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Patterns of Force, Sequences of Resistance: Revisiting Luckenbill with Robberies Caught on Camera

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ABSTRACT

Robberies are improvised encounters involving offender threat, sometimes force, and often victim resistance. While the association between threat, force, and resistance in robberies is well-established, sequential patterns are disputed due to biases of retrospective studies. To overcome these biases, we draw on CCTV camera recordings of 49 store robberies. Tentative findings suggest that lethal threat reduces victim resistance and *thereby* offender violence, except in robberies where offenders depend on victims in accessing the valuables. In those robberies, lethal threat increases the likelihood of victim resistance despite having no effect on offender violence. By providing more reliable and detailed accounts of real-life behavior during robberies, our analysis illustrates the potential of a newly emergent field of studies of crimes caught on camera.

Introduction

Almost 40 years ago Luckenbill (1980) published a groundbreaking study in this journal about patterns of force in robberies. For the first time, robberies were approached as transactional interactions between offenders and victims. Rather than explaining violence in robberies as related to the background of the offenders, as had been common practice in criminology, Luckenbill (1980) focused on the patterns of behavior of the people involved in robberies. Based on thorough analysis of police case files, he found that robberies were short and highly intense encounters, based on improvisation: "Because robbery usually is a fleeting transaction between strangers, the participants have little background information about one another; they must act on the basis of information flowing from their interaction" (Luckenbill 1982:813). Robbery offenders describe the demand for improvisation as a highly stressful experience because it requires adjustment to unexpected occurrences (Feeney 1986). The main reason for their stress is the fear they cannot persuade the victims to collaborate (Lindegaard et al. 2014).

Luckenbill's (1980) study brought about unique insights into the relationship between weapon brandishing, the methods for getting access to the valuables, and the level of force used by offenders. He formulated a range of hypotheses about the relationship between the level of threat installed by offenders during robberies, the level of dependency between the offender and victim in the transfer of the valuables, and the force used by offenders. He found that the offenders who used a weapon were unlikely to use violent force. He also found that if offenders depended on the victim in the transfer of the valuables, they were unlikely to use violent force even if they did not use a weapon. Unclear from Luckenbill's (1980) study was what the role of victim resistance was for the level of violent force used by the offender.

Since Luckenbill's (1980) study of robbery, others have repeatedly emphasized the importance of victim resistance for understanding the level of violence used by offenders in robberies (Felson and Steadman 1983; Tark and Kleck 2004; Wright and Decker 1997). While these studies have shown that

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victim resistance and offender violence is related, it has remained highly disputed what the exact sequential order is of resistance and violence (McCluskey 2013). In other words, it is unclear if resistance of victims takes place *before* or *after* offenders use violence. Victim-based studies suggest that victim resistance has little effect on offender violence (Block 1981; Kleck and DeLone 1993; Tark and Kleck 2004) while offender-based studies propose that victim resistance is pivotal in triggering offender violence (Jacobs 2013; Katz 1988; Lindegaard, Bernasco, and Jacques 2015). These contradictory findings may be related to different types of biases of self-report studies. Victims may underestimate their own role in robberies as a mechanism to deal with their trauma. Offenders may overestimate the role of victim resistance as a neutralization technique that legitimizes their use of violence.

While Luckenbill's (1980, 1981, 1982) work was pioneering for shedding light on the way robberies and other criminal events unfold as a chain of interactions between the people involved, his work and other work focusing on explaining crime through the causal mechanisms between different types of behaviors *within* criminal events (Block 1981; Hochstetler 2001; Katz 1988; Lindegaard et al. 2014; McCluskey 2013), suffered from a lack of reliable data about what people actually do when crime unfolds. In the case of robbery, studies investigated how robbery events unfold in behavioral patterns through analysis of police case files (Luckenbill 1981), self-reported crime statistics (Kleck and DeLone 1993), and interviews with offenders (Wright and Decker 1997) and victims (Luckenbill 1981). Particularly when the focus is to establish a reliable account of exact behavior (e.g., threat level, dependency between the offender and victim in the transfer of the valuables, and the level of force used by offenders) these methods are notoriously unreliable because of memory failure and social desirability answers (Clifford and Bull 1978). Even though scholars have tried to deal with these issues of measurement by triangulation (Lindegaard, 2010), the problem of establishing reliable measurement of the sequential pattern of behavior remains.

The purpose of this paper is two-fold: First, we aim to bring studies of sequential patterns of offender violence and victim resistance in robberies further by investigating their sequential relationship based on an analysis of CCTV camera recordings of robberies. More specifically we are interested in what ways the level of threat, dependency on the victim in transfer of the valuables, victim resistance and level of violence are related sequentially. Even though much is known about the importance of weapons and victim resistance for offender force in robberies, the sequential patterns between these variables have not yet been established. Second, we aim to reflect on the theoretical and methodological advancements of the newly emerging fields of studies of crimes caught on camera (Lindegaard and Bernasco 2018). This field has the potential to provide both more reliable but also new types of insights about criminal events that can advance interactional theories of crime. We take hypotheses generated through Luckenbill's (1980) study of robbery as a starting point for our analysis because his approach emphasized the importance of understanding patterns of interactions to explain how crimes are accomplished. However, his study, and those that followed, also illustrate the importance of more reliable and detailed accounts of real-life interactions during robberies. We base our analysis on high quality CCTV camera recordings of 49 store robberies in the Netherlands. Through detailed coding of the behavior of everyone involved in the robbery, we provide new insights into the way robberies unfold. We argue that these insights may be useful for situational crime prevention as they provide a better understanding of how violence in robberies may be prevented.

In what follows, we elaborate on Luckenbill's hypotheses about the conditions for different types of force used by offenders. We also draw on recent literature emphasizing the importance of victim resistance for offender violence in robberies. Based on these strands of research, we formulate four hypotheses about lethal threat and value access for the sequences of offender violence and victim resistance that we will investigate using visual methods (i.e., analysis of CCTV recordings of robberies). We argue that this visual method for studying robberies enables a more detailed investigation of the conditions for violence in robbery transactions, particularly the causal mechanisms between victim resistance, lethal threat and offender violence.

Offender violence and victim resistance in robberies

Luckenbill (1980) focused on understanding the different types of force used by offenders in their transaction with victims, and described under what kinds of conditions the different types of force were used during robberies. He distinguished between *threat* of force, *prodding* force and *incapacitating* force. Threat of force was categorized as happening with or without lethal weapons. Prodding force was a limited type of force, typically slapping or pushing to prevent victim resistance. Incapacitating force was the most massive type aimed at physically pacifying the victim. Luckenbill found that in about 20 percent of the robberies he analyzed the offender used incapacitating force in the beginning of the robbery (1980: 366). If offenders threatened with lethal weapons, there was less risk of violent force (prodding or incapacitating). If offenders depended on the victim for the transfer of the valuables, there was also less risk of violent force, independently of whether the offender had a lethal weapon.

Studies of robberies following Luckenbill confirmed his findings about the importance of lethal threat for the risk of offender force, even though some studies have challenged these findings (for an authorative overview of the discussion, see Brennan 2017). Recent studies also emphasized that not only lethal threat but also victim resistance is crucial for the risk of offender violence. The problem with the literature on violence and resistance is that it does not clarify the causal direction of victim resistance and violence because of the methodological difficulties of investigating sequences of behavior in robbery events.

Threat level

In his detailed investigation about the way robberies unfold, Luckenbill's (1980) overall finding was that offenders who displayed lethal weapons from the start of the robbery were unlikely to resort to violence (*hypothesis 1*). While Luckenbill (1980) did not investigate how lethal threat influenced the behavior of victims, he did investigate how violence used by offenders *in response* to victim resistance was influenced by lethal weapons. If victims resisted, offenders were more likely to use violence if they did not have a lethal weapon compared to if they had one. In other words, victim resistance did not change the effect that lethal weapons had on the odds that offenders would use violence.

Recent studies investigated how lethal threat influenced the behavior of victims during robberies. Kleck and DeLone (1993) focused on the opening phase of the robbery and confirmed that the display of a weapon in the beginning of the robbery made victims less likely to resist and made offenders less likely to use violence. Their study proposed that lethal threat prevents victim resistance, which in turn prevents offender violence (*hypothesis 2*). While many studies confirm that collaborating victims are less likely to get exposed to violence during robberies (Feeney 1986; Jacobs 2013; Katz 1988; Lindegaard, Bernasco, and Jacques 2015), it is debatable whether displaying lethal weapons are likely to make victims collaborate. A study based on interviews with Dutch robbery offenders (Bernasco, Lindegaard and Jacques 2013) showed that displaying lethal weapons did not prevent victim resistance. Differently from previous studies (Cook 1981; McCluskey 2013), Bernasco and colleagues (2013) found that lethal weapons did not substitute violence as a means of coercive force. In their sample, the display of weapons tended to be combined with the use of violence in the opening of the robbery. Offenders who expected victim resistance, typically because they were robbing other criminals, would carry a gun and use it preventively together with violence to avoid victim resistance (Lindegaard et al. 2014).

Dependency level access to valuables

Luckenbill (1980) found that lethal weapons were not always decisive for the risk that offenders would resort to violent force. He showed that in robberies where the offender depended on the victim as participant in the process of transferring the valuables (e.g., by depending on them for opening the safe) offenders were unlikely to use violent force even in robberies where they did *not* display a weapon. In

robberies where the victims were not necessary as participants for the transfer of valuables, weapons reduced offender violence. In robberies where the victims were necessary for the transfer of valuables, offenders would not use violence, independent of lethal threat (*hypothesis 3*).

To our knowledge, the dependency of the offender on the victim in the process of transferring the valuables has not been investigated elsewhere. Therefore, there has been no further evidence supporting Luckenbill's observation regarding this relationship, neither an explanation for why the threat-reduces-violence relation may not hold in situations where the victim is necessary as participant for accessing the valuables in the robbery. Either victims may be less likely to resist in robberies where they are necessary for the transaction of valuables, or offenders may be more tolerant towards their resistance. From a rational choice perspective, it seems logical that victims who have something to negotiate with, in this case the access to the valuables, may be more likely to use this relatively powerful positioning to resist towards the demands of the offender. Therefore, in robberies where offenders depend on victims for the transfer of valuables, we expect more victim resistance than in robberies where offenders do not depend on the victims, independent of lethal threat (*hypothesis 4*).

In our analysis of CCTV recordings of robberies, we will investigate four hypotheses. First, we examine whether displaying a weapon prevents offenders from using violence (*hypothesis 1*). We will also investigate whether displaying a weapon prevents victim resistance, which in turn prevents offender violence (*hypothesis 2*). Third, we will investigate whether dependency on the victims for the transaction of valuables prevents *offender violence* independent of lethal threat (*hypothesis 3*). Finally, we will investigate whether dependency on the victims for the transaction of valuables increases the likelihood of *victim resistance*, independent of lethal threat (*hypothesis 4*).

Crime caught on camera

Prior research that systematically explores camera footage of criminal behavior is sparse and recent. In a study of covertly observed shoplifters (Dabney, Hollinger, and Dugan 2004), 8.5 percent of the shoppers were seen shoplifting. Behavioral indicators predicted shoplifting far better than demographic characteristics. Levine, Taylor, and Best (2011) analyzed CCTV footage of 42 violent incidents, comparing aggressive incidents that ended in violence with those that did not. Challenging common beliefs, they demonstrated that third parties were more likely to take conciliatory actions than to escalate violence, a tendency that increased with group size. Three recent studies (Moeller 2017; Piza and Sytsma 2016; Sytsma and Piza 2018) used CCTV footage to investigate the behaviors of dealers and customers in illegal drug markets.

Three prior studies have explored interactions between offenders and victims in commercial robberies. Nassauer (2018) used selected footage published on YouTube to explore the notion that robberies are likely to fail if rituals are broken and if offenders display unexpected behaviors or emotions. Mosselman, Weenink, and Lindegaard (2018) explored how robbers attain dominance over victims by using weapons that afford aggrandizing posturing and forward movements. Lindegaard et al. (2017) showed that bystanders in commercial robberies consoled victims in the aftermath of the robbery according to a pattern of consolation found among chimpanzees in post-conflict situations. Video footage was triangulated with other materials in an explorative study that compared twenty peaceful and violent protest marches and meetings (Nassauer 2016). Using CCTV footage of street fights, Liebst, Heinskou, and Ejbye-Ernst (2018) showed that risk of victimization due to bystander intervention is affected by group membership, setting of the emergency, and type of intervention. To understand how incident-characteristics influence the duration, type and severity of force used by police officers against citizens, Willits and Makin (2017) analyzed footage of police body-worn cameras.

In each of these studies, CCTV recordings of crime or violence were used because they may improve upon the completeness, validity or reliability of alternative sources of information. The two main alternative sources of information about robberies and other crimes are police case files and

interviews with offenders, victims, or bystanders. The strength of video footage is that it allows researchers to observe much more details of the incident (e.g., by playing back in slow motion) than the alternative sources, that it allows testing of the validity and reliability of the observations (e.g., testing the correspondence between the of observations by multiple coders) and that the captured footage is not subject to bias due to human cognitive limitations or to police interview strategies and tactics. The literature on the psychology of law has extensively documented biases that jeopardize truth-finding in investigations (Vrij, Hope, and Fisher 2014). For example, to know whether an offender threatened with a gun, one can ask victims or witnesses, but they may not have seen it well or may not remember it correctly. One could also ask the offenders, but they may either not remember it correctly, or may have incentives to deny that they did. Regarding the reliability of measurements, an advantage of video material is that it can be watched over again and by multiple observers so as to minimize coincidental biases and mistakes.

While the ability to study in detail what people do during criminal events has the potential of changing our explanations of crime as associated with factors *outside* the situation to factors *inside* the situation, the use of footage from surveillance and security cameras also has some limitations. These include that recordings usually lack sound, cameras are limited in the quality and the coverage of the scene (some parts of the interaction may be partially or completely blocked or dark), and the businesses that install camera surveillance and the specific locations where the cameras are installed (typically with a focus on the cashier) are potentially selectivity biased. The lack of sound may not necessary be a problem in studies of human interactions because more than 70 percent of all human communication is non-verbal (Birdwhistell 1970). In the case of robberies verbal communication may be exceptionally important as robberies require some form of instructions of the victims due to the unprepared role they are expected to take on. In that sense the lack of insights into verbal communication in CCTV footage analysis may be more problematic in robberies than in crimes less ordered by scripts such as for example street violence. Additionally, to these disadvantages, CCTV camera recordings obviously provide little insights into motivations and intentions of the behavior being observed. The meaning of the behavior, as it is understood in the cultural context where it occurs, is not directly accessible from the footage. To interpret the meaning of the behavior observed with CCTV camera footage, other methods are required such as police case file analysis or interviews with the involved parties. Triangulation of such methods could potentially provide better understandings of the extent to which behavior is driven by actual interaction in the heat of the moment or by personal dispositions of the parties involved (Lindegaard and Copes 2017).

Data and method

To investigate in what ways the level of threat, the level of dependency on the victim in transfer of the valuables, and the level of victim resistance and offender force in robberies are related sequentially, we draw on CCTV recordings of store robberies provided by the Dutch police. We use these data for analysis of robberies because an offender-based study we conducted about the sequential order of behavior in 236 robberies in the Netherlands showed that victim resistance commonly occurred *before* offenders used violence. Even though the methodological setup for our study was truly situational, in the sense that we compared different types of robberies committed by the same offender (Lindegaard, Bernasco, and Jacques 2015), the conclusions could be criticized for being biased as it was still exclusively based on offender perspectives. By drawing on CCTV camera footage of robberies we aimed at avoiding the biases of retrospective studies based on offender or victim accounts.

Sample

We draw on CCTV camera footage of 49 store robberies committed in the Netherlands in the period 2013 to 2014. We were granted access to the footage by the Dutch National Police. All robberies in

the sample were therefore reported to and investigated by the police. The police provided us with video material from 184 robbery cases. Of those 184 only 58 were potentially useful for our analysis as they included visible interaction between offenders and victims recorded by a CCTV camera (about half of the cases only included stills and the other half no visible interaction). We excluded nine cases of the 58 recorded robberies because either lethal threat or value transfer was unclear or not visible from the footage. One third of the robberies lasted less than a minute, one third between two and three minutes, and one third more than three minutes (Lindegaard, Bernasco, and Vries 2016). The footage typically included the moment offenders would enter the shop. It was visible how they moved around in the shop before approaching the victim. It also showed how the offenders left the scene and the interaction in the aftermath of the robberies, such as how the police were called to the scene and the victim taken care of by the bystanders (e.g., consolation behavior see Lindegaard et al. 2017). The footage excluded audio, which means that the verbal communication, which we could clearly see was taking place during the robberies, was excluded from the analysis. The footage is different from previous methods used to study robbery as it provides unique insights non-verbal communication (e.g., how threat is established through postures and movements). Non-verbal communication is important in human interaction (Birdwhistell 1970) but has, nevertheless, not previously been studied in criminal events.

Our sample is not necessarily representative of the approximately 1600 robberies reported to the police in the Netherlands yearly. The most common target of the reported robberies is supermarkets (Rovers et al. 2010). That was also the most common target in our sample. Compared to Luckenbill's study (1980) based on analysis of 250 robbery police case files, our sample is much smaller but, we would suggest, provides a much more detailed and rich dataset for understanding behavioral sequences. The possibility of storing the footage and watching it repeatedly, and by multiple researchers, furthermore enables inter-coder reliability, which ensures a higher reliability of findings. Since our sample size is relatively small the power of statistical test would be quite low. Therefore, we decided to present our findings without any significance tests of the patterns found. This choice emphasizes that our findings must be regarded as hypotheses that need further testing with larger representative samples in future studies.

Coding

We developed a coding scheme for the analysis focusing on specific actions, bodily postures, and movements. We used the software of Observer XT (Zimmerman et al. 2009) to structure our analysis and to support the analysis of inter-coder reliability. All the footage was coded by two coders, who carried out the coding independently. A common inter-rater reliability measure is Krippendorff's alpha (Krippendorff 2004). Its theoretical range is 0–1, with values above .60 being considered acceptable and values above .80 good. All behavioral categories (e.g., whether a gun was shown) had Krippendorf's alpha values above .60, and many above .80. An alternative measure uses temporal overlap of observed behaviors. According to this criterion the mean inter-rater reliability for all behavior was .85 on average. The cases where the coders did not agree were watched by a third coder (the first author) and decisions about interpretations were reached through discussion among the three coders.

To analyze in what ways, the level of threat, the level of dependency on the victim in transfer of the valuables, and the level of victim resistance and offender force in robberies are related, we coded two dichotomous variables: 'lethal threat' (whether a gun or knife was displayed), and 'dependency victim' (whether or not the victim was required as participant in the access to the valuables). Furthermore, we coded actions, bodily postures, and movements of offenders, victims and bystanders, which were eventually aggregated up to broader categories of 'resistance' and 'violence'. Compared to Luckenbill (1980), who included attention to the intentionality of the force used by offenders (if it was meant as short or long term pacification of the victim), our data did *not* provide insights into what the offenders aimed at with the force they used. It seemed like the force used by

offenders in our sample was rarely 'incapacitating' as none of the victims became unconscious or so badly injured that they needed emergent treatment. In Luckenbill's (1980) terminology, the type of force we identified in our sample was 'threat' and 'prodding' force.

For the variable 'lethal threat' we focused on the display of a firearm or a knife. In terms of displaying we included both pointing at the victim and merely showing a weapon. We coded the duration of the display of lethal weapons, indicating the second of start and stop of the display. Since our interest was what the effect of lethal threat on victim resistance and offender violence we only paid attention to pointing or showing lethal weapons that took place *before* victim resistance (if any) and *before* offender violence (if any). Thus, if an offender displayed a lethal weapon after having committed violence against the victim, the lethal threat was not included in the analysis.

For the variable 'dependency victim' we focused on whether the offender relied on the victim for accessing the valuables. In some cases, they did not need the victims to participate to access the valuables (e.g., in jewelry stores where they just destroyed the display desks). In other cases, they relied on the participation of the victims (e.g., in some supermarkets where they could not open the drawer with money without a code for the computer). In the cases where they relied on the victims but were met with the resistance they often shifted strategy from including the victims in the transfer to trying to access the values themselves (e.g., by attempting to destroy the drawer with money). We therefore coded the duration of their strategy for getting access to the values but our overall focus was to identify robberies where they clearly depended on the victim (coded as victim transfer) and robberies were they did not depend on the victims for the transfer of values (coded as offender transfer) as our hypothesis was that this may effect victim resistance and offender violence.

For the variables 'violence' and 'resistance' we used definitions that we applied elsewhere (Lindegaard, Bernasco and De Vries 2016). We concluded that the offender used violence if we observed at least one of the following actions: *use* of weapon (firearm, sharp object, or other) and hitting, kicking, and grabbing or pushing aggressively. We concluded that the victim resisted if we observed at least one of the following actions: actively preventing the transfer of valuables, use of weapon (firearm, sharp object, or other), threating with weapon (show or point), grabbing, hitting or kicking offender, moving towards offender without being told to, and move away in attempt to escape. Since our interest was what the effect of victim resistance was on offender violence, we only paid attention to victim resistance that took place *before* the offender violence. Thus, if a victim resisted *after* the offender used violence, that victim resistance was not included in the analysis.

Findings

The patterns of force in our sample showed remarkable similarities with those reported by Luckenbill (1980) almost 40 years ago. Even though Luckenbill (1981) developed the categories by analyzing police case files and interviews and we used camera footage to construct them, Luckenbill's descriptions of the way robberies unfold are highly applicable to the behavior we identified on the footage. One major difference is the level of force used by offenders.

In the present section we present our findings regarding threat level and access to valuables, and the relationship between victim resistance and offender violence. We describe: The association of threat level and offender violence in our sample (H1). The association of threat level, followed by victim resistance, followed by offender violence (H2). The association of threat level and the level of dependency on the victims in accessing the valuables with offender violence (H3). The association of threat level and the level of dependency on the victims in accessing the valuables with victim resistance (H4). Because the analysis is based on 49 cases only, and percentages are therefore based on small baseline numbers, we present proportions as well as the ratio of raw frequencies (in parentheses). Given that the sample is likely not representative of commercial robberies, and fairly small, we refrain from tests of statistical significance since we believe that such tests do not clarify the degree of significance of the relationships found in our data (Cumming 2014).

Additionally, we use case descriptions of robberies to illustrate our findings. These descriptions were created specifically for the purpose of this article. In the quantitative analysis of the material, we only used observation codes that observers had entered while watching and coding the footage. At the appropriate places in the descriptions, the observation codes have been inserted in **boldface**.

H1: Lethal threat and offender violence

Table 1 displays the proportions of incidences in which offenders used lethal threat against the victims, cross-tabulated with offender violence. When offenders applied lethal threat, they subsequently used violence in 20 percent (8 of 41 with lethal threat) of the incidents. If lethal threat was not applied, violence was used in 50 percent (4 of 8 without lethal threat) of the incidents. Although the size of the sample is too small for reliable statistical inference, this finding demonstrates that the observations in this sample conform to hypothesis 1, which states that the presence of lethal threat leads to less offender violence than the absence of lethal threat.

Text box 2 describes a supermarket robbery with lethal threat, neither victim resistance nor offender violence.

H2: Lethal threat and offender violence accounting for resistance

Table 2 displays the proportions of incidences in which offenders used lethal threat against the victims cross-tabulated with victim resistance. When offenders used lethal threat, victim resistance occurred in 41 percent (17/41) of the robberies. In the absence of lethal threat, victim resistance occurred in 63 percent (5/8) of the robberies. Thus, in this sample victims were somewhat less likely to resist if offenders used lethal threat than if they did not. This finding demonstrates that the observations in this sample conform the first part of hypothesis 2, which states that the presence of lethal threat leads to less victim resistance than the absence of lethal threat.

To assess the second part of hypothesis 2, which states that lethal threat reduces offender violence by deterring victim resistance, we present the threat-violence relation separately for the 27 robberies without victim resistance (Table 3) and the 22 robberies with victim resistance (Table 4).

In both tables, after holding constant on victim resistance, there is still a tendency for robberies with lethal threat to be less violent than robberies without such a threat. In case of non-resistance, 13 percent (3/24) of the robberies with lethal threat are violent, against 33 percent (1/3) of the robberies without a lethal threat.

Table 1. Lethal threat by offender violence (N = 49).

	Without lethal threat	With lethal threat	Total
No offender violence	4	33	37
Offender violence	4	8	12
Total	8	41	49

Text Box 1. Supermarket robbery with lethal threat, neither victim resistance nor offender violence.

A man wearing a balaclava, a gray hood, black gloves, and a red sweater runs inside a supermarket (offender 1). He quickly grabs a reasonably sized silver gun from his pocket of his sweatpants and displays it [code: display lethal weapon]. He walks towards one of the cashiers (victim 1) working at the checkout line, while raising his weapon and grabbing a plastic bag from his other pocket [code: points lethal weapon]. Offender 1 briefly stops pointing his weapon when he is busy opening the bag. He now holds the bag in front of victim 1 while pointing his gun on her face [code: points lethal weapon]. Victim 1 puts money bills on the counter [code: victim transfer of valuables]. Offender 1 puts down his gun for a second to fill up his bag. He picks up his gun again [code: displays lethal weapon] and puts it down again to have one hand available for grabbing more money, as the notes keep on coming.

Table 2. Lethal threat by victim resistance (N = 49).

	Without lethal threat	With lethal threat	Total
Victim compliance	3	24	27
Victim resistance	5	17	22
Total	8	41	49

Table 3. Average proportions of violence after victim compliance (N = 27).

	Without lethal threat	With lethal threat	Total
Offender access		0.17 (1/6)	0.17 (1/6)
Victim access	0.33 (1/3)	0.11 (2/18)	0.14 (3/21)
Total	0.33 (1/3)	0.13 (3/24)	0.15 (4/27)

Table 4. Average proportions of violence after victim resistance (N = 22).

	Without lethal threat	With lethal threat	Total
Offender access	0.75 (3/4)	0.33 (2/6)	0.50 (5/10)
Victim access	0.00 (0/1)	0.27 (3/11)	0.25 (3/12)
Total	0.60 (3/5)	0.29 (5/17)	0.36 (8/22)

The same pattern is evident in Table 4. If the victims resisted when offenders displayed a lethal weapon, their resistance was less likely to be followed by violence (5/17 or 29 percent) than in robberies where offenders did not display a lethal weapon (3/5 or 60 percent). In other words, offenders seemed to be more tolerant towards victim resistance when they displayed lethal weapons than if they did not display such weapons. This may be related to the stress and doubt that offenders described when reflecting on how they committed their robberies (Lindegaard et al. 2014). Without a weapon, fear of losing control of the situation may be more overwhelming and potentially cause the use of violence as another way of ensuring compliance.

Based on the findings presented in Tables 3 and 4, which demonstrate that after controlling for victim resistance there still appears to be a negative relation between lethal threat and violence, it seems appropriate to conclude that whereas victim resistance mediates a part of the relation between lethal threat and violence, another part remains unexplained.

Text box 2 describes a jewelry store robbery with lethal threat, victim resistance and no offender violence.

H3: Lethal threat, access to valuables, and offender violence

Table 5 presents a simple cross-tabulation of the 49 robbery incidents by whether or not the offender used lethal threat and whether the victim was required for accessing the valuables.

It shows that 84 percent (41/49) of the robberies were committed with a lethal threat, i.e. by pointing or displaying a gun or a knife. Thus, the presence of a lethal threat is much more frequent than it is absent. In Luckenbill's study (1980: 368) this percentage was 72. In 69 percent of the incidents victim participation was required to obtain access to the valuables (33/49). In Luckenbill's study this percentage was almost the same: 72 percent.

Victim access to valuables and lethal threat are positively associated, indicating that lethal threats are more likely when the victim controls the access to valuables. This may indicate that before starting the robbery offenders are aware of their dependence on victims for access to valuables, and that they use lethal threat to emphasize their power to injure the victim and to induce their compliance. Offenders typically displayed a lethal weapon as a means of announcing the robbery, underlining their intentions with dominant body postures, movements in the direction of the

Text Box 2. Transcript of jewelry store robbery with lethal threat, victim resistance and no offender violence.

The first offender kicks in the door (offender1) entering the targeted jeweler store, closely followed by his seemingly taller companion (offender2). Both of them are wearing a black cap covered by the hood of their black jacket. Offender 1 has a shawl covering his mouth. The man behind the counter was in the middle of checking his mobile phone and reacts by threatening to throw the devise at his assaulters **[code: threat with object, included in code: resistance]**. This seems to startle offender 1 so much that he flinches and backs up into his partner in crime, both now standing just outside the store, but keeping the door open **[code: moves away, included in code: submission]**. By this time offender 2 decides to take the lead and steps in pointing his finger at the jeweler **[code: moves direction victim]**. Offender 1 has some trouble getting what seems to be an automatic firearm from the bag hanging from his neck while standing in the door opening **[code: display lethal weapon]**. He steps inside, moves in the direction of showcase and realizes his weapon is not fit for smashing glass after he failed to do so on an few attempts **[code: destroys object]**. In one single movement victim 1went from pretending to throw his phone to ducking behind the counter **[code: hiding]**. Offender 2 grabs a heavy hammer from a sports bag he is carrying and succeeds in destroying the display windows **[code: destroying object]**. He now empties the display cases for jewelry and puts the goods in his bag **[code: Offender transfer of valuables]**. He is now standing near the hiding victim who keeps his hands above his head, still holding the cell phone in one hand **[code: raise hands, included in code: compliance]**. He then puts the phone away and offender 2 makes sure the victim refrains from doing anything that might disrupt their work, by raising his hand indicating he is ready to hit the victim **[code: expanded posture, included in code: dominance]**. The victim reacts by raising his hands above head as a sign of submission **[code: raise hands, included in code: compliance]**. Meanwhile a third accomplice had entered the scene, dressed similar the other two offenders, with his mouth covered (offender3). Offender3 gets a hammer from his bag and on his first attempt destroys the window pointed out by offender1 **[code: destroys object]**. Offender1 steps outside the shop, pointing his weapon around, and steps back in pointing it towards the victim **[code: point lethal weapon]**. Victim1 responds by emphasizing his compliance through raising both his hands above his head **[code: raise hands, included in code: compliance]**. Offender 1 now helps offender 3 putting the jewelry from the display case into a big bag **[code: Offender transfer of valuables]**. Offender 2 puts valuables in the bag of offender 3 after destroying more display counters. Offender3 fills up his sports bag and destroys more counters as offender 1 and 2 make their way out the door. Offender2 returns to get something he forgot. Offender 1 stands in the door opening seemingly to make sure the others are coming. As offender 2 and the 3 step out going past him, offender 1 points his gun at the victim one more time **[code: point lethal weapon]** before all three of them leave. The victim now gets behind a curtain where his female coworker was hiding the entire time. All together the robbery lasted just over a minute.

Table 5. Cross-tabulation of lethal threat and access to valuables (N = 49).

	Without lethal threat	With lethal threat	Total
Offender access	4	12	16
Victim access	4	29	33
Total	8	41	49

victims, and wearing dark clothes and balaclavas. Weapons formed part of a general body posturing of offenders in their attempt to establish domination over the victims. Text box 1 describes an example of a robbery with lethal threat.

Table 6 displays the proportions of incidents in which offenders used violence against the victims, cross-tabulated by lethal threat and access to valuables. With the repeated caveat that the findings are tentative due to the small numbers of observations, we further conclude that the relation between lethal threat and offender violence holds for incidents where offenders do *not* depend on victim compliance for accessing the valuables (25 percent violence with lethal threat and 75 percent without lethal threat). For incidents where offenders rely on victims for the transfer of valuables, the association between lethal threat and the offender violence is less strong (17 percent violence with lethal threat and 25 percent without lethal threat). The latter finding substitutes hypothesis 3, which states that in robberies where victims are needed for accessing the valuables, offenders are less likely

Table 6. Average proportions of offender violence, by lethal threat and access to valuables (N = 49).

	Without lethal threat	With lethal threat	Total
Offender access	0.75 (3/4)	0.25 (3/12)	0.38 (6/16)
Victim access	0.25 (1/4)	0.17 (5/29)	0.18 (6/33)
Total	0.50 (4/8)	0.20 (8/41)	0.24 (12/49)

Text Box 3. Transcript of home appliance store with value access through victim, victim resistance and offender violence.

A man wearing a cap, cloves and a scarf covering his mouth steps inside the store. He opens his jacket and pulls out a large knife (offender 1). He is closely followed by his unarmed companion wearing a hood, cap, cloves and also a scarf covering his mouth (offender 2). Offender 1 raises his knife at one of the employees who rushes behind the counter to open the cash register (victim 1) **[code: points lethal weapon]**. Victim 1 touches the touch screen of the register, which assumingly opens with the scan of a fingerprint **[code: cooperates distance, victim transfer of valuables, included in code: compliance]**. Cashier does not open. Victim 1 makes several attempts with his finger but the cashier does not open **[code: victim resists transfer of values, included in code: resistance]**. Meanwhile offender 2 pushes another clerk, who is standing on the other side of the counter (victim 2) **[code: Aggressive push, included in code: violence]**. Offender 1 walks round victim 1 and steps behind the counter, standing close to victim 1 who is still struggling with the cash register. Victim 2 now comes to his aid, passes offender 2, giving him a dirty look **[code: glancing]**, and uses the fingerprint of victim 1 to get access to the touch screen controlling the register. Victim 1 presses the screen several times, the register opens, and victim 1 steps back to let offender 2 access the money **[code: victim transfer of valuables, cooperate distance]**.

to use violence than in robberies where victims are not needed for accessing the valuables, even in robberies where they do not use lethal threat.

Text box 3 describes a home appliance store with value access through victim, victim resistance and offender violence.

H4: Lethal threat, access to valuables and victim resistance

Table 7 displays the proportions of incidents in which victims resisted, cross-tabulated by lethal threat and access to valuables. Across lethal threat, this sample shows that 63 percent (10 of 16) of the robberies, where offenders could access the valuables on their own there was victim resistance compared to 36 percent (12 of 33) in robberies where they depended on the victim in accessing the valuables. In other words, victim resistance is *less* likely in robberies where offenders depended on the victims in transferring the valuables compared to robberies where they did not depend on the victims. When offenders depend on them in accessing the valuables, e.g. for a code or key to the safe, they are apparently likely to have established some kind of working agreement that implies not opposing the demands of the offender. This finding does not substantiate the first assumption in hypothesis 4, stating that victim resistance is *more* likely in robberies where offenders depend on the victims in transferring the valuables.

Looking at the impact of lethal threat, we find that when victims are required as participants for accessing the valuables, in 38 percent (11 of 29) of the cases victims resist after lethal threat, but only 25 percent (1 of 4) resist after nonlethal treat. In other words, lethal threat makes a difference for victim resistance, also in robberies where the offender depends on the victim for accessing the valuables. This finding does not substantiate the second assumption in hypothesis 4, stating that *independent* of lethal threat, victim resistance is more likely in robberies where offenders depend on the victims in transferring the valuables compared to robberies where offenders can access the valuables by themselves. It is worth noticing, that when victims are needed as participants in the transfer of the valuables, victim resistance is *more* likely in the case of lethal threat. This pattern reverses in robberies where the offender can access the valuables by themselves. In that case, victim resistance is *less* likely in the case of lethal threat.

Text box 4 describes a convenience store robbery with value access through victim, victim resistance and no offender violence.

Table 7. Average proportions of victim resistance, by lethal threat and access to valuables (N = 49).

	Without lethal threat	With lethal threat	Total
Offender access	1.00 (4/4)	0.50 (6/12)	0.63 (10/16)
Victim access	0.25 (1/4)	0.38 (11/29)	0.36 (12/33)
Total	0.63 (5/8)	0.41 (17/41)	0.45 (22/49)

Text Box 4. Transcript of convenience store robbery with value access through victim, victim resistance and no offender violence.

After roaming the store for a while a man wearing a winter coat and a woolen hat approaches the counter (offender 1). The cashier is standing with her hands on her waist (victim 1) **[code: expended posture, included in code: dominance]**. They are the only two people in the store. Offender 1 puts an item on the counter to buy. Victim 1 types in the item in the register, but does not open the drawer with the money yet. Offender 1 searches his pockets for a while as if he is looking for change. Suddenly he pulls out a knife and points it at the victim **[code: pointing lethal weapon]**. At the same time he leans over the desk, moving closer to her **[code: moves in direction of victim]**. She moves a step back **[code: victim cooperates distance]** but makes no attempt to open drawer **[code: victim prevents transfer of valuables, included in code resistance]**. To make his intentions more clear he holds the knife above his head as if he is going to stab her **[code: pointing lethal weapon]**. In reaction victim 1 raises both her hands **[code: raised hands, included in compliance]**. Offender 1 points at the cash register with the hand holding the knife **[code: pointing lethal weapon]**. Victim 1 now opens the register **[code: victim transfer of valuables]**, but when the offender puts his hands in there to grab the money, she firmly holds the money while she pushes away the hand of the offender holding the knife **[code: victim prevents transfer of valuables, included in code resistance]**. The other hand of the offender is now in the open register, and the victim tries to grab the money before the offender gets a hold on it **[code: victim prevents transfer of valuables, included in code resistance]**. During the struggle the offender gets hold of some of the money **[code: transfer of valuables]**, pulls his hand out of the grip of the victim, and runs towards the door **[code: moves away]**. He opens the door and swiftly makes his escape **[code: leaves the scene]**. Victim 1 walks after him out of the door [code: moves in direction offender] while dialing on her phone. She steps back in for a moment to remove the key from the register and lock it.

Discussion

Luckenbill's study of robberies (1980), published almost 40 years ago in this journal, generated highly valuable insights about the way robberies are carried out. Rather than explaining violence used by robbers as related to their personal characteristics, his study highlighted the importance of interactional dynamics as explanation for violence. His study had major impact on the theoretical tradition of interactional studies within criminology. We argued here, that this tradition has been seriously challenged by the lack of access to observations of actual behavior in criminal events. Even though studies of robberies have since then emphasized the importance of victim resistance for understanding offender violence in robberies, questions about mechanisms and sequential order of violence and resistance, and general issues of reliability and validity related to retrospective studies, still remained.

In this paper we drew on a new type of visual method in criminology, namely the analysis of CCTV camera recordings of criminal events. We showed that despite the problem of sample selectivity, this type of data is a step forward for understanding behavior in criminal events, particularly sequential aspects of behavior. CCTV footage provides a unique possibility to unobtrusively observe what is taking place when criminal events unfold. It forces researchers to go back to the basics and focus on measurements rather than getting caught up in modelling poorly measured phenomena (Cialdini 2009; Sullivan and McGloin 2014). Thereby, data drawn from CCTV footage are an answer to the current debate within the behavioral sciences about reliability and replicability (Baumeister, Vohs, and Funder 2007). Studies based on CCTV camera footage unobtrusively measure behavior as it takes place in real-life situations. They do not rely on complicated measurements of behavior, such as vignette questions about *potential* behavior, open questions about *past* behavior represented in retrospective, or *virtual* behavior as measured in artificial environments.

By putting measurement before modelling—by relying on actual behavior in real-life—questions about interpretation, however, obviously remain. For example, if an offender moves in the direction of the victim, has an expanded body posture, and speaks while gazing at the victim, we interpret those behaviors as dominant and threatening (Mosselman, Weenink, and Lindegaard 2018). If a bystander touches the victim in the aftermath of the robbery, we interpret it as consolation (Lindegaard et al. 2017). One could argue that these forms of behavior could only be interpreted as such if we knew that the parties involved in the situation experienced it as such, and that would require interviewing them about it. Therefore, we also propose that triangulation with other methods, and inclusion of findings from studies that focused on experiences, meaning-making and motivations are crucial for the interpretations of behavior caught on camera.

Another limitation of these data is sample selectivity, and it applies to both police and internet provided footage, which are the most common types of samples currently used in studies of crime (Lindegaard and Bernasco 2018). For police provided footage, it is unclear what the criteria are for including footage in a case. It is also unclear what the criteria are for putting up a camera in the first place, for saving the footage, and handing it over to the police. With internet provided footage it is unclear what the criteria are for uploading footage on the internet and for recording it in the first place. Additionally, with internet provided footage it may be difficult to evaluate if the footage itself is manipulated when uploaded. Also the behavior on the footage may be manipulated while being recorded. For these data to reach their full potential in studies of crime, these issues of sample selectivity need to be properly addressed.

The lack of sound in the recordings currently being used for analysis of crime, is not ideal since 30 percent of human communication is verbal. However, studies have shown that people who cannot hear what someone is saying, are still able to reconstruct the meaning with high certainly by relying on the bodily postures combined with the verbal communication (Liebst, Heinskou, and Ejbye-Ernst 2018). In the future CCTV camera recordings may be more likely to include sound. New types of recording devices may also change the current focus on crimes in public or semi-public places (e.g. assaults, robberies). Mobile devices, body cameras, or cameras installed in homes may provide opportunities for studying more private types of crimes or violence caught on camera such as sexual assaults and abuse.

The study we presented here was based on CCTV recordings of store robberies. We focused on the ways in which lethal threat and dependency on the victim in accessing the valuables influenced the sequential order between offender violence and victim resistance. Previous studies addressed these questions but our study is one of the first to rely on an unobtrusive form of observations (Lindegaard and Copes 2017).

Regarding lethal threat, we found that offenders were less likely to use violence when they displayed a lethal weapon in the beginning of the robbery compared to when they did not display lethal weapons. These findings are in line with the majority of studies on weapon presence and violence in robberies, which show that the presence of a weapon makes the risk of violence smaller (Kleck and DeLone 1993).

Considering the association between lethal threat and offender violence, we found that victim resistance partly mediated this relationship. In most cases lethal threat made victims less likely to resist and that prevented offender violence. This finding is in line with the literature emphasizing the importance of victim resistance for offender violence in robberies. It specifies that similarly to findings of offender-based studies (Jacobs 2013; Katz 1988; Lindegaard, Bernasco, and Jacques 2015), the sequential order of offender violence and victim resistance tends to be that victim resistance *leads* to offender violence. Lethal threat in other words has a pacifying effect on the victims, and that leads to lower risk of offender violence. This finding indicates that situational crime prevention for store robberies would benefit from focusing on how the behavior of victims may be influenced. More measures that could ensure victim compliance are important for prevention of violence in store robberies.

When comparing robberies based on whether offenders depend on the victims for the transfer of valuables or accessing the valuables, we found that offenders were less likely to use violence because victims were less likely to resist when the offender depended on the victims in accessing the valuables. In robberies where offenders had to reach a working agreement with the victims in order to access the values, apparently a smoother interaction developed with the victims being less likely to resist and the offenders less likely to apply violence. We also found that offenders tended to be more tolerant towards victim resistance when they depended on them for accessing the valuables. This finding is important for situational crime prevention in store robberies because it shows that measures that make offenders dependent on the victims are likely to prevent violence in robberies. Thereby, our findings confirm the relevance of locking valuables in certain display cupboards that require a key, and requirement of identification or specific codes to open cash drawers.

The presented study of robbery, inspired by Luckenbill (1980), and based on CCTV camera recordings is one of the first attempts to apply this type of visual method in criminology (Lindegaard and Bernasco 2018). Researchers who will draw on these data for the analysis of robberies in future studies should pay attention to potential differences in types of robberies, for example, street, store, and home robberies (McCluskey 2013). Behavior during store robberies may also be influenced by the hierarchical roles within the store (owner, manager, employee), and by individual characteristics such as gender, ethnicity and age (Lindegaard et al. 2017). We also recommend investigating the role of emotions for robbery interactions by coding postures and movements according to existing knowledge about bodily expressions of emotions (Tracy and Matsumoto 2008) and dominance (Dunbar and Burgoon 2005). Group dynamics within groups of offenders, but also within groups of victims and bystanders, also need closer study. We suggest carrying out these analyses not only in relation to robberies but also to other types of criminal events such as assaults, shoplifting, and terrorist attacks. More importantly, CCTV camera recordings offer the possibility for comparisons of behavior across similar criminal events in different cultural contexts, across different kinds of criminal events, across different individuals within the same criminal event, and even across sequences of time of the same individual within the same event. Through these comparisons, context for behavior potentially becomes a fraction of a second. It is in those fractions of seconds that normal changes to deviant, threat to violence, and compliance to resistance. CCTV camera footage brings us closer to understanding and explaining the way criminal events unfold for real.

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