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Improving Understanding of Police Use of Force

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The public does not appear to have a good understanding of police use of force. In an attempt to address this, the present study examined the degree to which university students understand various use-of-force issues and explored whether an educational intervention could improve this understanding. One hundred sixty students at a Canadian university completed a survey before and after completing an online 6-hr module on police use of force. Comparative analyses were conducted to assess differences between the pre- and postintervention surveys, and regression analysis was used to explore whether perceptions of police legitimacy and various demographic variables moderated the impact of the educational intervention on knowledge of police use of force. Results demonstrated that participants did not initially have a good understanding of use-of-force issues, but the intervention increased their level of understanding; this was the case regardless of their initial perceptions of police legitimacy and their demographic variables. The findings also indicate that perceptions of police legitimacy improved following the intervention. If replicated with more diverse samples, an educational intervention similar to the one explored in this study could be used to improve understanding of use-of-force issues amongst the broader public and enhance their perceptions of police legitimacy. It might also have the potential to educate jurors, lawyers, and judges and change how the media discusses use-of-force issues.

Public Significance Statement
The public does not appear to have a good understanding of police use of force. The results of this study demonstrate that an online educational intervention can increase this understanding while also enhancing perceptions of police legitimacy. Given these results, it may be possible to develop interventions to improve understanding of use-of-force issues more broadly amongst the general public, triers of fact, and the media.

Keywords: use of force, educational intervention, police legitimacy, beliefs, heuristics

Fuelled by high-profile policing incidents that have ended in tragic outcomes, such as the recent murder of George Floyd, and the perceived increased militarization of the police across North America, there is no shortage of media headlines expressing concerns about police use of force. For example, in a recent *New York Post* article, President Joe Biden suggested that police officers should be trained to shoot attackers "in the leg instead of the heart" to "avert the killing of civilians" (Jacobs, 2020). In the same year, concerns were raised by reporters about discrepancies between officer testimony and video evidence of police–public interactions, with one reporter asking why police officers lie so much: "Videos often contradict what police say in reports. Here's why some officers continue to lie" (Kaur, 2020). Another headline that recently made the news indicated that "An estimated 500 people have died from police use of tasers nationwide between 2010–2021" (Kummerer, 2023).

While not all media headlines promote misconceptions about police use of force, there appears to be an ever-growing number of headlines, like the ones highlighted above, that do include misinformation. Studies of marksmanship accuracy amongst police officers make it clear that President Biden's suggestion is ill-advised and scientifically unsound (Donner & Popovich, 2019; Rostker et al., 2008; Vickers & Lewinski, 2012). In the story about discrepancies

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The draft of the full survey (Appendix A), research related to various beliefs around police use of force (Appendix B), and the findings from the pre- and postintervention surveys (Appendix C) can be found on the additional online material at https://osf.io/9rjps/.

Ariane-Jade Khanizadeh is employed by a large police organization. The work presented in this article was conducted fully independently and is not associated with her employment. The views expressed in this article are those of the authors and not an official position of the police organization in which the lead author is employed nor of Carleton University.

Ariane-Jade Khanizadeh played a lead role in data curation, formal analysis, methodology, project administration, validation, and writing–original draft and an equal role in conceptualization and writing–review and editing. Craig Bennell played a lead role in supervision, a supporting role in formal analysis and project administration, and an equal role in conceptualization, methodology, and writing–review and editing. Heather McGale played a supporting role in data curation, methodology, project administration, and writing–review and editing and an equal role in conceptualization.

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between officer testimony and video footage, most of which involved the use of force, deception is raised as the only plausible explanation; a wide range of other less sinister explanations that have been highlighted by researchers are completely ignored (e.g., memory failure due to stress, field of view differences between an officer's eyes and their body-worn cameras; Artwohl, 2002; Murray et al., 2024; Shields et al., 2016). Finally, the taser article neglects to mention that research on conducted energy weapons has found them to be extremely safe with few reported deaths ever being attributed *directly* to these weapons (e.g., Bozeman et al., 2009; Mesloh et al., 2008).

What impact do such news stories, and media portrayals of police more generally, have on the public's understanding of police use of force? And if the public does not have a good understanding, what can be done? While there is a reasonable body of research examining public *attitudes* towards police use of force (e.g., Boivin et al., 2017; Kyprianides et al., 2021), we know of very little research that has examined public *understanding* of police use of force, and we are not aware of any research that has explored whether it is possible to improve the public's understanding of use-of-force issues (e.g., through some kind of educational intervention). Given these research gaps, the present study seeks to begin the process of exploring these issues.

Public Understanding of Police Use of Force

In recent years, researchers have begun focusing a lot of attention on public *attitudes* towards the use of force and the factors that influence these attitudes (e.g., Bradford et al., 2017; Kyprianides et al., 2021; Miethe et al., 2019). Conversely, we have less insight into public *understanding* of police use of force. Indeed, in our attempt to locate relevant literature, we could only identify a small number of studies that have examined this issue. In one study, O'Neill et al. (2017) found that young adults in the United States believed that lethal force is used in approximately 20% of all police–public encounters when, in reality, lethal use of force is actually quite rare (Schwartz & Jahn, 2020). They also believed that police use of nonlethal force has been increasing in the United States when in fact the opposite appears to be true (Hyland et al., 2015). In addition, their participants believed that officers receive approximately 80 hr of de-escalation and communication training as cadets, whereas officers in the United States appear to get approximately 36 hr of such training, on average (Reaves, 2016). Furthermore, participants in this study believed that it takes about 3 s between rounds when someone is trying to rapidly discharge a firearm, whereas in reality it only takes about 0.3 s (Lewinski et al., 2014).

Consistent with the results of O'Neill et al.'s (2017) study, another recent study demonstrated that people from the United States overestimate the frequency of lethal force by police against members of racialized communities. McCaffree and Saide (2021) surveyed 980 American adults and asked them to estimate the number of unarmed Black men in the United States who had been killed by police in 2019 and what percentage of all people killed by police in 2019 were Black. Just over half (53.3%) of participants who reported "very liberal" political views believed that over 1,000 unarmed Black men had been killed by police in 2019 and those with "liberal" or "very liberal" views believed that most people killed by police in 2019 were Black (56% and 60%, respectively). In contrast to these views, it was estimated by the researchers (using the Washington Post and Mapping Police Violence lethal force databases) that 60–100 unarmed Black men were killed by police in the United States in 2019, and approximately one quarter (25%) of all those killed by police in 2019 were Black (e.g., Lett et al., 2021). Those who reported "moderate," "conservative," or "very conservative" views also overestimated the number and proportion of Black men killed in the United States, but to a lesser degree.[1]

Most recently, Goldberg (2023) asked participants to estimate a number of different facts related to police use of force. Consistent with previous studies, he found that participants significantly overestimated nonlethal force overall and the degree to which nonlethal force involved Black Americans. He also found that participants significantly overestimated the number of individuals shot and killed by police overall and the degree to which victims of police shootings were Black and unarmed.

Increasing Public Understanding of Police Use of Force

If the lack of knowledge reported in these previous studies is pervasive, it is arguably important to improve the public's knowledge base. Not only will this likely enhance perceptions of police legitimacy (which has a number of positive benefits, such as increasing law-abiding behaviours and cooperation with the police; Jackson et al., 2012) but it may also improve trier-of-fact decision making (e.g., in a courtroom) and it might impact how the media portrays policing and police use of force specifically. There is virtually no research examining ways to enhance public knowledge of police use of force, except for a very limited literature examining the role of Community Police Academies (CPAs).

CPAs are designed to enhance public understanding of policing and often include weekly sessions for the public focusing on topics like police training, use-of-force tactics, and firearms (e.g., Cohn, 1996). They also often offer the opportunity for citizen "ride alongs" (when a civilian rides in the passenger seat of a police vehicle during an officer's shift). Some studies have demonstrated that CPAs can increase both knowledge of policing procedures and practices, as well as improve public perceptions of the police (Breen & Johnson, 2007; Brewster et al., 2005; Palmiotto & Unninthan, 2002). Conversely, some research has found that CPAs may contribute to stereotypical and unrealistic views of policing by focusing too much on tactics, such as firearms and special weapons and tactics ("SWAT") training (Bumphus et al., 1999).

One of the challenges associated with studies of CPAs is that most people who attend CPAs typically have positive views of the police already (e.g., trust in the police), which may influence their efficacy (Bumphus et al., 1999; Perez et al., 2021) and limit the generalizability of findings to community members who hold negative views of the police (Perez et al., 2021). CPAs may also not be a particularly practical intervention to enhance public understanding of policing given that they are often very lengthy and resource intensive.

Thankfully, research in other nonpolicing domains has demonstrated the potential value of other kinds of educational interventions, which may provide more practical approaches for increasing public understanding of police use of force. Lecture-type lessons, in

[1] Importantly, even though Black individuals in the United States are not killed by the police as frequently as the public may think, Black individuals do appear to be drastically overrepresented in lethal police shootings (DeAngelis, 2024).

particular, which impart evidence-based information to learners, have been shown to increase knowledge on topics ranging from dietary needs to organ donation (e.g., Bohaty et al., 2008; Ramadurg & Gupta, 2014; Rezaeian et al., 2014). Such an intervention, especially online instructional material targeting use-of-force issues specifically, seems ideally suited to the task of correcting misconceptions similar to those highlighted above. If we can demonstrate the value of an online, lecture-based intervention for our participants, this type of intervention may also be scalable so that it can be used to enhance public understanding of police use of force more broadly, including amongst triers of fact and members of the media.

Police Legitimacy

Police legitimacy has been defined as the degree to which the public perceives that the policing institution has the right to hold power and exert its authority to establish what constitutes appropriate behaviours (e.g., abiding by the laws; Tyler, 2006). Various tools have been developed to assess people's perceptions of police legitimacy, with the most common arguably being Tankebe et al.'s (2016) Police Legitimacy Scale (PLS), which builds on Tyler's (2005) model of trust in the police. Tankebe et al.'s (2016) PLS measures four specific dimensions of police legitimacy: (a) *police effectiveness* (the effectiveness of the police in solving and preventing crime), (b) *distributive fairness* (the degree to which different groups/people are getting similar resources from the police), (c) *procedural fairness* (the degree to which people who interact with the police are treated fairly), and (d) *police lawfulness* (whether the police abide by the law themselves and hold similar values to those held by members of the community).

Police legitimacy may relate to attempts to enhance public understanding of police use of force in at least two ways. Firstly, increasing one's understanding of police use of force may also have a positive impact on perceptions of police legitimacy. For example, clarifying how often the police use force, and making it clear that the vast majority of uses of force are legally justified, may positively impact public perceptions of procedural justice, distributive fairness, and police lawfulness (and therefore police legitimacy). If perceptions of police legitimacy are enhanced, one would expect this to have other impacts, such as an increase in law-abiding behaviours and cooperation with the police (e.g., Jackson et al., 2012; Perry, 2021; Sunshine & Tyler, 2003).

Secondly, one's perception of police legitimacy may influence the degree to which an educational intervention has its desired impact. More specifically, the intervention may have less of an impact on those who do not see the police as a legitimate source of authority (e.g., Bradford et al., 2017; Miethe et al., 2019) given that these people will likely be less accepting or open to the information being conveyed. For example, some research has demonstrated that those with more positive perceptions of police legitimacy are generally more accepting of police use of force so long as it is not excessive (Bradford et al., 2017; Gerber & Jackson, 2017). These individuals will likely be more receptive to information that attempts to correct misconceptions about the frequency of force and the degree to which force that is used is legally justifiable.

The Present Study

In the present study, knowledge of various use-of-force issues amongst university students was assessed before and after being exposed to an online educational intervention that was designed to enhance their understanding of these issues. The following hypotheses were tested:

1. Before being exposed to the educational intervention, the participants will have misconceptions about police use of force.
2. An educational intervention (i.e., a 6-hr online module on police use of force) will help correct these misconceptions, as evidenced by increased knowledge around the targeted use-of-force issues.
3. Perceptions of police legitimacy will be positively affected by the educational intervention.
4. Perceptions of police legitimacy will moderate the impact that the educational intervention has on participants' understanding of police use of force.

We also examined, in an exploratory fashion, whether various demographic characteristics moderated the impact of the educational intervention.

Method

Participants

One hundred eighty-six undergraduate and graduate university students completing a Police Psychology course at a Canadian university participated in this study. One hundred sixty participants completed *both* the pre- and postintervention surveys. These 160 students constitute the sample used for all analyses in the present study.

Most of these participants were female (n = 128, 80.5%),[2] between 18 and 24 years old (n = 126, 79.2%), White (n = 117, 74.5%), and had a liberal political attitude (n = 93, 64.1%). Most participants reported majoring in Psychology (n = 98, 62.0%) followed by Criminology and Criminal Justice (n = 45, 28.5%). There was a roughly equal split between participants who reported not having any personal experience with law enforcement (n = 82, 51.6%) and those who had (n = 77, 48.4%). Just under half reported that their previous encounters with law enforcement were positive (n = 76, 47.8%), about one third reported that they had been both positive and negative (n = 53, 33.3%), and only 5.7% reported that their previous experiences with law enforcement had been negative (n = 9), with 13.2% having never had an encounter with a law enforcement officer (n = 21). Only five participants reported that law enforcement officers had previously used force against them (3.2%).

Materials

Use-of-Force Survey

Participants completed an online survey to assess their understanding of police use of force (see https://osf.io/9rjps/ for a draft of the full survey). This survey first asked participants to describe what

[2] All percentages are calculated based on the number of participants who answered a given question (rather than the total number of participants). Responses to the demographic questionnaire from the pre- and postintervention surveys were combined to ensure that the most demographic information could be obtained from participants.

they think the purpose of law enforcement is and then select where they get most of their knowledge/information about policing (e.g., direct contact with policing, university courses, media sources). Next, force was defined for participants as *the amount of effort required by police to compel compliance in a subject* (International Association of Chiefs of Police, 2001). Participants were also told that types of force can include verbalization (e.g., "Stop!"; Show me your hands!"; "Get down!"), empty-hand control techniques (e.g., grabs, holds, joint locks, punches, kicks), less-lethal methods (e.g., blunt impact, pepper spray, conducted energy devices ["tasers"]), and lethal methods (e.g., firearms). Participants were asked to keep this definition in mind as they answered the survey.

Questions in the survey asked participants about their beliefs related to the frequency of police use of force, shooting accuracy from various distances, and the amount of training cadets receive before becoming an officer. The survey also asked participants to rate their level of agreement with various statements related to use-of-force incidents (e.g., "Officer and civilian memory of a use-of-force situation will be influenced by their focus of attention"), use-of-force dynamics (e.g., "A person can run towards an officer [close the distance] faster than an officer with general duty gear can retreat backwards"), police intervention tools (e.g., "Being tased can result in a life-threatening electrical pulse"), and police training (i.e., "Officers are mandated to receive the same amount and type of training across all provinces in Canada").

Police Legitimacy Scale

Participants also completed the 16-item PLS (Tankebe et al., 2016) before and after the intervention to assess the impact of the intervention on police legitimacy and how these perceptions might relate to misconceptions about police use of force (see https://osf.io/9rjps/ for a draft of the full survey). As discussed above, the PLS assesses perceptions of four aspects of police legitimacy: lawfulness (e.g., "The police act in a way that is consistent with my own moral values"), procedural fairness (e.g., "The police treat citizens with respect"), distributive fairness (e.g., "The police provide the same quality of service to all citizens"), and police effectiveness (e.g., "I feel safe walking in my neighbourhood at night"). Participants responded to each item using Likert scales (ranging from 1 = *strongly disagree* to 5 = *strongly agree*). Higher scores on the scale indicate more positive perceptions of police legitimacy. The scale was originally validated in the United States and Ghana and showed good internal consistency. More recently, this scale has been validated with a Canadian sample[3] (Ewanation et al., 2019). Similar to previous validation efforts, police effectiveness was again found to have weaker loadings onto police legitimacy in Ewanation et al.'s (2019) Canadian study.

Demographic Survey

General demographic information was also collected, including participant sex, age, ethnic background, political attitude they most identify with, and participants' area of study (see https://osf.io/9rjps/ for a draft of the full survey). Participants were also asked whether they had any personal experience with law enforcement (e.g., a friend who is/was a police officer), whether previous encounters with a law enforcement officer within the community were positive or negative, and whether a law enforcement officer had ever used force against them (and to describe).

Intervention

After completing their preintervention survey, students were exposed to two 3-hr video-taped modules that focused on police use of force. The first online module was presented by the instructor of the course (the second author). This module included a case study of an officer-involved shooting, as well as information about the authority to use force in Canada, the prevalence of police use of force in Canada, the role that police psychologists play in understanding the use of force, the impact of stress on use-of-force decision making, use-of-force myths (which included having students watch a video: https://www.youtube.com/watch?v=c3h9hUtlW_M), and the potential impact of use-of-force myths (e.g., on jury decision-making). This module concluded with an interview of an officer from the local police service who described his views on police use of force.

The second online module included an interview between the second author and a senior researcher from a large Canadian police organization. This researcher has extensive experience studying police use of force and is responsible for analyzing use-of-force data collected by his agency. In this interview, the interviewee discussed how the use of force is defined by his agency, the degree to which officers in his agency use force, and the processes in place in his agency when officers use force (e.g., reporting, investigations). The interview also included specific discussions around other topics, such as conducted energy weapons ("tasers"), and the interviewee provided advice for students who may want to work in the criminal justice field or policing.

As a part of these modules, students were also required to read three peer-reviewed journal articles. Each article was also associated with an online quiz to ensure students understood the articles. These articles focused on the following topics: the use of simulators in use-of-force training (Bennell et al., 2007), memory for use-of-force events (Hope et al., 2012), and the impact of stress on use-of-force decision making (Nieuwenhuys & Oudejans, 2010).

Procedure

Data were collected over eight semesters, beginning in the summer of 2018 and ending in the summer of 2022. The students first completed an informed consent form. This form described the study and asked the students whether they consented to participate. Those who consented could then access an online survey that assessed their understanding of police use of force, the PLS, and the demographic questionnaire (preintervention survey). The preintervention survey was completed before any content was provided in the course about police use of force. The students had 1 week to complete the preintervention survey from the time it became available. They could complete the survey whenever they wished during this 1-week period.

After the preintervention survey was completed, participants were given access to the two 3-hr video-taped modules and the associated quiz that tested the student's understanding of the assigned readings (i.e., the peer-reviewed journal articles). Students could access these modules at a time that was convenient for them, and they could work through the modules at their own pace; however, they needed to complete the quiz (that ensured they read and understood the

[3] It is important to note that the sample in Ewanation et al.'s (2019) study was predominantly White and the PLS may not validate in Indigenous and more diverse samples.

readings) by a predetermined deadline. Throughout the modules, students could also ask the course instructor (the second author) or the teaching assistant questions about the material being covered through an online discussion group.

After reviewing the modules and submitting their quiz, students were again given access to the same use-of-force survey they completed previously and the PLS (postintervention survey). Participants had 1 week to complete this survey on their own time. Following the submission of the postintervention survey, the students were provided with an online debriefing. The results of the pre- and postintervention surveys were discussed in class to explore the various views that the students held about police use of force before and after the educational intervention.

Both the pre- and postintervention surveys were typically completed within 3 weeks of each other. Participants who consented (in the preintervention survey) were also sent 6- and 12-month follow-up surveys (same as the pre- and postintervention surveys) to assess knowledge retention. Due to low response rates on these surveys ($n = 36$ for the 6-month follow-up and $n = 25$ for the 12-month follow-up), the Results section focuses on the findings from the pre- and postintervention surveys. The limited findings from the follow-up surveys can, however, be found in https://osf.io/9rjps/.

This study was approved by the Carleton University Research Ethics Board-B (Clearance No.: 106817).

Results

Before presenting this study's main findings, it is interesting to note where participants reported getting most of their information about policing. While almost half of participants reported getting most of this knowledge from university/college courses ($n = 85$, 48.3%), which makes sense given that participants were university students taking a Police Psychology course, a considerable number of participants reported getting this knowledge from sources that are frequently inaccurate, including the internet and/or social media ($n = 31$, 17.6%), TV news or the newspaper ($n = 22$, 12.5%), and fictional TV shows or movies ($n = 15$, 8.5%). Participants also indicated getting this knowledge from direct contact with policing/police officers ($n = 19$, 10.8%), from friends/acquaintances ($n = 3$, 1.7%), and from books about policing ($n = 1$, 0.6%).

Hypothesis 1: Participants Will Have Misconceptions About Police Use of Force

Beliefs Related to the Frequency of Police Use of Force

Prior to the intervention, on average, participants believed that police officers use *lethal* force (i.e., force with a deadly weapon) in 15.5% ($n = 157$, $SD = 16.6$) of all their encounters with the public, with estimates ranging from 0.0% to 70.0%. Participants also believed, on average, that officers use nonlethal force (e.g., baton, taser, pepper spray) or lethal force in 33.8% of all their encounters with the public ($n = 156$, $SD = 23.6$), with estimates ranging from 0.0% to 95.0%. In both cases, and as indicated in the additional online material (see https://osf.io/9rjps/), these estimates far exceed those that are reported in Canadian studies that address this topic (e.g., 0.1% for nonlethal force and 0.01% for lethal force; Baldwin et al., 2018; Hall & Votova, 2013).

Beliefs Related to Shooting Accuracy at Various Distances

Participants were asked to indicate the accuracy level (i.e., the bullet hits the target) that a currently trained and actively serving police officer would obtain while shooting at a static silhouette target. Estimates were given out of 100%, with higher scores indicating higher accuracy. On average, participants reported that the accuracy rate for officers shooting from 3 to 15 feet would be 84.0% ($n = 154$, $SD = 24.0$), from 18 to 45 feet would be 62.3% ($n = 155$, $SD = 22.6$), and from 60 to 75 feet would be 41.3% ($n = 155$, $SD = 23.7$). As indicated in the additional online material (see https://osf.io/9rjps/), these estimates exceed accuracy rates that are reported in research that has examined this issue (e.g., 38% hit rate between 18 and 45 feet for recruits who had formal police firearms training or military handgun training/certification; Lewinski et al., 2015).

Beliefs Related to the Amount of Training Cadets Receive

Participants reported that, on average, they believe cadets receive 104.4 hr ($n = 151$, $SD = 145.3$) of defensive tactics and use-of-force training before becoming an officer. Participants also reported believing that cadets receive, on average, 63.9 hr ($n = 150$, $SD = 87.9$) of communication and de-escalation training before becoming an officer. As indicated in the supplemental material (see https://osf.io/9rjps/), these estimates exceed the amount of training cadets actually receive. For example, cadets from the Royal Canadian Mounted Police receive 94 hr of police defensive tactics before becoming police officers and receive 21 hr of de-escalation, crisis intervention, and mental health training (Royal Canadian Mounted Police, 2019, 2022).

Endorsement of Various Use-of-Force Beliefs

Aggregate scores were computed for each participant using the nine use-of-force beliefs included in Table 1. More specifically, participants were given a score for each item depending on the extent to which they endorsed the belief (ranging from 1 = *strongly disagree* to 5 = *strongly agree*), with items "d," "e," "g," and "i," being reverse-coded. This meant that item scores could range from 1 to 5 and aggregate scores could range from 9 to 45, with higher scores indicating greater levels of knowledge. Overall, participants had an average aggregate score of 31.2 out of 45 ($SD = 4.42$, $n = 156$), with scores ranging from 16 to 41. The average for the item scores was 3.5 out of 5, with scores ranging from 2.3 to 4.5. The data in Table 1 demonstrate that some items (e.g., Being tased can result in a life-threatening electrical pulse) were clearly understood much less than other items (e.g., Officer and civilian memory of a use-of-force situation will be influenced by their focus of attention).

Hypothesis 2: Effect of the Educational Intervention

To test the second hypothesis, which focused on whether the educational intervention provided to the participants improved their knowledge of the use-of-force issues just described, we compared responses from before and after the intervention. Due to violations of the normality assumption, we first used Wilcoxon signed-ranks test to examine the impact of the educational intervention on participants' beliefs related to the frequency of use of force, shooting

Table 1
Average Scores for Use-of-Force Beliefs on the Preintervention Survey

Use-of-force belief	*n*	Minimum	Maximum	*M*	*SD*
Officer and civilian memory of a use-of-force situation will be influenced by their focus of attention.	157	2.0	5.0	4.5	0.7
It is possible for a person to be unaware that he/she has sustained a gunshot wound.	158	1.0	5.0	4.0	1.0
A person can run towards an officer (close the distance) faster than an officer with general duty gear can retreat backwards.	159	1.0	5.0	3.7	1.0
Officers are mandated to receive the same amount and type of training across all provinces in Canada.[a]	158	1.0	5.0	3.6	1.0
Being struck with taser barbs always incapacitates the person being tased.[a]	159	1.0	5.0	3.6	1.1
A person who is lying down on their stomach can stand up in a position to flee or fight an officer in 1 s.	159	1.0	5.0	3.4	1.1
It is a definite sign of deception when an officer's report differs from body-worn camera footage.[a]	158	1.0	5.0	3.2	1.2
A person can turn fast enough to significantly change their body position between the time an officer decides to pull the trigger of their firearm and when the round actually hits the body.	159	1.0	5.0	3.0	1.1
Being tased can result in a life-threatening electrical pulse.[a]	159	1.0	5.0	2.3	1.0

[a] Items were reverse-coded.

accuracy, and the amount of training cadets receive (see Table 2). Consistent with the material included in the intervention, significant reductions in the estimates of the frequency of police use of force were found. Significant reductions in the estimates of shooting accuracy were also found for each of the distances that were asked about. No significant differences were observed for estimates of the amount of training cadets receive before becoming officers using a Bonferroni correction for multiple tests ($\alpha = .007$).

To examine whether the educational intervention had an impact on participants accurately endorsing various use-of-force beliefs, we conducted paired-samples *t* tests. Firstly, the aggregate scores on the preintervention survey ($M = 31.2$, $SD = 4.4$, $n = 156$) were compared to those on the postintervention survey ($M = 34.0$, $SD = 5.0$, $n = 157$). A significant difference was found suggesting that the intervention significantly improved knowledge, $t(152) = -8.9$, $p < .001$, by an average of almost three points out of 45 (approximately a 7% increase, $d = 0.72$). Secondly, the individual item scores on the preintervention survey were compared to the postintervention survey (see Table 3). Six significant differences were found, all suggesting improvements in knowledge using a Bonferroni correction for multiple tests ($\alpha = .006$; all ps $< .001$).

Hypothesis 3: Effect of the Educational Intervention on Perceptions of Police Legitimacy

Paired-samples *t* tests were also used to examine the third hypothesis, which focused on the impact of the intervention on PLS scores (see Table 4). Overall, PLS scores after the intervention ($M = 50.83$, $SD = 11.89$) were significantly higher than those before the intervention ($M = 48.57$, $SD = 11.33$), $t(147) = -4.00$, $p < .001$, $d = 0.33$. Each item from the PLS was also examined individually, and scores for nine of the 16 items significantly increased following the intervention, further suggesting that perceptions of police legitimacy improved as a result of the intervention, at least for some items

Table 2
Wilcoxon Tests for Beliefs Related to the Frequency of Police Use of Force, Shooting Accuracy, and the Amount of Training Cadets Receive on the Pre- and Postintervention Surveys

		Preintervention	Postintervention		
Use-of-force belief	*n*	*M* (*SD*)	*M* (*SD*)	*z*	*p*
Frequency of *lethal* force (i.e., only force with a deadly weapon)—Percentage of all police–public encounters	156	15.5 (16.6)	6.5 (13.7)	435.00	<.001
Frequency of *any* nonlethal (e.g., taser) or lethal force (e.g., firearm)?—Percentage of all police–public encounters	155	32.8 (23.6)	15.8 (20.3)	1,089.00	<.001
Accuracy level that a currently trained and actively serving police officer would obtain at *3–15 feet*—Percentage out of 100%	151	83.8 (24.0)	77.8 (17.5)	1,498.00	<.001
Accuracy level that a currently trained and actively serving police officer would obtain at *18–45 feet*—Percentage out of 100%	152	62.3 (22.6)	51.8 (20.4)	1,592.50	<.001
Accuracy level that a currently trained and actively serving police officer would obtain at *60–75 feet*—Percentage out of 100%	152	41.3 (23.7)	30.7 (21.6)	1,738.50	<.001
Hours of defensive tactics and use-of-force training that cadets receive before becoming an officer	144	104.4 (145.3)	98.7 (126.4)	2,693.50	.445
Hours of communication and de-escalation training that cadets receive before becoming an officer	146	63.9 (87.9)	67.3 (96.6)	3,059.00	.209

Table 3
Paired-Samples t Tests for Use-of-Force Beliefs on the Pre- and Postintervention Surveys

Use-of-force belief	Preintervention *M* (*SD*)	Postintervention *M* (*SD*)	*t*	*df*	Cohen's *d*
A person who is lying down on their stomach can stand up in a position to flee or fight an officer in 1 s.	3.4 (1.1)	3.9 (1.0)	−5.7***	156	−0.45
A person can turn fast enough to significantly change their body position between the time an officer decides to pull the trigger of their firearm and when the round actually hits the body.	3.0 (1.1)	3.9 (1.0)	−9.0***	157	−0.72
A person can run towards an officer (close the distance) faster than an officer with general duty gear can retreat backwards.	3.7 (1.0)	3.6 (1.4)	0.5	157	0.04
It is possible for a person to be unaware that he/she has sustained a gunshot wound.	4.0 (1.0)	4.4 (0.9)	−4.9***	156	−0.39
Officers are mandated to receive the same amount and type of training across all provinces in Canada.	3.6 (1.0)	3.7 (1.0)	−0.6	155	−0.05
Officer and civilian memory of a use-of-force situation will be influenced by their focus of attention.	4.5 (0.7)	4.6 (0.7)	−0.6	155	−0.05
It is a definite sign of deception when an officer's report differs from body-worn camera footage.	3.2 (1.2)	3.6 (1.3)	−6.6***	156	−0.52
Being struck with taser barbs always incapacitates the person being tased.	3.6 (1.1)	3.8 (1.1)	−2.9**	157	−0.23
Being tased can result in a life-threatening electrical pulse.	2.3 (1.0)	2.6 (1.1)	−4.2***	157	−0.33

** $p < .01$. *** $p < .001$.

(see Table 4). Interestingly, two of the 16 PLS items significantly decreased following the intervention. These two items load onto the *police effectiveness* factor of the PLS.

Hypothesis 4: Police Legitimacy and Demographic Variables as Moderators

Finally, to examine the fourth hypothesis, which focused on the potential for PLS scores to moderate the impact of the educational intervention on knowledge of police use of force, a hierarchical multiple regression analysis was conducted. The same analysis was used to explore the role of various demographic variables as potential moderators.

For the model focusing on PLS scores, the first step of the hierarchical regression model included the preintervention aggregate scores for the endorsement of use-of-force beliefs along with preintervention PLS scores. In the second step of the model, the interaction term between these two variables was added. This did not account for a significant amount of variance in postintervention survey aggregate scores for the endorsement of use-of-force beliefs,

Table 4
Paired-Samples t Test for Police Legitimacy Scale Items

Police legitimacy scale item	Preintervention *M* (*SD*)	Postintervention *M* (*SD*)	*t*	*df*	Cohen's *d*
When the police deal with people, they always behave according to the law.	2.39 (1.08)	2.68 (1.11)	−3.55***	155	0.28
If I were to talk to police officers in my community, I would find their values to be very similar to my own.	3.47 (0.97)	3.57 (0.89)	−1.62	155	0.13
The police act in ways that are consistent with my own moral values.	3.19 (1.06)	3.43 (0.90)	−3.72***	154	0.30
The police treat citizens with respect.	3.37 (1.01)	3.47 (0.94)	−1.53	154	0.12
The police take time to listen to people.	3.21 (1.05)	3.37 (0.99)	−2.28*	154	0.18
The police treat people fairly.	3.01 (1.10)	3.14 (1.12)	−1.74*	154	0.14
The police respect citizens' rights.	3.46 (0.95)	3.49 (1.08)	−0.37	154	0.03
The police are courteous to citizens they come into contact with.	3.41 (0.96)	3.45 (0.98)	−0.65	154	0.05
The police treat everyone with dignity.	2.72 (1.10)	2.88 (1.07)	−2.18*	154	0.17
The police make decisions based on the facts.	3.08 (0.97)	3.27 (0.98)	−2.56**	154	0.21
The police provide the same quality of service to all citizens.	2.17 (1.17)	2.46 (1.11)	−3.50***	154	0.28
The police enforce the law consistently when dealing with people.	2.33 (1.13)	2.67 (1.10)	−4.58***	154	0.37
The police make sure citizens receive the outcomes they deserve under the law.	2.90 (1.09)	3.10 (1.08)	−2.44**	154	0.20
Crime levels in my neighbourhood have changed for the better in the past year.	2.96 (0.83)	2.92 (0.82)	0.56[a]	155	−0.04
There are not many instances of crime in my neighbourhood.	3.55 (1.12)	3.37 (1.16)	2.12[a]*	155	−0.17
I feel safe walking in my neighbourhood at night.	3.44 (1.31)	3.25 (1.34)	2.76[a]**	155	−0.22

[a] Items indicate that the change was in the opposite direction to what was expected (i.e., higher Police Legitimacy Scale scores at the preintervention than at the postintervention).
* $p < .05$. ** $p < .01$. *** $p < .001$.

$\Delta R^2 = 0.008$, $\Delta F(1, 146) = 2.01$, $p = .158$. This suggests that preintervention PLS scores did *not* moderate the impact of the educational intervention on use-of-force knowledge.

For all of the models focusing on demographic variables, the preintervention aggregate score for the endorsement of use-of-force beliefs was included in the first step along with the relevant demographic variable (sex, personal experience with law enforcement, and political attitudes). In the second steps of these models, the interaction term between the preintervention aggregate score for the endorsement of use-of-force beliefs and the demographic variable was added. The addition of the interaction terms for sex, $\Delta R^2 = 0.003$, $\Delta F(1, 149) = 0.79$, $p = .375$; personal experience with law enforcement, $\Delta R^2 = 0.001$, $\Delta F(1, 149) = 0.25$, $p = .617$; and political attitudes, $\Delta R^2 = 0.006$, $\Delta F(2, 135) = 0.63$, $p = .534$, did not account for a significant amount of variance in postintervention aggregate scores for the endorsement of use-of-force beliefs. This suggests that the demographic variables did not moderate the impact of the educational intervention on knowledge of police use of force.

Discussion

The findings from this study demonstrate that the participants endorsed certain misconceptions about police use of force but that an educational intervention was associated with a reduction (albeit not always large reductions) in many of these misconceptions. The findings also suggest that this educational intervention was associated with significant increases in perceptions of police legitimacy. Below, we discuss each of these findings and explore their potential implications.

Public Understanding of Police Use of Force

As expected, based on previous research, the participants in this study lacked an understanding of certain issues surrounding police use of force. For example, they significantly overestimated the frequency with which force is used, the accuracy of marksmanship skills, and the amount of training police officers receive. They also lacked an understanding of certain issues related to use-of-force dynamics, the lethality of tasers, and reasons why officer testimony may contradict body-worn camera footage.

Interestingly, almost half of our participants reported getting most of their knowledge about police use of force from university/college courses. While untested, it is possible that some university courses that our participants have taken may be perpetuating misunderstandings about police use of force, even if this is unintentional. For example, "critical criminology" courses, which endorse a more critical view of criminal justice issues, appear to be popular amongst the students at our institution (nearly 30% of our participants were criminology students). These courses often emphasize topics like social justice, abuses of power, and criminal justice failings, which, if not accompanied by balanced data, may result in misunderstandings about police use of force, such as how frequently it is used and how much physical harm it causes. Likewise, media (including social media) accounts of police use of force may also partially explain our results, especially given that over one third of participants reported getting much of their knowledge about policing from media sources. Like some university courses, the emphasis in much of the media on negative policing incidents (e.g., deaths caused by police use of force) and the rise of police militarization (e.g., the increasing use of special weapons and tactics teams) may result in public misunderstanding of police use of force.

On a psychological level, exposure to these topics in university courses or through the media may encourage students to rely on various heuristics—"intuitive judgements" or mental shortcuts—when forming views about the use of force, which may lead to misconceptions (Tversky & Kahneman, 1974). We believe that a reliance on three specific heuristics, in particular, may explain some of our findings. Firstly, the *availability* heuristic leads people to make likelihood estimates—like how frequently police use force—based on how easily instances of such incidents come to mind (Tversky & Kahneman, 1974). If students are frequently exposed to incidents where officers used force during police–citizen encounters (e.g., CBC News, 2023; Slugoski, 2020; Tunney, 2020), this may lead them to believe that police use of force occurs more frequently than it does. The *affect* heuristic, on the other hand, refers to instances where a person relies on their emotions to make a judgement (Finucane et al., 2000). Observing events that elicit negative emotional reactions—such as seeing a subject shot in the back—may lead to immediate judgements that the force was unjustified without considering use-of-force dynamics (e.g., the fact that the subject may have been facing the officer at the time the officer pulled their trigger). Lastly, the *representativeness* heuristic may lead one to overestimate the chance of an event occurring due to its similarity to an existing mental prototype (Tversky & Kahneman, 1974). For example, to the extent that well-known incidents of taser use—such as the death of Robert Dziekanski at the Vancouver International Airport in 2007—act as prototypes, people might believe that conducted energy weapons often cause death despite research to the contrary (e.g., Bozeman et al., 2009; Mesloh et al., 2008; White & Ready, 2007).

If an inappropriate reliance on heuristics explains the lack of understanding that participants exhibit with respect to certain issues related to police use of force, what then explains the knowledge that is shown when it comes to other issues, such as the role of attention in memory formation, or the fact that people may be unaware when they have been shot? In this study, knowledge in these areas may relate to information shared with students in other university courses they have taken, in particular psychology classes. Sixty-two percent of our participants were psychology majors, and the participants in this study were all enrolled in an upper-year psychology class, which required prerequisite classes to gain entry to the course. Core content in our psychology classes relates to fundamental topics in psychology—such as memory and the effects of stress on bodily functions—topics that relate directly to those questions where accurate preintervention responses were provided by most of our participants.

Effect of the Educational Intervention

The educational intervention that was provided to participants in our study was associated with a significant (albeit somewhat limited) impact on overall knowledge and on six of the nine belief items that were examined as part of this study. Like the previous psychology courses that our participants might have benefitted from, this intervention may have helped reduce the inappropriate reliance on heuristics similar to those described above and instead encouraged the participants to rely on the factual information provided during the intervention. Importantly, the intervention appeared to significantly

improve knowledge for participants with diverse views about police legitimacy and diverse demographic characteristics.

This suggests that the intervention may have had a fairly robust effect on knowledge accumulation, which is promising for those interested in scaling such interventions to target the broader public. That being said, there are two important caveats associated with this finding. Firstly, participants in our study were university students; who were predominantly White, female, and young; and who had few negative interactions with law enforcement officers (if they had any interactions at all). It is therefore highly possible that the effects of the educational intervention would differ if we investigated its impact on other participants, particularly those from more marginalized groups who have had more negative interactions with the police (e.g., young Black men; Samuels-Wortley, 2021).

Secondly, it is also important to highlight the fact that the intervention did not result in very large knowledge gains or even statistically significant knowledge gains for every item that was examined. As argued above, this may be because our participants already possessed knowledge about some topics (e.g., memory, stress), but it could also be a function of the intervention itself. In hindsight, the intervention did not focus as thoroughly on some of the issues we examined in this study (e.g., police training),[4] as it did on other issues (e.g., frequency of the use of force), which might explain the pattern of results we observed. If this is the case, it suggests that refinements to the intervention, which we are currently exploring, could have a broader impact on the knowledge that is gained. Of course, it could also be that perceptions about police use of force are generally resistant to change and that some perceptions are more resistant to change than others for some reason.

Another by-product of the intervention is that it was significantly associated with improvements in perceptions of police legitimacy—with the exception of the *police effectiveness* factor of the PLS. While this improvement was small in magnitude, these findings suggest that perceptions of police legitimacy may be impacted by improving knowledge of police use of force. In other words, it is likely that the material that was delivered during the intervention directly affected perceptions of key constructs that underlie perceptions of police legitimacy, such as distributive fairness, procedural justice, and police lawfulness (Tankebe et al., 2016), or that increased knowledge of police use of force indirectly affected perceptions of these things. Regardless of the mechanism, it is useful for police services to be aware that perceptions of police legitimacy (for the most part) have the potential to be impacted through public education efforts, at least to some extent and in the short term—a point we will return to below. However, here too, it is important to contextualize this finding and to remind readers of our participant demographics. The fact that perceptions of police legitimacy can be enhanced by exposing predominantly young, White, female, university students to an educational intervention about police use of force does not mean that the same finding would emerge for other groups of individuals.

It is also noteworthy that the intervention was associated with having more *negative* perceptions of the *police effectiveness* factor of police legitimacy immediately following the intervention. Previous research from our lab found that the concept of police effectiveness may be less related to the construct of police legitimacy in a Canadian sample (Ewanation et al., 2019). The authors of that study hypothesized that this may be because many Canadians may not be particularly concerned about crime levels and personal safety given that Canada is generally a peaceful country (i.e., Canadians do not consider these issues when thinking about police legitimacy). It is possible that participants in the present study had more negative perceptions of police effectiveness immediately following the intervention because it is affected by factors that police services can only partially control, such as the actions of offenders—something that the intervention may have made clear and more obvious to participants.

Implications

The present study has several important implications. First and foremost, it suggests that it may be possible to improve public knowledge of police use of force, to a degree at least. What is less clear is whether this can be accomplished using a more practical approach than a 6-hr intervention and whether the magnitude of knowledge gain can be further increased. Clearly, an online intervention may be effective given that this is what we used in the present study; however, there would be value in examining how short this intervention can be while still having a significant impact on knowledge and whether changes to content and/or the delivery mechanism (e.g., increased interactivity) can increase the degree of knowledge change. For the intervention to be applicable in broader public settings, a more concise version of the current intervention will be necessary. Before any of these issues are examined, however, it will be important to determine whether educational interventions can have a meaningful impact on other types of participants, particularly those from marginalized groups who have more negative perceptions of the police (Cao, 2011) and experience more negative interactions with them (Wortley et al., 2020).

Secondly, the fact that knowledge gains seem to be associated with some (albeit small) improvements to perceptions of police legitimacy is likely to be beneficial, especially if this can be replicated in other, more diverse samples (including marginalized populations) and the magnitude of the change can somehow be intensified. Enhanced perceptions of police legitimacy may open doors for more meaningful and informed conversations to take place between the police and the communities they serve. Other benefits of improving perceptions of police legitimacy may include increases in law-abiding behaviours and cooperation with the police (e.g., Jackson et al., 2012; Perry, 2021; Tyler, 2005), reductions in crimes which may free up police resources (Sunshine & Tyler, 2003), and increases in public perceptions of safety (e.g., Breen & Johnson, 2007; Nofziger & Williams, 2005).

Thirdly, the findings from this study suggest it might be possible to improve trier-of-fact decision making. Frequently, individuals who review use-of-force incidents (e.g., juries, judges, oversight bodies) have limited knowledge of police use of force (Johnson, 2007), which has the potential to negatively influence decision making. For other types of incidents (e.g., cases involving battered women who kill their husbands), the use of subject matter experts in court has been found to have a positive impact on courtroom decision making (e.g., Bornstein, 2004; Levett & Kovera, 2008; Schuller, 1992). While we could not locate any research showing the same impact in cases involving police use of force, our results suggest that subject matter

[4] For example, with respect to police training, the intervention made it clear that use-of-force training is often suboptimal with respect to the amount of time dedicated to this topic, but the intervention did not describe in detail the number of training hours that police officers in Canada receive.

experts may be able to successfully educate triers of fact on these issues, which should result in fairer, more just decisions being made.

A final implication of the study relates to the potential to improve the media's portrayal of policing and police use of force specifically. As mentioned earlier, the media plays an important role in communicating information to the public and can have a significant impact on public perceptions (Donovan & Klahm, 2015; Lewandowsky et al., 2012; Miethe et al., 2019), and results from the present study suggest that people are likely to obtain a lot of information about policing from the media. However, the media often perpetuates erroneous beliefs pertaining to police-related issues and events where the police have used force (e.g., BBC News, 2018; Samaha, 2017; Scott, 2018). Taking steps to educate the media about police use of force may change how reporters discuss it (e.g., Nicholson, 2018), which could then help increase public understanding of these issues as well.

Limitations

There are five important limitations associated with the present study that warrant discussion. The first is that while the intervention provided to the participants as part of their mandatory course requirements, there was no way to ensure that students fully completed (and paid attention to) each section of the intervention. Given the results we observed, it seems likely that most of them did, but in future research, it may be useful to implement methods for tracking this information (e.g., attention checks interspersed throughout the modules).

The second limitation relates to the sample. As discussed above, participants in the present study were university students who were predominantly White, young, and female, and most of these students have had positive interactions with the police if they have had any interactions with them at all. Of course, this sample is extremely limited, and it could be the case that very different results would emerge if we were to conduct this study with other samples, especially individuals from Indigenous and racialized groups and other communities (e.g., 2SLGBTQI+ [two-spirit, lesbian, gay, bisexual, transgender, queer, and intersex, with the "+" representing inclusivity of other identities]).

The third limitation relates to the lack of a control group (i.e., participants who responded to the pre- and postsurveys but did not receive the educational intervention). Future research should aim to implement a control group to better determine the degree to which the knowledge gain is related to the educational intervention as opposed to other factors (e.g., knowledge gained from other sources, such as other university courses being taken by participants or exposure to the media).

The fourth limitation is that the intervention targeted some topics more thoroughly than others, which may explain why we observed more significant knowledge gains for certain topics. In addition, the intervention was also very lengthy, making it impractical for broader public education campaigns. Moreover, the intervention did not adequately consider the social, cultural, and historical contexts surrounding police use of force, which is important in its own right and perhaps particularly so if we hope to engage with Indigenous, racialized, and other minority groups in future studies (e.g., historical mistreatment at the hands of the police, racial biases in use-of-force statistics, the rise of police militarization). Designing a streamlined intervention that adequately covers key target areas and contextualizes them appropriately is a major goal for our future research. We are currently engaging with Indigenous and racialized community members to facilitate this.

The final limitation is related to the follow-up surveys. Only a fraction of participants in this study completed the 6- and 12-month follow-up surveys, and the collection of these data was staggered (i.e., data were collected at different time points for different participants). Future research should examine similar issues to those explored in the present study with adequate sample sizes to allow for more robust inferences to be drawn about knowledge gain and knowledge retention over time.

Conclusion

Overall, this study suggests that an educational intervention has the potential to modestly improve university students' knowledge of use-of-force issues, regardless of their initial perceptions of police legitimacy. This study also suggests that police legitimacy may also improve to a degree as a result of this learning. Together, these results suggest that it might be possible to improve knowledge of police use of force more broadly amongst members of the public, triers of fact, and the media using a scalable version of the current intervention. This is something that we are currently exploring, and we hope others will too as the impact of such an intervention could be significant.

Résumé

Le public ne semble pas avoir une bonne compréhension du recours à la force par la police. Pour tenter d'y remédier, la présente étude a examiné dans quelle mesure les étudiants universitaires comprennent les différentes questions relatives au recours à la force et a cherché à déterminer si une intervention éducative pouvait améliorer cette compréhension. Cent soixante étudiants d'une université canadienne ont répondu à une enquête avant et après avoir suivi un module en ligne de six heures sur le recours à la force par la police. Nous avons effectué des analyses comparatives pour évaluer les différences entre les enquêtes avant et après l'intervention, et avons utilisé une analyse de régression pour déterminer si les perceptions de la légitimité de la police et diverses variables démographiques modéraient l'impact de l'intervention éducative sur la connaissance du recours à la force par la police. Les résultats ont montré que l'intervention a amélioré la compréhension des participants sur les problèmes liés au recours à la force, indépendamment de leur perception initiale de la légitimité de la police et de leurs variables démographiques. Les résultats indiquent également que les perceptions de la légitimité de la police se sont améliorées après l'intervention. Si elle est reproduite avec des échantillons plus diversifiés, une intervention éducative similaire à celle explorée dans cette étude pourrait améliorer la compréhension des recours à la force et la perception de la légitimité de la police par le public. Cela pourrait également permettre d'éduquer les jurés, les avocats et les juges et de modifier la manière dont les médias traitent les questions relatives au recours à la force.

Mots-clés : recours à la force, intervention éducative, légitimité de la police, croyances, heuristique

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