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Title

Psychological and sociological factors influencing police officers' decisions to use force: a systematic literature review

Running head

Review of factors underlying police officers' decisions to use force

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Title

Psychological and sociological factors influencing police officers' decisions to use force: a systematic literature review

Abstract

Aim

Police action is frequently discussed and almost always monitored. The aim of this systematic review is to identify the psychological and social factors underlying police officers' decisions to use force.

Methodology

Scientific articles were selected from six databases (PsycINFO, PsycARTICLES, Psychology and Behavioral Sciences Collection, HeinOnline, ScienceDirect, PubMed).

Results

We found 923 articles matching our search, and 52 were retained based on their results regarding the psychological factors underlying police officers' decisions to use force and the decision-making process itself. We found that the most frequently studied factors were belonging to an ethnic minority, carrying a conducted energy device (CED), the police department's policies and managerial organization, and the environment in which the encounter occurred. However, it seems that the most predictive factor in the decision to use force is the resistance and behavior of the suspect.

Keywords

Decision-making, law enforcement, police, use of force, predictive factors

Introduction

The use of force by police officers is frequently reported in the international media. Praised after the terrorist attacks of 2015, hated during the “gilet jaune” protests in France sparked by the rise in fuel taxes announced in November 2018, police officers are under particular scrutiny because they have the right to use force. In France, the first “gilet jaune” protests led to numerous injuries among citizens confronting riot police, caused by extensive “Flash-ball” use. But France is not the only country concerned about police use of force. In the United States, there is often criticism of fatal shootings by police officers. The Michael Brown case, involving an Afro-American teenager shot by a police officer on August 9th, 2014, raised considerable concern about the role of racism in police shootings. In order to understand the deployment of legitimate violence by police officers, it is important to identify the psychological and sociological factors underlying their decisions to use force. At the same time, environmental factors are likely to influence the way officers perceive and react emotionally to the situation and will therefore affect the cognitive processes underlying their decisions. These factors are thus also included in this work.

The decision for the police to use legitimate violence is one of the most important concerns of public policy about security, because it reflects the quality of police actions. It also reveals something about the type of political regime. In all countries, legitimate violence occurs within a legal framework that lays down the rules that police forces are required to follow in order to fulfill their duty (Jobard, 2002). According to Max Weber, legitimate violence is the use of physical force authorized solely by the state in order to maintain its domination over a given territory and its population (Weber, 1919). By definition, this force can therefore only be used by the police, and governments wish to keep it this way (Mouhanna, 2011). Use of force by the police is one of the main ways that governments ensure public order. Not only Weber (1919), but also Norbert Elias (1939) and Maslow (1943) observed that citizens crave for safety and therefore need a community force to ensure it, generally known as “the police”. The police must therefore be allowed to use force, within the limits laid down by the law, in order to maintain the safety of citizens. The very existence of a police force depends on the use of force (Bittner, 1970), although most constitutions introduce precautions to avoid any risk of a coup d'état by the police. For example, in France, there are two coexisting forces that can take over from each other in the event of failure of one.

Most countries provide a use-of-force model (i.e. Desmedt, 2009) to guide police officers in their decisions to use force in their daily duties by showing the relationship between the suspect's behavior and the appropriate response to that behavior. Unfortunately, these models do not take into account the complexity of the decision to use force, although they can offer a good way of showing recruits how the job is supposed to be done. Most authors conclude that policing is an ongoing learning situation (Bayley & Bittner, 1997).

The use of force lies at the heart of police officers' actions. While some authors see that use of force is legally justified (Colliot-Thélène, 1995), even if there seems to be insufficient training (Moreau de Bellaing, 2009), others see it as a necessary and essential part of police functions (Bittner, 1970; Bittner, 1990). The need to be able to use force arises from the "irreducibly indeterminate" aspect of police work (Monjardet, 1996) involving a vast range of actions and incidents, and the duty of the police to enforce the law (Moreau de Bellaing quoting Napoli, 2003, p. 207). This raises the question of what constitutes use of force. Can it be just a simple verbal order by a police officer? Or must there be physical contact? This is a long-standing question in the literature, but we refer to a widely held model of aggression (Allen, Bushman, & Anderson, 2018) based on Tedeschi and Felson's (1994) social interactionist theory, which states that a simple verbal order can be seen as coercive action because it interferes with the individual's freedom to come and go. In France, it is mandatory to obey an order by an identifiable police officer (L.233-1 of the French Highway Code, and 78-1 to 78-7 of the criminal procedure code, which are constitutional laws based on art. 7 of the Declaration of the Rights of Man and of the Citizen). Therefore, a verbal order can be considered to be an act of coercion toward an individual.

Understanding why the police use coercion is important because it would help explain errors made by officers and reduce negative public opinions of the police. The main aim of this study of the decision to use legitimate violence is thus:

- To identify the psychological and social factors involved in law enforcement officers' decisions to use legitimate violence, and possibly those that are the most predictive.

This should help us understand how police officers decide whether or not to use coercive action. This would make it possible to set up appropriate training programs to enable officers to find

alternative solutions. Police use of force is under considerable scrutiny by citizens, who on the one hand expect the police to protect them, but on the other hand also wish to be safe from the police. The results could thus help reduce the use of force by police officers by giving them keys to understanding and dealing with social interactions (Tedeschi, & Felson, 1994).

Methodology

We conducted a systematic literature review by searching several scientific databases: PsycINFO, PsycARTICLES, Psychology and Behavioral Sciences Collection, HeinOnline, ScienceDirect and PubMed. These databases were selected because they cover the main publications in our field. More pragmatically, they were also those that were most accessible.

Due to the large proportion of studies in English in our field of study, the search terms were *decision-making*, *use of force*, *law enforcement* and *police* (in English). We ran the search using the following procedure: first, we looked for [*police* OR "*law enforcement*"] AND *use of force* AND *decision making*. As this yielded a large number of results, we then added a combination of two of these words in the Title, Abstract or Keywords. We would have preferred to find them only in the Title, but this is not possible in some databases. At this point, 923 articles met our search criteria. We retained only those with a Title that matched at least one of our search terms. We also only retained those published since 2009 as an earlier review of the literature already exists (Klahm, & Tillyer, 2010), and we wished to focus on more recent studies.

To be selected, the articles had to meet three conditions. They had to concern:

- 1) the police in general or a police force in particular,
- 2) the use of force or coercion by any means,
- 3) one or more factors influencing the decision to use force.

These criteria were mandatory. If one was missing, the article was excluded. To ensure their presence, we checked the methodology section of the articles; the population had to be, at least partially, a police force, and observations had to concern decisions to use legitimate violence. We excluded studies using data prior to 2000 as their reports no longer correspond to policing today. We also excluded articles about the decision to use force that did not focus on a factor that could influence it in some way, and those with fewer than twenty participants. However, we did retain some studies that at first sight did not specifically involve a factor influencing the decision to use

force, as they provide some interesting input on the subject (see Hickman, Atherley, Lowery, & Alpert, 2015).

Results

Database searches yielded a total of 923 articles, but only 52 were considered relevant to our study according to our criteria. These studies (N = 52) involved a total of nineteen factors that may influence the decision to use legitimate violence:

TABLE 1 - STUDY SELECTION AND MAIN STUDIED FACTORS

| <u>Main studied factors</u> | <u>Relevant studies</u> |
|---|---|
| 1. suspect's ethnic group (n = 10) | <ul style="list-style-type: none"> • Buehler, 2017 • Dabney, Teasdale, Ishoy, Gann, & Berry, 2017 • Fridell, & Lim, 2016 • James, 2012 • Jetelina, et al., 2017 • Kahn, Steele, McMahon, & Stewart, 2017 • Mears, Craig, Stewart, & Warren, 2017 • Morrow, White, & Fradella, 2017 • Paoline III, Gau, & Terrill, 2018 • Shane, Lawton, & Swenson, 2017 |
| 2. suspect with mental disorders (n = 5) | <ul style="list-style-type: none"> • Kesic, Thomas, & Ogloff, 2013 • McTackett, & Thomas, 2017 • Morabito, Socia, Wik, & Fisher, 2017 • Schulenberg, 2016 • Johnson, 2011 |
| 3. neighborhood of the encounter (n = 5) | <ul style="list-style-type: none"> • Boivin, & Obartel, 2017 • Klinger, Rosenfeld, Isom, & Deckard, 2016 • Krishan et al., 2014 • Lee, Jang, Yun, & Lim, 2010 • Lee, Vaughn, & Lim, 2014 |
| 4. police officer carrying a conducted energy device (CED) (n = 4) | <ul style="list-style-type: none"> • Crow, & Adrion, 2011 • Lin, & Jones, 2010 • Sousa, Ready, & Ault, 2010 • Taylor, & Woods, 2010 |

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|--|--|
| 5. organizational policy and training (n = 4) | <ul style="list-style-type: none"> • Ferdik, Kaminski, Cooney, & Sevigny, 2014 • Lee, & Vaughn, 2010 • Prenzler, Porter, & Alpert, 2013 • Terrill, & Paoline III, 2017 |
| 6. suspect's behavior and resistance (n = 4) | <ul style="list-style-type: none"> • Boivin, & Lagace, 2016 • Bolger, 2015 • Dai, & Nation, 2009 • Hickman, Atherley, Lowery, & Alpert, 2015 |
| 7. police officer's experience (n = 3) | <ul style="list-style-type: none"> • Boulton, & Cole, 2016 • Mangels, Suss, & Lande, 2020 • Vickers, & Lewinski, 2012 |
| 8. police officer using a bodycam (n = 2) | <ul style="list-style-type: none"> • Ariel, 2016 • Henstock, & Ariel, 2017 |
| 9. officer's decision-making style (n = 2) | <ul style="list-style-type: none"> • Brown, & Daus, 2015 • Hine, Porter, Westera, Alpert, & Allen, 2018a |
| 10. police officer's stress (n = 2) | <ul style="list-style-type: none"> • Renden et al., 2017 • Verhage, Noppe, Feys, & Ledegen, 2018 |
| 11. police officer's ego depletion (n = 2) | <ul style="list-style-type: none"> • Staller, Christiansen, Zaiser, Körner, & Cole, 2018 • Staller et al., 2019 |
| 12. police officer's physiology (n = 2) | <ul style="list-style-type: none"> • Akinola, & Mendes, 2012 • Andersen et al., 2018 |
| 13. police officer's personality | <ul style="list-style-type: none"> • Brandl, & Strohshine, 2013 |
| 14. officer's working memory ability | <ul style="list-style-type: none"> • Kleider, Parrott, & King, 2010 |
| 15. suspect's age | <ul style="list-style-type: none"> • Brown, Novak, & Frank, 2009 |
| 16. police officer's gender | <ul style="list-style-type: none"> • Nickel, 2016 |
| 17. prior information | <ul style="list-style-type: none"> • Johnson, D.J. 2018 |
| 18. fellow officer at the scene | <ul style="list-style-type: none"> • Pickering, 2017 |
| 19. police officer's level of education | <ul style="list-style-type: none"> • Rydberg, & Terrill, 2010 |

We grouped these nineteen factors into three categories:

- factors specific to the suspect (n = 20);
- factors specific to the police officer (n = 15);
- contextual factors (n = 17).

1. Factors specific to suspect

This category includes studies focusing on the characteristics of the suspect against whom law enforcement officers used legitimate violence.

1.1 Belonging to an ethnic minority

As the literature comprises almost exclusively Northern American studies (43 studies carried out in Canada or the United States), it is not surprising that the suspect's ethnic origin is at the heart of a relative majority of articles on the topic of police use of force (10 out of 52). However, the data from this literature are somewhat contradictory.

Some studies support the thesis of the existence of an ethnic bias leading to disparities in the use of lethal force; the mortality rate among Blacks and Hispanics has been shown to be respectively 2.8 and 1.7 times higher than among Whites (Buehler, 2017). Likewise, Blacks are 1.49 times more likely to be the target of a conducted energy device (Fridell, & Lim, 2016). Morrow, White and Fradella (2017) also found that ethnic minorities are more likely to be physically coerced. Moreover, it seems that White police officers are more coercive than their Black counterparts towards Blacks (Paoline III, Gau, & Terrill, 2018). This was also observed by Jetelina et al. (2017), who postulated that ethnic differences between suspect and officer seem to play a significant role in the decision to use force. They found considerable variability related to the ethnicity of the suspect and the police officer, with greater intermediate weapon use in all combinations of officer/citizen ethnicity compared to White-White dyads, except for Hispanic-Hispanic (0.58 versus 1 for White-White). With regard to ethnic minority groups, attire and appearance that reinforce stereotypes, such as dreadlocks or an "Afro" cut, aggravate the ethnic bias towards the suspect (Dabney et al., 2017). Finally, indicators tend to show that negative cultural perceptions, such as bias against certain ethnic groups, reinforce the phenomenon, exponentially so when the suspect is convinced that the police are going to arrest him because they are biased towards him (Mears et al., 2017). This point is corroborated by Jetelina et al. (2017). Some authors have also observed how ethnicity influences the way the encounter plays out. Kahn et al. (2017) observed

that coercion tends to be used against Blacks and Hispanics earlier in the encounter, whereas greater force is used against Whites as the situation develops.

However, other studies take a different approach. For example, Fridell and Lim (2016) found lower rates of ethnic bias in high crime neighborhoods. In other words, the influence of the location takes precedence over ethnic minority, reinforcing or diminishing the use of force. This issue remains open to debate. At the micro-ecology level, Klinger et al. (2016) found that deadly force was mainly deployed in neighborhoods with largely Black and young populations and low owner-occupancy households. Both Lee et al. (2010) and Hickman et al. (2015) observed that it is only the suspect's behavior that is responsible for coercive action against him and not his ethnicity. It has also been shown that police officers hesitate longer to use their service weapon against armed Black than White individuals (James, 2012). Similarly, they erroneously shot unarmed Whites more rapidly than unarmed Blacks during simulations (James, 2012). Other studies show that it is only the suspect's resistance that is likely to trigger a reaction, and not ethnicity (Shane, Lawton, & Swenson, 2017). On a related subject, Johnson (2018) found that ethnic bias disappeared completely when patrol officers received accurate dispatch information about the suspect prior to the encounter.

These studies therefore indicate that ethnicity may influence police officers' decisions to use force. However, no clear conclusions can be drawn about how and to what extent it moderates or exacerbates the use of force.

1.2 Suspects with mental disorders

Our review also includes a large number of studies on the impact of mental disorders on the police use of legitimate violence. Mental disorders involve a small proportion of the people police officers have to deal with and only affect the individual's behavior sporadically and in the most extreme cases. Evidence of a suspect's erratic or poor discernment is likely to affect the way the police perceive his dangerousness and hence their use of force.

However, empirical studies show that suspects with mental disorders are subject to increased vigilance by law enforcement officials (Kesic, Thomas, & Ogloff, 2013; McTackett, & Thomas, 2017; Morabito et al., 2017; Schulenberg, 2016; Johnson, 2011). This can be seen, for example, by the fact that 7.2% of those who have experienced the use of force suffer from mental disor-

ders, which is more than their share of the general population (Kesic, Thomas, & Oglhoff, 2013). However, the fact that people with mental disorders are more likely to be aggressive, resist or carry a gun makes it more likely that they will be subjected to legitimate violence (Johnson, 2011; Kesic, Thomas, & Oglhoff, 2013). Similarly, it is not the unpredictability of the suspect's behavior but his resistance that leads to greater use of force (McTackett, & Thomas, 2017). Indeed, mental health symptomatology seems to have a moderating effect on the use of force, at least at the lower end of the continuum. Individuals presenting with these symptoms are half as likely to be subject to empty-hand tactics (Jetelina et al., 2017). Similarly, citizens under the influence of alcohol or drugs are 25% less likely to be subject to these techniques. On the other hand, they are more likely to be subject to intermediate weapon use (Jetelina et al. 2017). Moreover, the comorbidity of mental disorders with intoxication influences police officers' perception of the dangerousness of the suspect, particularly if his behavior is inappropriate, and is likely to explain more frequent use of force (Morabito et al., 2017). It thus seems that mentally ill people are at particular risk of being criminalized and subject to a high level of coercion. This is undoubtedly largely due to inadequate mental health resources (Schulenberg, 2016).

1.3 Suspect's behavior

There is greater consensus about the issue of the suspect's behavior as a factor in police officers' decisions to use force. All the selected articles (Boivin, & Lagace, 2016; Dai, & Nation, 2009; Bolger, 2015; Hickman, et al., 2015) agree that the suspect's behavior and resistance are the most predictive factors in the use of force. This supports earlier studies (Terrill, 2005), as evidenced by reviews covering different periods (Bolger, 2015; Klahm, & Tillyer, 2010). For example, some authors claim that behavior is the primary factor in the decision to use force (Boivin, & Lagace, 2016), and others show that the suspect's behavior and resistance greatly influence the use of coercion (Dai, & Nation, 2009). It therefore seems that the suspect's behavior and resistance are the main causes of police officers' decisions to use force.

Hickman et al. (2015) also investigated whether the suspect's resistance and behavior are the key factors underlying police officers' use of force. To this end, they used a method of force factor coding. Two teams coded the suspect's and the officer's behavior on a 6-point scale, from (1) no resistance by suspect and presence of officer, to (6) use of lethal force. The two

teams showed a high level of agreement. They then subtracted the suspect's resistance level from the officer's level of force. Most cases came within -1 to +1 correspondence, indicating that the police officer's use of force was in line with the suspect's behavior, supporting previous hypotheses.

1.4 Age and gender

The suspect's age and gender are also involved in the decision to use force. Irrespective of the circumstances, it appears that age is not likely to influence the decision to use coercion (Brown, Novak, & Frank, 2009) although it does affect the likelihood of arrest (Brown, Novak, & Frank, 2009). Regarding gender, it seems that women are to some extent protected from all forms of coercion and the police are less likely to use physical force against them (Dai, & Nation, 2009) or any other means of intermediate force such as conducted energy devices (Crow, & Adrion, 2011). Without further regression analyses, Jetelina et al. (2017) also found that men were one third more likely to be subject to empty-hand control tactics than women, and more than twice as likely to be subject to intermediate weapon use.

In sum, the suspect's age does not seem to have an impact on the use of coercion, and women are treated more favorably, law enforcement officers being less likely to use force against them at any level.

2. Factors specific to the police officer

This category includes the characteristics of law enforcement officers who use legitimate violence.

2.1 Character and personality

Police officers make the decision to use legitimate violence on their own. It thus seems obvious that their character and personality are at the heart of the decision-making process. However, the meta-analysis by Klahm and Tillyer (2010) shows that there has been no recent study of the influence of personality. While the use of force is rare, a limited number of officers are responsible

for a large number of incidents – 6% of officers are responsible for 40% of reported use of force by the police (Brandl, & Strohshine, 2013). Jetelina et al. (2017) also observed that a third of officers are responsible for two thirds of police use of force, corroborating the findings of Brandl and Strohshine (2013) who divided officers into “low-rate” and “high-rate” groups based on the number of force incidents in which they were involved. They observed that shift hours and patrol area seem to have as much influence as experience and age on the officer’s propensity to use force (Brandl, & Strohshine, 2013).

Self-control has been observed to play a key role. Staller et al. (2018 and 2019) found that when police officers’ self-regulation resources are depleted, impairing their self-control, they show less patience and react earlier to provocative resistance by using force. This phenomenon was defined by Baumeister (1994 and 1998) as “ego depletion”, based on the theories of Freud (1961a / 1923 and 1961b / 1933), and it can be seen to affect police officers' decisions to use force. This may be correlated with personality traits or the officer’s ability to regulate emotions. Further research is required to elucidate this point.

Anxiety, whether due to a personality trait (Renden et al., 2017) or generated by officers’ awareness that they will be held accountable for their actions (Verhage et al., 2018), could also be a notable factor in decision-making. For some authors, accountability leads to increased stress that could affect the quality of decisions made by officers in the most difficult situations (Verhage et al., 2018), while for others, stress does not affect decisions, and it is only the intensity of the threat that affects the decision to use force (Renden et al., 2017). However, stress could affect the effectiveness of the response, making the implementation of coercion less than optimal (Renden et al., 2017).

Taken together, these observations provide some indication of how police officers cope with anxiety and “ego depletion” phenomena. We can hypothesize that there is strong correlation between officer’s emotion regulation and cognitive abilities on the one hand and the frequency and intensity of their use of force on the other.

2.2 Personal characteristics and professional experience

In addition to character, personality and ethnicity, police officers' gender, level of education and experience can influence their decisions to use legitimate violence. As mentioned above, White

police officers are more coercive towards Blacks than their Black counterparts (Paoline III, Gau, & Terrill, 2018). However, that is the only study examining the ethnicity of police officers. The gender of the officer also influences the use of coercion; women officers use less force than men, based on different reasoning, with an emphasis on need and opportunity (Nickel, 2016). Moreover, while women generally use less force than men, they also use it differently. Studies show that they use less empty-hand control than men, but they are significantly more likely to use intermediate weapons (Jetelina et al., 2017). This could be explained by the fact that most use of force is toward men (Dai, & Nation, 2009; Jetelina et al., 2017), and intermediate weapon use could compensate for women's relatively less strength.

Regarding professional experience, experts and experienced police officers adapt better to circumstances and possible outcomes than novices, whose reasoning is more sequential and linear. This was shown in an analysis of cognitive tasks performed by 12 experienced officers (specialized firearm officers, SFO) and 11 novices (authorized firearm officers, AFO) (Boulton, & Cole, 2016), corroborating previous research showing that experts use an intuitive reasoning system whereas novices use analytical reasoning (Chi, 2006). Mangels et al. (2020) also observed considerable differences in the way experts and novices reacted to videos showing police use of force; the experts focused on the broader picture, putting "force mitigation" and "back-up opportunity" at the top of their word list. They also referred to "verbal command" or "verbal direction", whereas novices frequently referred to "control" (Mangels et al., 2020). Experts thus seem to focus on the event as a whole, and not solely on the aim of controlling the suspect.

This observation also applies to shooting speed and accuracy. In a study comparing elite members of an Emergency Response Team (ERT) and rookie police officers, the former had greater shooting speed, better accuracy and made fewer mistakes. An eye-tracking device revealed that the better performance of the experts could partly be explained by their greater use of the "quiet-eye" technique, enabling them to focus longer on the target before shooting (Vickers, & Lewinski, 2012).

We can also assume that a higher education level, while not affecting the number of arrests or searches, may significantly reduce the frequency of the use of coercion (Rydberg, & Terrill, 2010). Interestingly, police officers with more than five years of experience have been shown to use hard-empty hand control more than intermediate weapons (Jetelina et al., 2017). This could

be explained by the fact that experienced officers are older and do not wish to get physically involved with suspects to avoid injury. Further research is required on this issue.

2.3 The decision-making system and physiology

The decision-making system underlying the use of legitimate violence also influences the decision itself. Hine et al. (2018a) found that recruits tended to use intuitive reasoning and reported experiencing perceptual, cognitive and physiological impairments when making a decision to use force. When interviewed after a scripted simulation, 91 Australian police recruits said that they did not consider more than three coercive options, and more than half (51.35%) reported that they intuitively considered and implemented a single option. More than one-third (34.07%) experienced cognitive impairment impeding their ability to recall information that could have helped them make their decision (Hine et al., 2018a). It has also been shown that rationality leads to avoiding extreme choices, while intuitiveness coupled with low anger control invites action (Brown, & Daus, 2015). It can therefore be hypothesized that rationality has the potential to reduce the use of weapons but is not involved in the decision to use coercion, at least among recruits.

From a physiological perspective, heart rate appears to influence officers' decisions. Andersen et al. (2018) found that interventions aimed at enhancing parasympathetic nervous system activation can reduce the heart rate during stressful situations and reduce lethal force decision errors. Furthermore, this benefit lasted over time, as optimal results were obtained six months after the intervention, and effects were still noticeable at eighteen months (Andersen et al., 2018). Akinola, and Mendes (2012) found that police officers performed a shoot/don't shoot task (Correll et al., 2002) better when their cortisol level had previously been raised by carrying out a stressful supervised task. Officers with higher cortisol levels made fewer errors, notably when the suspect was an armed Black man. The results were not significant when the suspect was an armed White man (Akinola, & Mendes, 2012).

A study by Kleider et al. (2010) investigated working memory and negative emotionality. They found a correlation between working memory capacity, negative emotionality and overall performance in a shooting task (Correll et al., 2002). Negative emotionality was monitored by inter-beat interval (IBI) measured by electrocardiogram (ECG) and facial muscle movement measured

by electromyography (EMG). High working memory capacity was correlated with high discriminability and low error rate. Surprisingly, high negative emotionality and high working memory capacity also led to fewer mistakes. Shooting speed was not affected.

Physiology and cognitive capacity therefore seem to play a key role in police officers' decisions to use force.

3. Contextual factors

In addition to factors related to the police officer and the suspect, contextual and social aspects play an important role in police officers' decisions to use legitimate violence. These include organizational aspects, training and equipment, which are outside the control of either the suspect or the agent, as police officers do not usually choose the equipment they carry.

3.1 Managerial organization and institutional policies

Managerial organization and police training yield consistent outcomes. Studies show that strict policies on the use of force tend to reduce police officers' use of coercion (Prenzler, Porter, & Alpert, 2013; Terrill, & Paoline III, 2017). Managerial organization is particularly important: division of responsibilities, supervision and a well-established hierarchy are all factors that reduce the use of force (Lee, & Vaughn, 2010). Moreover, some law enforcement agencies adopt the use of less lethal technologies such as conducted energy devices to replace other means of force such as batons and tear gas, reducing the use of firearms (Ferdik et al., 2014). The accuracy of dispatch information about the suspect also helps to remove ethnic bias (Johnson, 2018), by providing an effective preparatory phase for the decision to use force (Johnson, Cesario, & Pleskac, 2018). The presence of other officers in the vicinity is also a factor in the deployment of force by providing the possibility of assistance. By contrast, a colleague's use of a firearm may influence the decision of another officer to open fire. Thus, the close proximity of other law enforcement officers influences the decision to use coercion (Pickering, 2017).

3.2 Equipment

In addition to institutional policies, practical aspects such as carrying certain types of equipment provided by the police department also play a role. For example, body-worn cameras tend to reduce the use of force. Indeed, the Denver Police Department found that body-worn cameras led to a 35% decrease in complaints of police use of force (Ariel, 2016). Similarly, in Great Britain, body-worn cameras led to a 50% reduction in the use of force, but mostly at the bottom of the force continuum, in other words, physical restraint and handcuffing (Henstock, & Ariel, 2017). The use of conducted energy devices (CED) also reduces the use of other types of intermediate force (Lin, & Jones, 2010; Sousa, Ready, & Ault, 2010, Taylor, & Woods, 2010). It appears that CEDs are deployed in almost half the situations requiring the use of force (Crow, & Adrion, 2011). Carrying a CED reduces the use of batons, physical force and tear gas, as well as opportunities for using firearms. Police officers prefer to use CEDs than their gun when possible, especially when the department's policy does not restrict CED use (Ferdik et al., 2014). CEDs also reduce the risk of injury and remove field officers from physical confrontation, even if its effectiveness in life-threatening situations is poor (Lin, & Jones, 2010).

3.3 Neighborhood

The neighborhood where the interaction between the suspect and the police officer occurs is also important. However, studies have produced divergent results. While some researchers have found that the neighborhood and its characteristics have no impact on the use of violence or likelihood of arrest (Krishan et al., 2014), others postulate that social disorganization (Boivin & Obartel, 2017), unemployment rate (Lee et al., 2010) and crime rate (Boivin, & Obartel, 2017; Lee et al. 2010; Lee, Vaughn, & Lim, 2014) in the neighborhood increase the deployment of force. Alongside, Klinger et al. (2016) show that Blacks, lower income, low owner-occupation household rate and younger population are correlated with deadly force usage. In the end, it seems to support that the environment where the interaction occurs does affect police officer's use of force.

Discussion

This systematic literature review reveals considerable diversity in the selected publications. Each article describes a particular factor, in isolation or combined with other factors. Retaining only

the main factor within each study, we identified no fewer than nineteen different factors. Several conclusions can be drawn.

First, it seems that police officers' decisions to resort to legitimate violence is effectively multifactorial. This is in line with previous reviews on the subject that found a significant number of factors involved to a greater or lesser extent in the decision-making process (Bolger 2015; Klahm & Tillyer, 2010). Secondly, it appears that the most predictive factor for the deployment of force is the suspect's resistance and behavior (Klahm, & Tillyer, 2010; Bolger, 2015; Lee et al., 2010; Boivin, & Lagace, 2016; Dai, & Nation, 2009; Hickman, et al., 2015; Klinger, et al, 2016); a consistent finding of studies is that officers only use force if the suspect's behavior makes them do so. However, this does not address the issue of proportionality. Finally, and more surprisingly, while it is the police officer who ultimately makes the decision, there has been little research on this factor, and only 15 studies in this systematic review (N = 52) concerned the characteristics of law enforcement officers. However, it may not always be possible to observe officers' characteristics (Ericson, 1981). For example, there has been no research on this issue in France, and we found only one article from Belgium (Verhage et al., 2018), one from Netherlands (Renden et al., 2017) and two from Germany (Staller et al., 2018, 2019).

Regarding the suspect, skin color is the main factor in the studies we selected. Ten of them studied the issue but drew divergent conclusions about the extent to which ethnicity affects the decision to use force. However, all the studies agree that police officers, whatever their ethnicity and skills, shoot Black men more than White men (e.g. Akinola, & Mendes, 2012; Vickers, & Lewinski, 2012). Another factor is gender; women are less likely than men to be subject to any form of coercion (Dai, & Nation, 2009; Jetelina et al., 2017).

Apart from ethnicity, other characteristics of the suspect are rarely studied. Their behavior is generally described in terms of their possible aggression against police officers (Hickman et al., 2015; Boivin, & Lagace, 2016). The issues of mental health and intoxication are raised, but as an aggravating factor. While it would clearly be difficult to study the suspect's personality or intention, it could help determine whether or not to use coercion against them. The literature consistently observes that the use of force is the result of split-second micro-decisions (Hickman et al., 2015; Kahn et al., 2017). It could be useful to observe the progression of suspects' behavior in

situations leading to the decision to use force; this would help police officers anticipate the course of events and respond accordingly to avoid using coercive measures. However, this would require considerable perspicacity and discernment by police officers who are already in a stressful situation.

Regarding the officer, and in order to explore their decision-making process in depth, ideally, they should be interviewed immediately after the event. However, it is not easy to conduct an interview after an intervention involving the use of force, not least because the officer has to continue working, taking suspects into custody and following all the relevant procedures. External observers would not be able to obtain reliable information about the officer's decision after a lapse of time. In fact, outside of a setting where all the untested variables are controlled, in training for example, as in Hine et al.'s (2018a, 2018b) study with recruits, it would be very difficult to obtain reliable reports, as memories become blurred over time. Pickering (2017) tried to obtain information from 83 US police officers a short time after the events, but with little success; memories had faded, some officers saying they did not remember having made the decision, others admitting that they only realized afterwards what they had done (Pickering, 2017). One explanation for this phenomenon is that the amygdala, which plays an essential role in emotional processing, has links with the nervous system, enabling it to control actions without their author being aware of it at the moment of accomplishing them (Goleman, 1995; LeDoux, 1996; Berthoz, 2003; Evans, 2010).

Hine et al. (2018a; 2018b) used semi-structured interviews to obtain information about the decision-making process of Australian recruits immediately after an intervention. They found that the main decision-making system was intuitive and involved many factors such as the immediate environment and the risk of possible escalation or collateral damage, as well as the stress generated by the intervention and the behavior of the suspect (Hine et al., 2018a; Hine et al., 2018b). These results support previous work by Terrill (2003 and 2005). Other authors have investigated cognitive aspects to understand if these have any effect on officers' decisions to use force. Their results seem generally consistent. As expected, greater cognitive abilities, such as working memory, improve decision making and reduce error rates when deciding whether or not to shoot a possibly armed suspect (Kleider et al., 2010). Other authors have studied cognitive load, establishing that low cognitive resource availability leads to quicker and hence poorer decisions (Stall-

er et al., 2018; Staller et al., 2019). These elements suggest that police officers perform within the limits of their cognitive and physical abilities. Training is clearly paramount, as experienced officers are less likely to make mistakes in relation to the use of force (Mangels et al., 2020; Vickers, & Lewinski, 2012). The department's policies may also be a significant factor (Ferdik et al. 2014; Lee et al., 2010). In this way, our study highlights the multifactorial aspect of police officers' decisions to use legitimate violence.

Overall, studies focusing on specific issues draw similar conclusions. One consistent finding is that CED use reduces the use of firearms (Crow, & Adrion, 2011; Ferdik et al., 2014; Lin, & Jones, 2010; Sousa, Ready, & Ault, 2010; Taylor, & Woods, 2010). However, it also seems to affect the use of other coercive means, for example, by replacing other intermediate means of coercion such as pepper spray (Sousa, Ready, & Ault, 2010). Another consistent finding concerns the difficult interactions between police agents and suspects with mental disorders, which often leads to greater use of force (Kestic, Thomas, & Ogloff, 2013; McTackett, & Thomas, 2017; Morabito et al., 2017; Schulenberg, 2016; Johnson, 2011). Jetelina et al. (2017) found moderate use of force against suspects presenting with mental health symptomatology, notably regarding hard-empty hand control and intermediate weapon use. The results highlight the fact that mental health disorders are perceived as inappropriate social behavior, and not just as a potential threat to police officers and citizens.

Other conclusions can also be drawn from studies focusing on the personality of police officers. Based on the fact that a small proportion of officers are responsible for a large proportion of coercive actions – 6% of officers are responsible for 40% of use of force (Brandl & Stroschine, 2013; Jetelina et al., 2017), it seems likely that personality plays a significant role. It has been demonstrated that poor ability to cope with anxiety leads to greater use of force (Renden et al., 2017; Verhage et al. 2018). Likewise, efficient use of cognitive load seems to prevent ego depletion and therefore preserve the ability to act rationally when confronted by aggressive individuals (Staller et al., 2018; Staller et al., 2019). Interestingly, both experience (Boulton & Cole, 2016) and education level (Rydberg, & Terrill, 2010) lead to significantly reduced use of force, suggesting the importance of training, and that it is not just a question of personality traits. Regarding gender, Nickel (2016) demonstrated that female police officers do not use legitimate violence as

much as their male counterparts; although their sample was limited, the authors concluded that this was a cultural and not a genetic trait, which would be inconvenient in a predominantly male profession (80% of officers in the French gendarmerie are male). These results are also supported by Jetelina et al. (2017).

Regarding the cognitive processes involved in decision-making, recruits mainly seem to use an intuitive process (Hine et al., 2018a), as opposed to the rational process used by experts (Chi, 2006). Moreover, Brown and Daus (2015) observed a link between action (i.e. use of force) and intuitiveness, whereas rationality is correlated with analytical thinking and restraint (Brown & Daus, 2015). This suggests the importance of developing rationality and discretion in order to reduce the use of legitimate violence by police officers. However, Vickers and Lewinsky (2012) found that expert firearm officers shoot faster than rookies, while Kleider et al. (2010) demonstrated that fast shooters rely on more intuitive decision making, which could lead to higher error rates. Overall, results show that expert officers take better decisions than novices about using coercion; while this seems obvious, it could also be counter-intuitive in that experts base their decisions on intuition (Hine et al., 2018a). Furthermore, they focus on force mitigation rather than on physical control, which is the primary objective when they are put in a real-life situation (Mangels et al., 2020). These discrepancies require further investigation.

Limitations

This systematic literature review only included studies published in the last ten years – since 2009 – from six databases and based on restrictive selection criteria. It is likely that other relevant studies on this topic exist but are not included in this review.

Certain factors identified and discussed in this review are the subject of only one of the 52 studies. These include:

- police officer's experience (Boulton, & Cole, 2016)
- police officer's personality (Brandl, & Stroshine, 2013)
- age of the suspect (Brown, Novak, & Frank, 2009)
- gender of police officer (Nickel, 2016)
- prior information (Johnson, D.J. 2018)

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- presence of colleagues (Pickering, 2017)
- police officer's educational level (Rydberg, & Terrill, 2010)
- police officer's working memory ability (Kleider, et al., 2010)

While some of these factors have produced consistent results with relative consensus, such as level of education (Fyfe, 1988), it would have been interesting to see other larger-scale studies on these subjects to confirm and validate the results. For example, the officer's personality has been little studied – only 15 of the articles in this review specifically addressed this issue – although it could largely underlie their decision to use force. A more balanced distribution of the various factors involved in the decision-making process would thus be desirable. Furthermore, some issues do not seem to interest researchers despite particularly encouraging initial results. For example, it would be interesting to examine in more depth the role of "ego depletion" in law enforcement discussed by Staller et al. (2018, 2019) as it involves a reduction of the resources required to maintain self-control. These resources represent a cognitive reserve that can be used for decisional purposes (Freud, 1961a / 1923; Freud, 1961b / 1933), and when they are reduced, law enforcement officers resort to legitimate violence more frequently and more rapidly (Staller et al., 2018; Staller et al. 2019). These results should be examined further, as they indicate that some mental abilities and personality traits could lead to reactions by police officers that are widely perceived to be inappropriate. They also have implications for recruiting police officers.

Some studies also involved very small samples, even though we mainly retained those with at least twenty participants: 25 officers for Nickel (2016), 24 for Vickers and Lewinski (2012), 23 for Boulton and Cole (2016), and 7 cases for Prenzler, Porter and Alpert (2013). Most PhD theses included in the review have small samples (Nickel, 2016; Pickering, 2017; James, 2012). Their findings thus need to be supported by further studies with larger samples to avoid drawing conclusions that could be biased by the small sample.

Some factors have been investigated by a single author and therefore also require further research; for example, in our review, the effect of body-worn cameras, which concerns many police departments, was only studied by Ariel (Ariel, 2016; Henstock, & Ariel, 2017).

Finally, some factors have yielded divergent results in different studies, making it difficult to

determine a trend regarding their influence on the decision to use force or on the decision-making process (Brown, & Daus, 2015; Hine et al., 2018a). In addition, some factors receive considerable attention that appears unrelated to their actual influence on the decision to use force. For example, the ethnicity of the suspect or the police officer has been the subject of a disproportionately large number of studies and their findings are contradictory (Buehler, 2017; Dabney et al., 2017; Fridell, & Lim, 2016; James, 2012; Mears et al., 2017; Morrow, White, & Fradella, 2017; Paoline III, Gau & Terrill, 2018; Shane, Lawton, & Swenson, 2017; Jetelina, et al., 2017; Kahn, et al., 2017). Indeed, while some authors found that Blacks were 2.8 times more likely than Whites to be shot during a police intervention (Buehler, 2017), others found no evidence that ethnicity influences officers' decisions to use legitimate violence (Shane, Lawton, & Swenson, 2017). These disparities can probably be explained by methodological differences. For example, the only factor that Buehler (2017) explored in a study of 2,285 reports of fatal shootings was ethnicity. Thus, by ignoring other factors that could explain the use of lethal weapons, it lacks a cross-sectional analysis that could reveal elements other than ethnicity justifying the deployment of lethal force. In another study with a similar sample, involving 1,948 reports of lethal force, the authors concluded that it was the suspect's behavior and not belonging to a minority ethnic group that led to the use of the highest degree of coercion (Shane, Lawton, & Swenson, 2017). This suggests that statistical analysis and consideration of multiple factors such as ethnicity and the individual's behavior are likely to lead to significant differences in the results. Likewise, these divergent results may be due to the different perspectives; some studies focus solely on ethnicity and use of force (see Buehler, 2017), while others see a bigger picture and take several factors into account (Fridell, & Lim 2016). Buehler (2017) looked only at racial disparities in lethal police shootings and found that Blacks and Hispanics are more likely to be shot at than Whites. By contrast, Fridell and Lim (2016) looked at the role of the neighborhood alongside ethnic disparities and concluded that ethnic disparities disappear in high crime rate neighborhoods, with no difference between Blacks, Whites and Hispanics. We can therefore assume that these two studies drew different conclusions about the same issue because they looked at it from different perspectives. Nevertheless, their conclusions do not entirely contradict each other.

Conclusion

Review of factors underlying police officers' decisions to use force

This systematic literature review provides an overview of the psychological and social factors underlying police officers' decisions to use legitimate violence. It highlights interest in certain factors such as the underlying decision-making process involved in the use of force. It raises the question of the influence of the environment where the encounter occurred. It also corroborates previous studies showing the predominant influence of the suspect's behavior and resistance in the decision to resort to coercion.

By contrast, our review shows that some questions about the decision to resort to legitimate violence remain unanswered, as certain factors that could be particularly relevant to police forces around the world have been little studied. For example, physiological and emotional factors are only discussed in a few studies. Nevertheless, it can be assumed that police officers face situations that are highly emotionally charged and they could be overwhelmed by those emotions. Works on emotion regulation and cognitive abilities would help police agencies in their training process and police officers in their daily duty. In any event, these issues about the decision to use force require further research as its ins and outs could be further explored.

Conflict of interest

Authors report no conflict of interest.

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| First author, year (Country) | Studied factor | Sample | Methodology | Main results |
|-------------------------------------|---|--|---|--|
| Akinola, 2012 (US) | Cortisol influence on threat related decision | 73 police officers | Officers were stressed by a role play task under supervision to increase their cortisol level and then asked to perform the shoot/don't shoot tasks | Increased cortisol level reduces errors for armed and Black targets. This negative correlation is lower for unarmed and White targets. |
| Andersen, 2018 (US) | Influence of heart rate on use of force | 57 police officers | Officers were trained to moderate their heart rate and observations were made on simulated intervention afterward. | Reducing heart rate by enhancing activation of parasympathetic nervous system reduces the number of lethal shooting errors, even 18 months after training. |
| Ariel, 2016 (US) | Body-worn cameras | 16774 arrests in response to a call | Analysis of reports | Wearing a body camera led to a 35% decrease in complaints about use of force and an 18% decrease in police arrests. |
| Boivin, 2016 (CA) | Suspect's behavior | 1174 Canadian police reports | Analysis of reports | Suspect's resistance and behavior is the most predictive factor of police use of force. |
| Boivin, 2017 (CA) | Influence of neighborhood | 1411 reports of use of force | Analysis of reports | Social disorganization predicts use of force and crime rate in the area. |
| Bolger, 2015 (US) | All factors | | Meta-analysis | Suspect's conduct during the encounter is the most influential element in police use of force. |
| Boulton, 2016 (GB) | Police officer's experience | 12 SFOs and 11 AFOs | Interviews about past interventions | Experts show adaptive flexibility to changing task demands, while novices stick to procedural rules. |
| Brandl, 2013 (US) | Police officer's personality | 1084 police officers and 477 reports of use of force | Analysis of reports | A small proportion of officers are responsible for a large number of use-of-force situations. |

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| Brown, R. A., 2009 (US) | Suspect's age | 671 encounters with suspects | Analysis of reports | Young people are more likely to be arrested than adults, but there is no difference in the use of force. |
| Brown, S. G., 2015 (US & JM) | Decision-making style and anger control | 120 police officers | Officers had to decide whether they would take coercive action or not in two scenarios of different gravity. | Rationality leads to avoiding extreme choices, while intuition and weak anger control lead to action. |
| Buehler, 2017 (US) | Belonging to an ethnic minority | 2285 legal intervention deaths | Analysis of reports | Mortality rates among Blacks and Hispanics following legal interventions are 2.8 and 1.7 times higher than among Whites. |
| Crow, 2011 (US) | CED deployment | 461 reports of use of force | Analysis of reports | CEDs deployed in 50.3% of encounters. CEDs are used more often on non-White men. |
| Dabney, 2017 (US) | Belonging to an ethnic minority | 934 encounters in an African American neighborhood | Data collected during ride-along patrols and coded on three categories: a warning is given, a citation is issued, or an arrest is made. | In a highly multicultural environment, physical appearance, such as dreadlocks that enhance suspect's racial stereotype, is correlated with more frequent use of force. |
| Dai, 2009 (US) | Suspect's behavior and gender | 263 cases | Analysis of reports | Suspect's behavior greatly influences police use of coercion. Women are less likely to be coerced by force. |
| Ferdik, 2014 (US) | Institutional policies and CED deployment | 259 county police departments | Analysis of reports | Less restrictive CED policies lead to greater CED deployment and less use of firearms. |
| Fridell, 2016 (US) | Belonging to an ethnic minority and CED deployment | 1846 reports of use of force | Analysis of reports | A Black suspect is 1.49 times more likely to experience CED deployment. No change for other forms of coercion. This effect is moderated by neighborhood crime rate. |

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| Henstock, 2017 (GB) | Wearing a body camera | 430 police shifts | Analysis of reports | Body-worn cameras reduce the use of force by 50%. This effect is mainly concentrated on the lowest degree of force (physical restraint or handcuffing). |
| Hickman, 2015 (US) | Force factor and suspects' behavior | 1240 police reports | Analysis of reports | Study demonstrates police use of force mostly (75%) matches (-1;+1) suspect's resistance. It also increases over time from lower to higher than suspect's resistance. |
| Hine, 2018a (AU) | Decision-making process | 91 recruits | Recruits went into a simulated intervention and were then debriefed about the decision they had taken. | Recruits make more use of intuitive than analytical reasoning. They also report perceptual, cognitive and physiological impairments. |
| James, 2012 (US) (Thesis) | Belonging to an ethnic minority | Three trials involving soldiers, police officers and civilians with no experience of carrying arms. | Third experiment was exclusively with police officers. They were tested immediately after their shift and after three days off. | Police officers are slower to shoot a Black than a White suspect. They are more likely to shoot unarmed Whites than unarmed Blacks. |
| Jetelina, 2017 (US) | Ethnicity and use of sublethal force | 5630 reports from 1693 police officers | Analysis of reports | There is tremendous variation in intermediate weapon use depending on the ethnicity of officers and civilians. |
| Johnson, R., 2011 (US) | Suspects with mental disorders | 619 encounters | Analysis of reports | People with mental disorders are more likely to be aggressive, resist or carry a weapon. But once these aspects are factored out, use of force is not affected. |
| Johnson, D. J., 2018 (US) (Thesis) | Influence of prior information on ethnic bias | 102 students and 51 police officers | Participants were given prior information about a decision to shoot situation, then had to make a decision relative to a picture showing a suspect who was either armed or not. | When police officers are given accurate prior information, ethnic bias disappears and decisions are better. |

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| Kahn, 2017 (US) | Belonging to an ethnic minority and time | 139 use of force cases | Analysis of cases | Force used against Blacks or Hispanics starts at a higher point than against Whites. Over time, greater force is used against Whites. |
| Kesic, 2013 (AU) | Suspects with mental disorders | 4267 reports of use of force | Analysis of reports | 7.2% of the people against whom force is deployed suffer from mental disorders. They are more likely to use weapons and be violent toward police officers, who respond accordingly. |
| Kleider, 2009 (US) | Working memory and negative emotionality | 24 urban police officers | Participants took a working memory test, watched a video ending with the shooting of an officer on duty and then were asked to take the shoot/don't shoot task while they were monitoring their inter-beat interval by electrocardiogram and facial muscle movement by electromyography. | Low working-memory capacity is correlated with high false alarm rate. Low working-memory capacity and high negative emotionality lead to lower discriminability. These variables have no effect on shooting speed. |
| Klinger, 2016 (US) | Influence of neighborhood | 230 police shooting reports | Analysis of reports | Micro-ecology analysis demonstrates that Blacks, lower income, low owner-occupation household rate, and younger population are correlated with deadly force usage. |
| Krishan, 2014 (US) | Influence of neighborhood | 916 police reports | Analysis of reports | Use of force and probability of arrest are independent of the neighborhood. |
| Lee, 2010 (US) | Influence of neighborhood | 8798 custody reports | Analysis of reports | Suspect's behavior and not ethnicity explains use of force. Neighborhood unemployment rate increases the use of coercion and possibly crime rate. In-service training is a significant factor of level of police use of force. |

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| Lee, 2010 (US) | Managerial organization and institutional policies | 86 cases | Case analysis | Division of labor, hierarchy of authority, extensive monitoring, unity of command are factors responsible for bad decisions to open fire. |
| Lee, 2014 (US) | Influence of close neighborhood | 1459 reports of use of force | Analysis of reports | High crime rate in a small neighborhood is correlated with a higher level of legitimate force. |
| Lin, 2010 (US) | CED deployment | 1188 reports of use of force | Analysis of reports | CED replaces other means of coercion. It generally reduces intensity of use of force and decreases officer injury rates. Its effectiveness is poor in life-threatening situations. |
| Mangels, 2020 (US) | Police officers experience | 42 experts police officers and 36 novices | Participants watched footage of five real use of force events. Afterwards they were asked about what they saw, if they felt threatened and what would they have done. | Experienced police officers focus more on the possibility of mitigating use of force than novices. They are also more confident about the possibility of back up. |
| McTackett, 2017 (AU) | Suspect with mental disorders | 286 use of force situations | Analysis of reports | The potential instability of the suspect does not imply an increase in the use of force. It is proportional to suspect's resistance. |
| Mears, 2017 (US) | Belonging to an ethnic minority | None, literature search | Literature review | Heuristics relying on biases about the dangerousness of ethnic minorities increase the use of force, particularly when the suspects assume police officers are biased against them. |

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| Morabito, 2017 (US) | Suspect with mental disorders and comorbidities | 4211 use of force situations | Analysis of reports | Suspects who are both mentally disordered and intoxicated are perceived to be more dangerous and are therefore subjected to more use of force than individuals with mental disorders only. Individuals with no perceived disorders are the most likely to have a firearm pointed at them. |
| Morrow, 2017 (US) | Belonging to an ethnic minority | 519948 police reports | Analysis of reports | Blacks and Hispanics are significantly more likely to be physically challenged than Whites. |
| Nickel, 2016 (CA) (Thesis) | Gender of police officers | 25 police officers – 13 men and 12 women | Focus groups were taped discussing a real-life event and what actions they would take. | Women make the decision to use force differently from men. They prioritize need and timeliness. |
| Paoline, 2018 (US) | Belonging to an ethnic minority, suspect and officer | 6059 encounters between Blacks and Whites | Analysis of reports | White police officers are more coercive towards Black suspects. No difference for Black officers. Police officer's ethnicity does not predict the suspect's resistance. |
| Pickering, 2017 (US) (Thesis) | Colleagues nearby | 83 police officers | Interview with police officers involved in a decision-to-shoot situation. | Police officers influence each other, both through their actions and their presence. |
| Prenzler, 2013 (CA) | Managerial organization and training | 7 case studies about use of force | Literature review | Police departments can reduce use of force. Problem-oriented resolution approach allows for more appropriate interventions. |
| Renden, 2017 (NL) | State anxiety and stress | 88 police officers | Participants enter a 144m ² room and must proceed to an arrest in a randomly assigned high or low threat scenario. | Anxiety affects police officers' state of stress but not their decisions. Decisions are only affected by the threat. Stress affects effectiveness. |

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| Rydberg, 2010 (US) | Level of education | 3356 encounters with a suspect | Analysis of reports | While level of education does not reduce likelihood of arrest or search, higher education significantly reduces use of force. |
| Schulenberg, 2016 (CA) | Suspect with mental disorders | 577 encounters with a suspect | Analysis of reports | Suspects with mental disorders are more likely to be prosecuted than those without. |
| Shane, 2017 (US) | Belonging to an ethnic minority | 1948 reports of use of lethal force | Analysis of reports | Data show that it is not ethnicity that influences the decision to open fire but only the suspect's behavior. |
| Sousa, 2010 (US) | CED deployment | 64 police officers | One group was given a CED, not the other. Both groups faced with three scenarios with different suspect resistance. | CED deployment replaces other coercive means and reduces use of firearms. |
| Staller, 2018 (DE) | Ego depletion | 80 police officers | 44 officers were shown a disgusting video and 36 immersed their hand in very cold water, both situations designed to induce ego depletion. They were then placed in a scenario in which they had to prevent an increasingly aggressive individual breaching a cordon. | Video did not induce any change but the cold pressor task did. Depending on the circumstances, decreased self-control leads officers to use force more quickly. |
| Staller, 2019 (DE) | Ego depletion | 200 German police recruits | Recruits completed a cognitive depletion task ("e" crossing). They then worked through a video-based real-life scenario with a provocative citizen and had to indicate when they would intervene. | Ego-depleted officers reported that they would use coercion more rapidly. |
| Taylor, 2010 (US) | CED deployment | 18 police precincts over a four-year period | Analysis of reports | CED deployment reduces the use of any other coercive means. |

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| Terrill, 2017 (US) | Institutional policies | 3340 use of force situations | Analysis of reports | Restrictive use-of-force policies issued by police departments have a downward impact on use of force by their officers. |
| Verhage, 2018 (BE) | Stress management | 150 Belgian police officers | Questionnaires were completed by 137 officers. 13 were interviewed to explore in greater depth the influence of stress during interventions. | Police officers' accountability for their actions increases their stress level, which hinders decisions in critical situations. |
| Vickers, 2012 (CA) | Difference between experts and rookies | 24 emergency response team police officers | Participants were equipped with a gaze tracking device and were asked to decide whether they should discharge their firearm on an armed or unarmed individual. | Experts make fewer mistakes when a cell phone is drawn. Experts also shoot faster than rookies. Overall, experts have better performance. |

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