obtaining, coding and analysing videos that have recorded relevant events such as crowd policing, de-escalation techniques, use of force, and citizen resistance in action (McCluskey et al., 2023).

In this article, we first present a brief review of research using SSO methodology and its strengths and weaknesses. We argue that in comparison to SSO, on the one hand, video observations reduce or remove observer reactivity; allow for re-watching encounters, which reduces subjectivity and allows for consistent reliability testing; and are resource-efficient. On the other hand, video observations provide less understanding of the context and the lack of insight into the subjective experiences of the people observed. We reflect on video-based social observations (VBSSO) and video data analysis (VDA) and introduce a video-analytical tool from behavioural biology – the *ethogram* – to study behaviours and interactional dynamics within police-citizen encounters. To do so, we draw on practical examples from our own research based on analysis of BWC and CCTV videos. We argue that the field of policing would benefit from using ethograms to measure police-citizen interactions because they allow for more precise and reliable measurements that enable comparative research and theory development.

## 2 Extant Observational Research in Policing and the Role of Videos

### 2.1 *In-Person SSO*

Policing scholars have frequently employed the SSO methodology to combine “aspects of ethnography and survey research, utilizing systemized protocols that guide the careful documentation of observed phenomena” (Brunson & Miller, 2023, p. 206). The methodology is characterized by systematic application of research protocols that “structure the act of observation, and determine what information the observer should code, and how that information is to be coded” (McCluskey et al., 2014, pp. 5124-5125). A pioneering research project lead by Albert Reiss was the first to systematically observe how officers interacted with citizens. The project involved 36 observers who rode with police officers for 7 weeks, and observed thousands of police-citizen encounters. Reiss’ observers coded their observations through a survey-inspired instrument with observational items, using pen and paper. For example, when observing on-going searches, the observers would code items indicating if a “personal and/or property search was attempted or conducted” and if the observer would “say this ‘frisk’ was necessary for the protection of the officer” through crossing off “yes” or “no”. Moreover, they would cross off items on a bullet-point list indicating what kind of weapon or evidence was found in the search. They would also note if the citizen objected, and what they said (Reiss, 1971a, pp. 11-12; see also Reiss, 1968, 1971b). Reiss (1971a) noted that coding such encounters should be done in a way that facilitated recording sequences of events and behaviours as they occurred.

Another large-scale SSO was the Project on Policing Neighbourhoods (PPN) study (Mastrofski et al., 1998), where observers observed 3,125 police-citizen encounters and interviewed officers, their supervisors and randomly selected citizens. The goal was to observe and code “everything they do during a typical tour of duty” (p. viii), in particular the behaviours of citizens and officers in encounters. The observers also coded situational and environmental variables such as average time spent on different activities, and ratios indicating proactive or reactive police work. For example, observers in the study would code if the citizen showed any sign of physical injury or illness, if the citizen had a weapon in their possession and if the citizen threatened or assaulted the police.

While a lot of SSO research draws upon these two studies, there are several smaller-scale independent SSO studies, such as Todak and James’ (Todak, 2017; Todak & James, 2018) study of de-escalation in police-citizen encounters. Here, Todak went on 35 ride-alongs and coded 90 variables per encounter, including individual (e.g. gender, age and race), situational (e.g. date, time and weather conditions) and behavioural variables. The behavioural variables included, for example, whether citizens had an escalated behaviour or not, whether officer attempted to de-escalate through empowering the citizen or not, and the citizen’s demeanour (categorized from highly respectful to hysterical).

In-person SSO has some clear advantages in relationship to non-observation methods, and the method is well-suited for researchers interested in studying encounters where the relevant factors can be observed throughout the entire interaction. It allows for observing behaviour as it occurs naturally, while other

methods such as surveys and interviews struggle to overcome memory errors and social desirability biases, among other issues (Jerolmack & Khan, 2014). In-person SSO's strongest feature is observing frequently occurring phenomena, such as respectful exchanges between officers and citizens (McCluskey et al., 2014). However, the methodology has its limitations. Riding along with officers might affect their behaviour and thereby violate the assumption that studied behaviours are naturally occurring (Brunson & Miller, 2023), and observers might even feel the need to help officers if things escalate (Spano & Reisig, 2006). Moreover, large-scale SSO studies require significant resources to conduct, which makes training, planning and observing a costly and often inefficient endeavour. When observing rare phenomena such as violence and force, reaching statistical power within a reasonable timeframe and budget can be challenging. For example, Todak and James' (2018) study failed to observe any use-of-force incidents over 131 police-citizen encounters. SSOs also have validity concerns, as correctly capturing behaviours as they occur can be challenging even for the most trained observer. Especially in conflicts, it can be hard to observe and precisely code what happens and in which order behaviours occur (Dunham & Alpert, 2008). This can provide us with incorrect information that could harm the analyses.

## 2.2 Video-Based Research

Recently, various congruent and overlapping approaches to study interactional dynamics via video footage have emerged, and their applications in policing research are on the rise. Some are doing "video-based systematic social observation", hereafter VBSSO (e.g. McCluskey et al., 2023); others define their research within the framework of "video data analysis", hereafter VDA (e.g. Nassauer & Legewie, 2021); and some, like our research team, use the term "video-based interactional ethology" to describe our methodology (Lindegaard & Bernasco, 2018). In the following, we review some of the research applying these frameworks to a policing context and show how they can help us with understanding policing actions while simultaneously addressing some of the limitations of in-person SSO methodology.

VBSSO is, as the name suggests, an adaptation of the SSO approach using video data. It follows the same methodological logic of creating a coding protocol, coding the relevant variables and taking qualitative (field)notes that later may be written into narratives. However, since the observers no longer need to ride along with the officers, but can watch the video-recorded interactions from their office, it has proven more cost-efficient (McCluskey et al., 2023). For example, Dixon and colleagues (2008) used VBSSO to analyse the influence of race on traffic stop interactions using dash cam videos. They coded "race/ethnicity", the officers' and the citizens' "communication style" and conceptualized these as, for example, "dismissive or indifferent" and "apologetic or belligerence". Worden and McClean (2014) researched how often police used just or unjust behaviours in encounters. Their coding scheme was constructed specifically for capturing officers' behaviour towards citizens and involved a long string of items their observers filled out after viewing each video. They coded if any of the relevant forceful behaviours (e.g. handcuffing or pain compliance) or resistance behaviours (e.g. defensive or verbal resistance) occurred or not, as well as demeanour variables (e.g. if officers were

angry or sarcastic). Sytsma and colleagues (2021) analysed how individual and environmental factors were associated with escalation, using bodycam footage. They coded if a specific behaviour or action had occurred, such as an officer displaying verbally antagonistic behaviour, and if a suspect attempted to flee the scene.

Dai's (2021) study of procedural justice utilized BWC videos and coded if the citizen passively, defensively or verbally resisted against officers. Moreover, they instructed coders to indicate what characterized the citizens' "manner towards officers" at certain points of the interaction. Here, they categorized citizen manner as "friendly", "businesslike" or "hostile" and coded if officers, for example, comforted or reassured the citizen, as well as ranking the officers' patronization, anger or sarcasm towards the citizen on a scale of 1 to 5 (see Dai, 2023, for the observer instructions). Piza and colleagues (2023) conducted an "SSO of BWC footage" to study force across micro-time intervals, more specifically 5-second intervals. Their force measures included soft-hands control, hard-hands control, blunt impact, chemical device and threats of lethal force. Coders were instructed to code, in each 5-second segment, whether each of these forms of force occurred. Moreover, their citizen behaviours were operationalized as verbal antagonism, physical antagonism, attempts to flee and the possession of weapons. For example, the definition of physical antagonism was if the citizen "behaved in a physically aggressive or antagonistic manner towards the police, for example punching or kicking officers" (Piza et al., 2023, p. 37, for their codebook).

Terrill et al. (2023) researched the correlates of escalation using a combination of dashcam videos and bodycam footage. Their coding instructions use codes indicating that citizens showed conflict behaviours and that officers used non-coercive behaviour, as well as the occurrence of both force and resistance. In their use of force and resistance measurements, they detail their coding structure. For example, citizens' aggressive resistance is defined as "attempts or actually attacks/strikes an officer ... (e.g., suspect hits officer with hands, fists, feet, legs, or non-lethal weapon)". Use of force is described through behavioural descriptions, such as "Takedown: Throws, pushes, or shoves suspect to the ground, wall, car (e.g. pushes suspect against vehicle, shoves fighting suspect to the ground)" (Terrill et al., 2023; Methodological Appendix).

Such codebooks in social science and policing are similar to what behavioural biologists would call ethograms (Ejbye-Ernst, 2022, p. 28). However, a main difference is that VBSSO codebooks are typically informed by more abstract analytical concepts like "resistance" or "force" while ethograms categorize behaviour more descriptively as for example "pushing" or "hitting". VBSSO codes can involve assumptions about intentionality, with codes like "defensive resistance" defined as citizen's attempts to evade police control by "leaving the scene, fleeing, hiding from detection, or pull away from officer's grasp" (Dai, 2023). These codes involve the assumption that citizens have certain intentions with their actions, even though from a video observation you cannot necessarily know if someone is intentionally "leaving a scene" or "fleeing" or just coincidentally pass by or have to catch a train. In an ethogram approach, such assumptions about intentionality are typically left out or described in more detail in order to capture whether someone

is intentionally fleeing or coincidentally leaving the scene in a hasty manner. VBSSO codebooks can involve codes that combine behaviour with outcome of behaviour such as “lethal force” (Piza et al, 2023) with no further specifications, while an ethogram approach would separate force behaviour from its outcome and specify the force behaviour in detail, such as “shooting at or towards someone”.

In other video-based studies, the authors position themselves within the VDA framework formalized by scholars such as Anne Nassauer. The goal within VDAs is, according to Nassauer and Legewie (2021), to “reconstruct a situation step-by-step, analyse its inner dynamics, and establish comprehensive story lines” (p. 149), often by triangulating videos with different data sources such as pictures, police case files and documents (see also Collins, 2008). The analytical strategy is to reconstruct “the situational sequence in detail, including the context in which it arose, before analysing if a situation shows intrinsic dynamics that contribute to the occurrence of an outcome or its absence” (Nassauer, 2022, p. 42). Nassauer and Legewie (2022) note that neutral and balanced data, optimal capture and observing naturally occurring behaviour are the most important factors when selecting and collecting data. While the VBSSO methodology is employed in a quantitative manner, the VDA framework is more flexible and can be used both for qualitative and quantitative research. However, there are many overlaps, even to the extent that some authors apply “SSOs to a VDA framework” (Chillar et al., 2021) or say they do “SSO video data analysis” (Sytsma et al., 2021).

The VDA approach draws on a range of different frameworks, such as visual studies, ethnography, behavioural studies and multimodal interaction analysis; however, with an explicit distinction from a human ethological approach (Nassauer & Legewie, 2021), with its ambition to quantify across cases and contexts (and even species). Within policing, the framework has been applied to study processes of interaction between protesters and police (e.g. Bramsen, 2018; Nassauer, 2016, 2019), escalation processes into force (Nassauer, 2022) and racial biases in lethal force usage (Nassauer, 2023). Nassauer and Legewie (2021) note that the focus when coding the video data should be on facial expressions, interactions and contexts. Bramsen (2018), for example, coded elements such as “violent acts, as well as potential violent situations” (p. 307) and included codes for the atmosphere and positioning of the police and protesters, while Nassauer (2016) coded emotions through body postures and facial expressions, and the occurrence of key events, such as if people were hurt by another person or if objects were destroyed, over the course of the protest.

As we alluded to, we believe these video-based approaches address the limitations of SSO. We can reduce or remove the risk of influencing how the observed behave, and we can with a stronger degree of certainty say that we are observing naturally occurring behaviours when we are doing video observations. Furthermore, videos enable us to test the intercoder reliability of predefined codes and interpretations of behaviours through between-coder comparisons. This is crucial: in-person SSOs effectively prohibit having two observers in the back of the car, and it is therefore commonplace to not publish intercoder reliability estimates (Worden & McClean, 2014). Moreover, using videos makes it easier to sample observations, and especially rare criminological events, such as use of force, which

makes the approach more efficient. Instead of using 36 observers, like Reiss did, we can train a small team of coders to observe rare events via video. This allows us to observe what would take months or years, in merely “a matter of weeks” (Schafer et al., 2022, p. 6). As a future prospect, AI and algorithm-driven coding may be used to automatically detect behaviours of interest within larger datasets and select these encounters for manual coding (Bernasco et al., 2023). Furthermore, we can re-watch an encounter as many times as needed to capture details. Using videos also makes it easier to capture behaviours accurately, separating behaviours from outcome of behaviours, and as such capture the temporal order of behaviours, which improves our understanding of causal mechanisms (McCluskey et al., 2023). Here lies the specific contribution of the ethogram to address these limitations, with its rich ethological detail and detailed capture of behaviours in naturally occurring settings, as we will go on to show shortly.

### 3 Choosing Type of Video and Sampling

The first step towards a video-based analysis of policing is to select a type of video. In policing, this will typically be either CCTV or BWC, but dashcam videos and third-party videos from cellphones can be used as well. Each of these video types has different camera perspectives. CCTV cameras usually have a broad view allowing us to see multiple people and their interaction. The quality of the video depends on, for example, the sensor format, focal length of a lens, weather conditions and distance from the observed people. Sometimes, they are operated live by an employee, which enables turning of the camera angle to follow people if they move around. Some CCTV videos contain audio, but most do not, which makes coding of the content of the verbal communication impossible. In such cases, we can however often use nonverbal cues as proxies for their verbal counterpart (Eibl-Eibesfeldt, 2017), such as verbal commands (e.g. pointing with the finger), loud talking or yelling (e.g. visibly open mouth) or threats (e.g. pointing with a weapon). Moreover, CCTV cameras are out of reach for officers, who cannot turn them on or off, which makes it a reliable and mostly objective data source to know what occurred. They may deter or displace certain crimes and people, which can lead to certain biases in what we are able to collect (Lindgaard & Bernasco, 2018). CCTV cameras thus capture a bird’s eye view of encounters – allowing for precise coding of behaviour and situational variables like distance and the amount of people present – and, crucially, are more likely to capture all officer behaviours than BWCs are.

BWCs have a first-person perspective and mostly contain audio. This enables a more in-depth analysis of emotions (e.g. through tone of voice, breathing intensity) and allows for inclusion of verbal language in our coding. BWCs do however limit the view of the wearer’s behaviour, as they are mounted to the officers’ uniform. Activation of the cameras may differ by officer, or over time and jurisdictions, which can create certain selection biases (Katz & Huff, 2023; McCluskey et al., 2023). Being a part of the officers’ uniforms, they are hypothesized to positively affect citizen (and officer) behaviour and reduce conflicts, although the evidence is

mixed (for a review, see Lum et al., 2020). This also means they are within reach of citizens, who might end up knocking them off during conflicts. For example, Piza and Sytsma (2022) reported that the cameras fell off in 34% of their use-of-force videos. In sum, the BWCs have a range of potential quality issues that can make them hard to analyse.

Dashcam videos can be positioned somewhere in between these two types: they are mounted inside the police car and are stationary when recording interactions in a direct line outside of the car, while typically capturing audio close to the car. This renders them useful to analyse traffic stops. However, it also means that the actors might move out of its field of view and sound capture range, which limits their usefulness for many analyses (Brunson & Miller, 2023). Third-party videos resemble BWCs in that they are often capturing the perspective of citizen, recording the officer with their smartphones (although police sometimes also record with their own phones; for example, in jurisdictions where BWCs are not implemented). More or less active bystanders might also be recording conflicts, and such videos can provide a broader field of view than if recorded from the officers' or active participants' fields of view. Third-party videos can easily be edited or tampered with before they are uploaded, which makes it crucial to authenticate or triangulate with other sources. Such tampering is also a subjective concern for the recorded officers, who stress that edited videos might not show the whole picture of conflicts and that such videos can be used against them (Sandhu & Haggerty, 2017).

Usually, video data require access granted by police departments or other organizations and businesses, such as municipalities, shops or restaurants. Some video footage is publicly available, such as YouTube videos released by US police departments (Uchida et al., 2022). For all footage, bias in the selection of footage may occur, for example, due to choices by organizations to give access to or publish certain footage, or lost or non-retained video (cf. McCluskey et al., 2023). The design of sampling selection strategies in video-based studies is potentially more consequential than in in-person SSO studies, where observers have limited influence on how samples are composed. When using videos, we can choose to sample all available cases within a time period (Pollock et al., 2021), all available use-of-force encounters (Sytsma et al., 2021) or compare use of force with potential use-of-force encounters (Schafer et al., 2022). Alternatively, we can select a random sample provided to us by our collaborators (Sunde et al., 2023), or all videos that fall within a certain context, such as ticketing events (Friis & Lindegaard, 2022).

When selecting the type of video for analysis, the most methodologically significant decision is whether to choose footage with audio (i.e. BWC, mobile phone, dashcam videos) or without audio (i.e. CCTV, dashcam videos where sound is unavailable). This choice directly impacts the scope of the analysis, as it determines whether the focus is solely on nonverbal actions or whether it also includes "speech acts" (Austin, 1975). Including audio in the analysis leads to a more comprehensive understanding of the action being studied. However, it also makes the coding and interpretation of the data considerably more complex. Despite this complexity, we believe that incorporating the verbal dimension is the way forward for the interaction ethological methodology. The inclusion of audio

enriches the video analysis by providing an opportunity to grasp subjective meaning and motivations that would otherwise be missing from the visual recording of observable behaviours alone (Blumer, 1969). Without considering this subjective dimension, the explanatory potential of interaction ethology cannot be fully realized. This is because subjective meaning and motivations are the essential mechanisms that underpin people's actions and the production of causal social effects. Therefore, to truly understand and explain human behaviour through interaction ethology, it is crucial to take into account both the observable actions and the underlying subjective factors that drive them (Kaas et al., 2024).

#### 4 Human Ethology and the Features of Ethograms

Video-based research, regardless of if we call it "VBSSO", "VDA" or "video-based interaction ethology", shares many similarities. Yet, they differ in particularly one aspect, the use of a structured behavioural inventory – an ethogram. Defined as "a set of comprehensive descriptions of the characteristic behavior patterns of a species" (Lehner, 1998, p. 90), this methodological tool has been important for animal (and human) ethologists and behavioural biologists, and researchers have developed behaviour- and species-specific ethograms. These behavioural inventories are developed based on observing naturally occurring behaviours from animals in their natural habitat. A classic example from behavioural biology is the work of de Waal (1988), who developed ethograms to compare social behaviour among chimpanzees and bonobos, and ethograms have been applied to a wide range of animal behaviours, including cats (Stanton et al., 2015), wolves (MacNulty et al., 2007) and pigs (McGlone, 1985). However, ethograms of policing behaviour generally or, in particular, police use of force, or de-escalation in policing, do not exist.

The features of the ethogram differentiate it conceptually from an (VB)SSO codebook. Ethograms include descriptive categories of behaviour, separated from the effect of the behaviour, whereas an SSO codebook typically involves interpretative categories, for example, whether a police stop is legal or illegal in nature (Schafer et al., 2022). The descriptive and detailed nature of ethograms allows for the study of sequential patterns within encounters, whereas the SSO codebooks typically focus on whether a specific category of behaviour occurs (e.g. force, aggression) and not on what the processes are that bring about such categories (but see Terrill et al., 2023, for an exception). For example, they can code if physical force was used and specify what type of force was used (e.g. handcuffing, hard-hand tactics). The more descriptive nature of the ethogram method implies coding ways of using force, for example, different ways of handcuffing or different ways of using a gun that are as free of interpretation of intentionality as possible (Jones et al., 2016). Rather than coding "excessive force", an ethogram approach would code, for example, "being kicked on the head while lying on the ground".

The more descriptive way of coding is done to avoid potentially conflicting interpretations of what, for example, "force" means to people carrying out the coding. Such approaches have been embraced in the SSO studies too with the

reason to increase consistency and accuracy. For example, Mastrofski et al. (1998) argued in their SSO guide that “the more discrete and limited the decision an observer must make, the easier it is to achieve sufficient reliability” (p. 9). With the ethogram method, the goal is to “document behavior, leaving interpretation to take place later” (Jones et al., 2016, p. 489). A key aspect of the ethogram method that distinguishes it from the VBSSO method is the procedure of intercoder reliability tests of the measurement instrument rather than of the people carrying out the coding as it typically is limited to in SSO (Terrill et al., 2023). Intercoder reliability testing is typically part of developing the measurement instrument, with specific codes being tested on reliability by investigating what kinds of codes that can be applied in a reliable way by two independent coders and what kinds of codes that are impossible to reach good intercoder reliability scores on. After such evaluations, the low-reliability-score codes are typically redefined and tested again in their new versions, and, if still not working well, such codes are excluded from the measurement instrument. Only at the point of a high intercoder reliability score of the specific code, the coding of the subsequent sample can take place.

Ethograms are usable when it comes to several units and levels of analysis. While, for example, Dai’s (2021, 2023) codebook captures encounter-level behaviours and the codebook of Piza and colleagues (2023) is concerned with 5-second intervals, the ethogram can be adapted and used in whichever way fits the unit of analysis, as long as the detail level of the behaviours remain the same. Depending on one’s research focus, ethograms can be developed with varying levels of resolution. Typically, one develops a comprehensive behavioural inventory that captures and defines very specific behaviours, such as “pointing the index finger while shouting” or “moving in closer proximity” in the ethogram coding (Ejbye-Ernst et al., 2022). This allows us to use and analyse micro-detailed behavioural codes, rather than different types of behaviours (e.g. aggression or resistance). These behavioural codes may then, in a later analytical stage, be categorized or grouped into broader, conceptual types of actions such as aggressive behaviour (Eibl-Eibesfeldt, 2017). The final ethogram is typically a combination of behaviours already identified by other researchers and new behaviours unique to the specific ethogram, so that it captures all the behaviours relevant to the topic under investigation.

Another feature distinct to the ethogram is that the descriptive nature of the measurement instrument, developed for specific contexts of the behaviour, allows for comparison of behavioural patterns across contexts. This is common in behavioural biology, where, for example, behaviour of third-party individuals during aggression is compared across species in order to investigate evolutionary traits. The ethogram method has been used for such comparisons too; for example, in a study of consolation behaviour in street fights compared to armed robberies (Liebst et al., 2024), the impact of danger on bystander intervention across national city contexts (Lindegaard et al., 2022), and variation in patterns of consolation behaviour in humans and chimpanzees (Lindegaard et al., 2017), were analysed. In cases where bio-evolutionary explanations are not adopted, the use of the ethogram often leads researchers to maintain an interest in identifying universal behavioural expressions that humans employ in connection with a given activity – for example,

universal forms of behaviour through which humans de-escalate interpersonal violence (Pallante et al., 2023; Philpot et al., 2020). In the context of policing, such a comparison approach would allow for theorizing patterns found across contexts and contribute to the current lack of theory development and theory testing, as pointed out by, for example, Terrill (2014).

The ethological approach to analysing micro-details in human interpersonal behaviour aligns with a micro-sociological perspective. This alignment is recognized by Goffman (1971), who acknowledged that the ethological method offers a most detailed approach to studying human interaction. Despite this, only a few studies of human behaviour have exploited this ethological potential so far. For example, Jones and colleagues (2016) developed an ethogram describing behaviours occurring in an operating room, while Fragnière and colleagues (2017) studied waiting behaviour in cable car lines in ski slopes. Mosselman and colleagues (2018) took a qualitative approach to studying emotional displays in robbery situations. Philpot and colleagues (2022) studied reconciliation behaviours, and Pallante and colleagues (2023) developed an ethogram for distress expressions, both in post-conflict situations. While the first two studies used in-person observations and were conducted in small, contained areas, the latter three used video footage as their data due to the complex and fluid nature of interpersonal conflicts. As for police research, the ethological potential is largely unexploited when it comes to studying behavioural elements of policing, such as use of force and de-escalation. Some exceptions include an ethologically inspired approach to studying policing of football hooliganism (e.g. Stott et al., 2008).

Developing an ethogram usually combines both deductive and inductive elements. The deductive elements come from reviewing existing research on the same topic or utilizing already existing ethograms. Here, the researcher can gain information about what behaviours others have identified that might be relevant to their study. The inductive elements come from observing the empirical material and registering any relevant behaviours and constructing definitions. This is a process that typically requires multiple parties reviewing the material to write comprehensive and clear definitions of the behaviours observed. The inductive phase is also used to determine what type of behaviours should be coded and how they should be defined. For example, if the research is concerned with mapping interactional patterns across encounters, behaviours that almost never occur but appear as outliers may not make the cut into the ethogram. In other cases, the researchers can decide to make a more comprehensive behavioural inventory that also includes rare types of behaviour. A key feature of the ethograms is that they should include mutually exclusive definitions; this way, one specific behaviour is captured by one specific code and not another.

Once an ethogram is finalized and published, it should aim to catalogue all behaviours that we can expect to see and code systematically, within the context of our study. Stanton and colleagues (2015), for example, attached their ethogram as a table, effectively listing all behaviours cats do based on their systematic review, ranging from, the calm “allogroom: Cat licks the fur of another cat’s head or body,” to the aggressive “rake: Cat makes kicking movements with one or both hind legs against (modifier)” (pp. 10-11). Others make use of pictures, such as McDonnell

and Poulin's equid play ethogram (2002). When published, policing ethograms can be reused by the same research team on different datasets, or in replication studies by other researchers on the same type of police or policing context. Published ethograms can be adapted and modified by others (Jones et al., 2016) based on the context or the focus of their study, and a use-of-force ethogram, for example, can be used as the foundation for future studies. In some cases, it might be directly relevant and therefore ready to use, while in other cases it might need refinement – a European police ethogram might not capture American, African or Asian police officers' behaviours accurately, and a use-of-force-oriented ethogram will need adaptation and development if one intends to study de-escalation, just like Jones and colleagues' (2016) ethogram of human behaviour in the operating room needed refinement after being adapted from ethograms used to study bonobo and chimpanzee communication.

A logical starting point for an ethogram of policing behaviours could be the force continuum, since they provide officers with practical, behavioural descriptions (although ethologically vague) of what officers can do in encounters with citizens and when certain behaviours are prudent and legal (see, for example, Henriksen & Kruke, 2020). We would also turn to existing research on force and de-escalation to identify what behaviours were described as relevant, often ranging from small talk on the one end, to firearms usage on the other. The questions would then be whether and how the police actually use these behaviours, which should be determined through detailed observations of a subset of collected videos. In this observational process, one should also capture other behaviours that are not mentioned as part of the force continuum and the existing literature. As such, the ethogram of policing behaviours should ideally capture all key behaviours officers use to manage and de-escalate conflicts and how they use force in practice. When the types and definitions of behaviours have been reviewed, catalogued and tested for intercoder reliability, the ethogram can be applied in a systematic way to code the remaining video material quantitatively. We now turn to some examples from our own research using ethograms that were inductively developed and used to categorize police and ticket inspector conflict behaviours.

## 5 Practical Examples of Ethograms

To illustrate how we develop and use ethograms, we turn to examples from two research projects that were based on an ethogram method. Both projects were PhD projects of the respective authors and parts of a larger research agenda to observe, understand and eventually prevent threats and violence towards frontline workers.<sup>1</sup>

The first example is from a project on ticket inspectors who issue fines to bus passengers without valid tickets (Friis et al., 2020; Friis & Lindegaard, 2022). This project collected more than 1,200 BWC videos from buses in Denmark to study the interactional patterns of conflicts between ticket inspectors and passengers.

1 Note that while systematic intercoder reliability testing of the ethograms' codes is desirable, as noted, this was unfortunately not possible due to resource constraints for these projects.

Inspectors work in units of two or three, and to avoid limiting our data capture to one-viewer perspectives of the interactions, all inspectors were instructed to record their colleagues' passenger encounters. Specifically, we were interested in examining whether certain types of ticket inspector actions increase or decrease the risk of subsequent passenger aggression. To do so, we first conducted an inductive screening of a subsample of the video data to identify the types of behaviours that occur in situations in which a passenger does not have a valid ticket. This phase included decisions about what behaviours to code and how to define them. Here, the ethogram was developed using both very specific behaviour codes and more conceptual behaviour codes. Specific behaviour codes that emerged from the initial inductive screening phase of the data included "physically blocking the way for the passenger" and "holding onto the passenger", as seen in Appendix A. It was possible to capture these bodily behaviours as inspectors were instructed to record each other during the project. Eventually, the codes "blocking" and "holding onto the passenger" were grouped into a broader analytical type of action – "confinement of physical space" – together with the code "asking the bus driver to hold the bus doors closed". The ethogram was also supplemented with insights from previous research and the theoretical assumptions that guided the project.

A key advantage of using BWC to analyse interaction patterns is that these cameras capture both visuals and audio. Thus, behaviour codes may both involve verbal and nonverbal behaviour, which enables a more comprehensive behavioural analysis than CCTV footage allows for. This advantage is seen in the conceptual behaviour code "showing sympathy", which is included in the ticket inspector ethogram. This code involves statements where the inspector indicates that they understand that it is frustrating/annoying/unfair/sad to receive a fine, for example, by saying "I'm sorry," "Unfortunately," and "I know this is frustrating." Saying "unfortunately" as a dismissive response to a request/question from the passenger is not sympathy. This conceptual behaviour code involves different types of verbal utterances and does not only capture one specific type of behaviour/verbal utterance but, rather, a range of behaviours that conceptually can be coined as acts of sympathy. In total, the ethogram consists of thirteen inspector types of behaviours.

The analysis was informed by character contest theory (Goffman, 1967) suggesting that inspector's actions that challenge the passenger's face may escalate the interaction into aggression. Both the overall action types of "confinement of physical space" and "showing sympathy" were used to test whether specific actions of the inspector associate with subsequent passenger aggression. Our findings revealed that physically dominant behaviours, such as the confinement of physical space variable, were highly and robustly correlated with passenger aggression. This type of behaviour occurred in 19% of the encounters. The other predictor variables – authority and accommodation – were also (positively and negatively, respectively) associated with the aggression outcome, albeit less robustly. These types of behaviour occurred in 22% and 46% of the encounters. Our findings indicate that dominating the physical space is particularly influential in understanding risk factors of work-related victimization for ticket inspectors and that the manner in

which they interact with passengers without tickets can influence their safety (Friis et al., 2020).

The second example of an ethogram was developed for a project on police-citizen encounters, aiming to study the role of demeanour on low-level force, using CCTV videos from the streets of Amsterdam (Sunde et al., 2023). We collected videos in collaboration with the Amsterdam police and the city of Amsterdam, totalling over 1,000 hours of video material. In around 450 videos, we observed some kind of police-citizen encounter. Our first exploratory viewing was to determine which videos showed such encounter and whether or not the video showed any conflict. In our inductive phase, we observed ten randomly selected videos, where half involved some kind of conflict, and recorded all behaviours we observed. During this process, the primary author of the study trained a colleague with experience in video analysis to use the ethogram, and both applied it in coding the same videos. Then, we discussed the variables' definitions and rules of application and attempted to clarify any ambiguous definitions as an attempt to ensure reliability. As an example, this process led to splitting the (original) variable indicating arrestation techniques into two variables – arrest without pain (i.e. a “regular” handcuffing) and arrest with pain (i.e. forcing someone to the ground to handcuff them). After the inductive viewing phase, we added codes for other behaviours we would expect observing in policing encounters based on previous research and the aforementioned force continuum (Henriksen & Kruke, 2020). For example, no use of firearms was observed either in the inductive phase or in the deductive phase, but it was included in the ethogram nevertheless, because the Dutch police carry and sometimes deploy their guns.

To further detail how the inductive coding process was carried out, we review briefly the behavioural variable called “physical and spatial control”. This code exemplifies the value of the inductive coding phase. In the police literature, we found a glaring gap and lack of focus on non-forceful yet still coercive behaviours that clearly have a controlling function. Much like the ticket inspectors blocking the passengers, we observed in our inductive phase that officers would lightly hold a citizen on their upper arm or wrist, touch them on their shoulder, slightly push them away on their chest, or position themselves so as to block potential exit or escape paths; however, such coercion was not considered in the extant research reviewed. We included this variable in our ethogram precisely because it captures behaviours that officers seemingly often perform when managing potentially conflictual encounters, and we argue it must be understood as a form of physical coercion and a mild form of force. This highlights the value of careful inductive observation of the video material, allowing for descriptive categories of behaviour, instead of simply relying solely on pre-existing ideas and interpretative categories of how participants actually behave. In the complete sample, we observed this form of mild force in no less than 43% of all the total cases, and it was the most prevalent physical force behaviour. The ethogram in this study consists of a section of fifteen officer behavioural variables ranging from approaching to gun usage, and a section of fourteen citizen behavioural variables ranging from compliant gestures to violence against the police. The complete ethogram for this study can be found in Appendix B.

After developing the ethogram, we systematically coded the remaining sampled videos to investigate the demeanour hypothesis, using Excel. This hypothesis states that police are more likely to use force against citizens with a bad attitude, irrespective of their criminal behaviours (e.g. Engel et al., 2000; Klinger, 1994; van Maanen, 1978). In the project, each behavioural code was initially coded at the individual level. However, since the unit of analysis was the encounter itself, we aggregated the behaviours to the encounter level for analysis. In the analysis, we compared encounters where police employed any kind of physical force with encounters where they did not, and estimated the effects of citizens having a bad demeanour, being noncompliant and being aggressive and/or performing a crime on police use of force outcomes. We used three different outcomes: (1) a dichotomous variable indicating if force occurred or not, (2) a force behaviour count variable and (3) a force severity variable. We concluded not only that having a bad demeanour (such as using argumentative gestures and pointing) did have a small, positive effect on our force outcomes but also that both noncompliance (such as attempting to flee) and aggression and crime (such as violence against officers) were stronger predictors of force, in line with our hypothesis (Sunde et al., 2023).

The methodological contribution of introducing ethograms is to facilitate an analysis that emphasizes human behaviour as the core subject, which can act as a counterweight to a substantial portion of social science research that, surprisingly, seldom relies on direct observations of actual behaviour (Pallante et al., 2022). By exploiting the details that we can observe through repeated, careful watching of our video data, we can move beyond general codes that indicate – for example, that a citizen was disrespectful, or that the officer used non-lethal or lethal force – and instead describe what behaviours were performed. It also allows us to consider behaviours that traditional research might not catch in the heat of the moment, or even consider forceful, and, thus, ideally, capture “everything they do” (cf. Mastrofski et al., 1998, p. viii).

## 6 Discussion and Conclusion

In this article, we have demonstrated the utility of using videos to analyse conflicts and conflict behaviours in police-citizen encounters and argued for the application of ethograms in describing, quantifying and comparing these behaviours to advance the field of policing and the study of police behaviour. We have described the distinct features of the ethogram; discussed various video sources, primarily CCTV and BWC; and shown how they can be employed, by drawing on examples from our own research. Our aim with this methodological tool is to foster more efficient research processes, to ensure more reliable observations without the influence of reactivity or observer interpretations, to facilitate replication and to improve theory development. Most characteristically, the video-based ethogram method allows an unsurpassed level of detail in examining police-citizen encounters that can reveal behavioural patterns and the impact of behaviours on conflict outcomes. This is crucial because research on police-citizen interactions and use of

force is often contested and sensitive, especially regarding subjective perspectives on what constitutes reasonable or unreasonable force. To truly understand how forceful and violent interactions *actually* unfold and how they end up as forceful, as opposed to people's experiences or perceptions of them, we need objective measures that are as free of observer interpretation and subject reactivity as possible.

To this end, ethograms and video analysis go hand in hand. With the recent increase of video-analytical approaches in policing studies – typically coined VBSSO and VDA – we believe the time to add ethograms and detailed ethological coding to the field's methodological toolkit is now. We have argued that with the ethogram method, we should not use categorical codes, indicating whether or not a citizen was “defensively resisting”, or if an officer used lethal force, but rather that we should code that the citizen was “running away” or that the officer was “shooting with a gun”. While there will always be some influence from human observers' own interpretation of an event, an ethogram method should allow us to move closer to a descriptive nature of what occurred and, thus, limit this influence. This would make it easier for researchers to compare the influence of behaviour across cases and contexts. For example, the meaning and subjective understanding of “defensive resistance” will likely differ if we compare policing in action in Africa, America and Europe – both on the side of the police officer and the police researcher. However, codes that describe actual behaviour (e.g. “the citizen is running away”) are ethologically intuitive and free of context-specific influence, meaning that any researcher can utilize any ethogram as the basis of their own research and capture what goes on in a meaningful way. At the same time, the coding of the ethogram method allows us to remove behavioural outcomes from our coding, which we have argued is another crucial advantage over traditional coding.

Moreover, we propose that, similarly to how behavioural biologists use ethograms to catalogue specific types of animal behaviour (e.g. aggression, mating and play behaviour), we need to develop context-specific policing ethograms. These would capture various aspects of policing behaviour, involving specific actors within law enforcement (e.g. riot police, negotiators or patrol officers) across different types of policing situations (e.g. crowd control, arrests, traffic enforcement or mediation in conflicts between citizens) and jurisdictions (e.g. across continents, countries or states), and contain different aspects of policing behaviour (e.g. use of force and de-escalation). Furthermore, once an ethogram exists, the next researcher does not need to start from scratch. Instead, they can take a more deductive approach in the initial phase, where existing ethograms are validated and, if needed, adjusted, to fit in another jurisdiction, police unit type or enforcement context (e.g. extending from police officers and ticket inspectors to correctional officers and bouncers). The scientific end-goal should be to move towards standardized ethograms of policing and enforcement, open for other researchers to utilize for observational research, replication and comparison, hypothesis testing and theory-building. Anyone can adopt an ethogram, apply it to their context of interest, revise it as needed, replicate prior studies, test hypotheses and publish their updated ethogram.

With these efforts to better capture, quantify and compare the role of behaviours in policing in mind, we believe using standardized ethograms may aid

theory-building within policing as well. Like Terrill (2014) pointed out, while criminology has a plethora of theories on crime, policing scholars have virtually no theory of police behaviours; indeed, there is no life-course theory or social disorganization theory of police behaviour, and Alpert et al.'s (2020) authority maintenance theory is perhaps the closest to date. Instead, as Terrill (2014) points out, it is tempting to conclude that police use force “because they can” (p. 267). Therefore, the field typically contains “a hodgepodge of descriptions, observations, postulates, hypotheses, constructs, and varying pieces of empirical evidence that at times suggest a semblance of a theory but rarely, if ever, specify an adequate theory” (p. 261). Using standardized ethograms like we have discussed, we can access more detailed and reliable descriptions of behaviour, more accurately compare these behaviours across contexts, and quantify them to test different hypotheses. And just like the biologists who study conflict and consolation behaviours in primates use ethograms to collect observations, form and test hypotheses based on these observations, conceptualize modes of behaviour from these hypothesis testing, construct postulates about behaviours from these tests, and eventually form a theory of these behaviours, better-founded theories (or if one accepts Terrill's premise, *any theory*) of police behaviour may be developed.

Furthermore, one of the key advantages of using video data more broadly is that it allows us to capture the sequences in which behaviours occur. When employing in-person SSOs, it can be challenging for observers to determine the exact sequence of events – that is, whether officers become agitated due to citizens' behaviours (or vice versa) or on their own accord (Dunham & Alpert, 2008). The temporal ordering of behaviours has been one of the biggest black boxes of research on police-citizen encounters and use of force (Klinger, 1994), but, with video-analytical approaches, we can now delve into this black box and more accurately assess the temporal order in which behaviours occur. Again, we argue that ethograms are specifically suited for this, as it allows for capturing each behaviour and not just the category of behaviours, in the order it occurred. Capturing sequences of behaviour was indeed a common denominator in the two examples we provided: the use of video data to trace the sequential order of the unfolding event, in order to identify the interactional forces that step-by-step cause the behavioural outcomes. As such, a promise of the video-based micro-sociological analysis in these and other studies is, as highlighted by Nassauer and Legewie (2021, p. 163), how it “provides researchers with the opportunity to examine the essence of social situations and study if there is causality at the microlevel”. Although observationally based analyses of causality are vulnerable to unobserved confounders, this limitation is at least partially offset by the extremely high resolution with which the underlying mechanisms can be studied using video data (see also Beach & Pedersen, 2019).

When we started analysing videos around ten years ago, we thought it would be possible to record everything in an encounter – every bodily movement, hand gesture, facial expression – and that doing so would reveal patterns and insights we had never seen before. However, as we gained more experience, we realized that upfront choices must be made as part of developing the ethogram, since coding everything is too time-consuming and impossible to include in the analytical

model. The level of detail and intriguing insights from the video sometimes made it hard to make these choices. Nevertheless, over the years, we have learned that the very detailed behavioural codes typically end up being collapsed into higher-level behavioural units for analysis – behaviours should be recorded in detail but not overly so. This constitutes a limitation for our ethogram method, in particular, and video analysis more generally.

In our research projects, we typically aim to integrate video analysis with other data sources such as participant observations and interviews, ideally involving the same participants and situations (Friis et al., 2020). This can help us address one of the other limitations of ethogram-based video analysis, by adding subjective meaning and emotions to the analysis. This can compensate for the fact that observational methods are narrowly specialized in capturing behaviour. One way to do so is to follow Keesman (2022), who used a novel methodological technique – a video elicitation interview technique, where officers reflected on their actions caught on camera – to gain insights into both what officers actually did and their ex-post interpretation of events. We highly encourage future research, especially using BWC, to analyse the videos of events to capture behaviour, and also to talk with the people carrying the cameras about why they acted as they did. Such insight into concrete situations may provide more precise accounts, than talking about general concepts and topics, which would allow us to triangulate objective data about what actually occurred with subjective data about how the actors experienced them.

Moving forward, the rise of artificial intelligence, machine learning and computer vision tools can help us make the coding more time-efficient compared to manual observation and coding. Consider, for example, Reiss (1971) and his observers, who spent 7 weeks observing full 8-hour shifts, or Sytsma and colleagues (2021) who spent around 300 hours to code 91 videos. While the latter represents an improvement time-wise, the increasingly rapid development of smart tools could offer future research ways to make it even more efficient. For example, automated coding of mechanical aspects of behaviour, such as distance between people (Bernasco et al., 2023, p. 20) and behavioural indicators of social relationships (Weina Ge et al., 2012), has been done; for example, recognition of the police via their uniforms in the case of policing research should also be possible with the use of advanced technologies like AI and computer vision tools. More complex things, such as identifying conflict behaviours, might be possible in the future, but in any process of analysing videos, some elements of human coding need to be integrated with the automated coding. As such, the way forward is to integrate computer vision tools with human interpretation rather than hoping for a replacement – after all, losing all touch with the field can be dangerous.

To conclude our argument, we emphasize that to advance policing research we should exploit the rich potential of available video material – including cellphone cameras, dashcams, body-worn cams and CCTV cameras – and use them in analyses of police-citizen encounters, particularly of conflicts. We have introduced an established ethology-inspired methodological tool to this context – the ethogram. This article represents the first call for policing scholars and researchers to employ this tool, and we have provided some guidelines and two examples of its application

in practice. Building on this approach requires effort, but if the field can pull in the same direction, towards more unified policing ethograms, we believe we can more reliably describe, quantify and compare policing in action.

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