Bachelor Thesis

Augmented Reality in Daily Policing: Effects on Citizens' Willingness to Cooperate, Legitimacy Perceptions and Privacy Concerns.

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Abstract

Currently, the Dutch police are considering implementing Augmented Reality (AR) glasses for officers on duty, which need to be tested on citizens beforehand to avoid adverse consequences. Therefore, this online experiment aims to investigate possible effects of AR-glasses on citizens' willingness to cooperate, their legitimacy perceptions and to assess possible privacy concerns. This quantitative study used a 3 (type of technology: traditional, mobile phone, AR-glasses) x 3 (type of information: navigation, notification, facial recognition) design. Participants (N = 135) were randomly allocated to one out of nine conditions, in which they were shown a video (the manipulation) followed by several questions about the study variables. Accordingly, the video entailed a police officer explaining the type of technology he is using, and for which purpose the device is used, namely the type of information. Results indicate that the more participants viewed the police as a legitimate authority, the more they were willing to cooperate. Furthermore, the use of AR-glasses did not increase citizens' willingness to cooperate. Next, legitimacy seems to not influence the overall relationship of type of technology and citizens' willingness to cooperate, since the interaction turned out to be only marginally significant. However, correlation analyses pointed to the direction that legitimacy might influence the relationship of type of technology and willingness to cooperate for participants encountering the police in a traditional manner or with a mobile phone. Lastly, participants who encountered the police with technology capable of facial recognition seem to have higher privacy concerns compared to participants who encountered the police in a traditional manner. All in all, this research suggests that AR-glasses do not seem to have a different effect on citizens' willingness to cooperate and their legitimacy perceptions compared to a traditional manner or a mobile phone. Whereas technologies, such as mobile phones and AR-glasses, raise privacy concerns when they are utilised for facial recognition purposes. Concludingly, it can be said that the police may implement AR-glasses in daily policing, however, they may avoid using AR-glasses for facial recognition purposes.

Keywords: Police, Augmented Reality, willingness to cooperate, legitimacy, privacy, facial recognition

Augmented Reality in Daily Policing: Effects on Citizens' Willingness to Cooperate, Legitimacy Perceptions and Privacy Concerns.

In 2016, a study of the Cambridge University found that after the implementation of body-worn cameras (BWC) by the police, citizens' assaults on officers increased. Prior to the implementation of BWCs, however, it was predicted that citizens would be more cooperative, and the citizen-police relationship would improve (Ariel et al., 2016). Such study shows how important it is to properly test new technologies before they are implemented in policing.

In fact, in the police domain most technologies are implemented without prior research, as well as they continue to be implemented without evaluation research about their effects (Lum & Koper, 2017; Lum, Stoltz, Koper, & Scherer, 2019). Currently, the Dutch Police are considering implementing new technology in their daily policing, namely Augmented Reality. Augmented Reality (AR) is a technology with which users perceive virtual objects superimposed/composited with their environment (Lukosch, Lukosch, Datcu, & Cidota, 2015). By now, there are only few studies investigating the effects on citizens regarding the use of AR in policing. Specifically, the majority of previous studies solely focused on the use of AR for crime scene investigations rather than for officers on duty (Engelbrecht & Lukosch, 2020). Hence, it is of importance to assess possible consequences of the implementation of AR-glasses in daily policing.

Accordingly, Deflem and Wellford (2019) suggested two assumptions about the implementation of technologies and their consequences in the police domain. To begin with, they assume that as long as existing structures of the police will not be changed by the implementation of new technologies, outcomes with regards to citizens' reactions will not be negative. Second, they found that if technologies are implemented without prior set objectives and goals, there is a higher risk of failure. Such failure might result in, for example, negative attitudes of the citizens, which subsequently, could result in adverse, non-expected consequences for officers and citizens (Deflem & Wellford, 2019; Lum, Koper, & Willis, 2016). Specifically, non-expected consequences could be citizens' increased privacy concerns or less willingness to cooperate (Sousa, Miethe, & Sakiyama, 2017). In fact, the polices' main objective, namely security, can only be achieved by the cooperation between police and the citizens (Deflem & Wellford, 2019; Sampson, Raudenbush, & Earls, 1997).

Therefore, this study investigates the effects of police officers wearing AR-glasses on citizens' willingness to cooperate, their legitimacy perceptions, and their privacy concerns. In order to investigate such effects, theoretical frameworks are utilised. Specifically, the study

utilises the 'Two-Stage Process-Based Model of Regulation (PBMR)' which focuses on perceived procedural justice and legitimacy of the police and resulting willingness to cooperate (Tyler, 1990). However, only legitimacy is taken into account. Subsequently, a framework is utilised which assess citizens' privacy concerns regarding the implementation of new technologies by authorities which was developed by van Zoonen (2016). Afterwards, previous studies are taken into account to derive hypotheses. Lastly, the experiment is outlined in order to allow replicability of the study followed by the results and a general discussion.

Augmented Reality

As aforementioned, one technology which is considered to be used in daily policing is Augmented Reality. AR is also called "the middle ground" between artificial and real reality (Kipper & Rampolla, 2013, p. 1). It takes on different digital and computer-generated information such as images, audios, and videos which are then incorporated into a real-live environment. Notably, Kipper and Rampolla (2013) claim that the most common stimulation is visual stimulation. Also, there are several different technological devices which can be used with AR, such as computers, smartphones, and glasses. AR-glasses, for example, enable the user to receive a continuous AR feed based on individual needs and preferences, such as real-time navigation to places (Kipper & Rampolla, 2013). As shown, there are several opportunities to use AR, however, the current study will concentrate on the use of AR-glasses.

AR-Glasses and Citizens' Willingness to Cooperate

As briefly outlined, studies have shown that the implementation of new technologies could lead to a decrease in citizens' willingness to cooperate (Sousa et al., 2017). However, in order for the justice system to work, and its main objective security to be achieved, citizens need to cooperate with the police (Deflem & Wellford, 2019). Accordingly, Tyler (1990) developed the two-stage process-based model of regulation (PBMR). The PBMR is one of the most empirically supported compliance theories, focussing on the internalisation of values regarding citizens' cooperation with authorities (Baz & Fernández-Molina, 2017). It emphasises the role played by the public opinions of procedural justice and legitimacy beliefs of authorities, such as the police. Respectively, Tyler (2006) defines legitimacy as "a psychological property of an authority, institution, or social arrangement that leads those connected to it to believe that it is appropriate, proper, and just." (p. 365).

In particular, two stages are making up the PBMR. First, citizens perception of procedural justice and second, their perception of the legitimacy of the police. Research

indicates that when citizens view the police as performing their duties with procedural justice, they are more likely to cooperate and comply with the law (Tyler & Fagan, 2008). Furthermore, the belief of the police being a legitimate authority has been shown to directly correlate with citizens' willingness to cooperate (Bolger & Walters, 2019; Reisig & Lloyd, 2009; Tyler & Fagan, 2008). All in all, the PBMR predicts that perceptions of procedural justice lead to the perception of the police as a legitimate authority. These perceptions, in turn, lead to citizens' cooperation with the police (Bolger & Walters, 2019).

Yet, a meta-analysis with longitudinal studies indicated that the relationship of legitimacy beliefs and citizens' willingness to cooperate was significantly stronger than the relationship of procedural justice and citizens' willingness to cooperate (Walters & Bolger, 2018). Hence, this indicates that citizens' willingness to cooperate is primarily dependent on their perception of the police as a legitimate authority. Consequently, this study will only take perceptions of legitimacy into account, and thus, disregard procedural justice.

With regards to the current study and taking the above into account, one can predict that there is a positive effect of citizens' perceptions of the legitimacy of the police on their willingness to cooperate (H1).

Next, the use of new, efficient technologies by the police could increase citizens' willingness to cooperate. For instance, Cowper and Buerger (2003) conducted a study for the Federal Bureau of Investigation (FBI) to investigate the potential use of AR in combination with policing. Results of the FBI study suggest that AR is a way to improve and enhance the ability to accomplish several tasks simultaneously since situational awareness can be greatly improved. Their study demonstrated that one officer equipped with AR can fulfil the same number of tasks as three unequipped officers since information processing and decision making can be done almost concurrently. Hence, AR seems to increase the effectiveness of the police (Cowper & Buerger, 2003; Denning, 2002). Thus, using effective methods, such as AR, could lead to a higher willingness to cooperate.

Taking the aforementioned into account, the current study investigates the citizens' willingness to cooperate and legitimacy perceptions of the police in different conditions. In these conditions the citizen encounters a police officer who is either using no technology, using a mobile phone or wearing AR-glasses.

Considering that efficient technology could increase citizens' willingness to cooperate, it is predicted that there is a main effect of type of technology (traditional, mobile phone, AR-glasses) on citizens' willingness to cooperate. Specifically, it is hypothesised that the use of AR-glasses positively affects citizens' willingness to cooperate compared to the use of no

technology or to the use of a mobile phone (H2).

In addition, the predicted main effect of type of technology on willingness to cooperate could depend on legitimacy. In fact, previous research suggests that legitimacy is a moderator of citizens' willingness to cooperate (Murphy, 2013; Sunshine & Tyler, 2003). For example, a study of Lammers, Galinsky, Gordijn, and Otten (2008) showed that the effect of their study's independent variable, namely power, on citizens' cooperation was dependent on their legitimacy perceptions. Similarly, it can be assumed that citizens who encounter the police using efficient technologies might be more cooperative the more they perceive the police as a legitimate authority.

Hence, it is predicted that legitimacy moderates the relationship of the type of technology and willingness to cooperate. To be more specific, it is hypothesised that the effect of legitimacy on willingness to cooperate is the strongest for the AR-condition compared to the traditional or mobile phone condition (H3).

AR-Glasses and Citizens' Concerns of Privacy

Not only the willingness to cooperate might be influenced by newly implemented technologies by the police, but also new technologies could bring issues such as privacy concerns held by citizens. Van Zoonen (2016) came up with a framework which offers an instrument to understand and assess possible privacy concerns held by citizens regarding the implementation of technologies by authorities.

The framework consists of two factors influencing privacy concerns which are placed on two dimensions, which then identify four possible types of privacy concerns. The first factor encompasses the types of data involved, such as biometric measured data which, for example, includes facial recognition. In contrast, the second factor is the purpose of data collection and data usage, for instance, data collection for surveillance purposes. The continuum of the type of data involved ranges from impersonal to personal, whereas the purpose of usage of the data ranges from service to surveillance. Van Zoonen (2016) claims that impersonal data, such as navigation used for services purposes hardly raise any privacy concerns. However, if the data is personal, such as facial recognition, and the data will be used for surveillance purposes citizens might be raising controversy and, consequently, might be concerned with their privacy.

In general, individuals tend to assess for which purpose the data is used and weigh the benefits that providing their data might offer (van Zoonen, 2016). If citizens have the perception that authorities use their power to gather biometric data for surveillance purposes, they might feel violated in their privacy. In fact, a wired police officer equipped with

technologies purposely designed to reach beyond human capabilities and assess personal, sensitive information could cause severe public resistance to such technology. Therefore, citizens might become concerned when 'big brother' capabilities can identify a citizen without their awareness and/or permission, such as facial recognition with the use of AR-glasses (Kipper & Rampolla, 2013; van Zoonen, 2016).

Next to that framework, several studies found that newly implemented technologies increased citizens' privacy concerns. For instance, Cowper and Buerger (2003) raised awareness of the privacy concern when using AR in policing, since the core component of AR is a constantly recording camera. Accordingly, studies of Miller and Toliver (2014), as well as Sousa et al. (2017), revealed that citizens seemed to be worried about the usage of recorded material by technologies incorporating a constantly recording camera. This, in turn, affected their willingness to cooperate. Moreover, one study investigating the effects of facial recognition technologies with regards to privacy concerns revealed that the majority of the participants expressed worries about their personal privacy. Participants believed that advanced technologies affect the balance of power between the government and themselves (Nakar & Greenbaum, 2017). In sum, previous research suggests that technologies incorporating a constantly recording camera, as well as facial recognition technologies, raise privacy concerns in citizens.

As aforementioned, Cowper and Buerger (2003) conducted a study for the FBI with regards to AR and its potential use for officers on duty. In addition, they suggested different fields of the application of AR, among others the implementation on patrol. Officers on patrol could use AR, first, for navigation purposes. In that case, 3D maps could be presented to the officer to improve spatial awareness and enable navigation. Second, officers could use AR to receive live notifications about crimes and criminals in their area. Finally, they could use AR to receive biometric recognition data, such as facial recognition, for instantaneous identification of wanted suspects (Cowper & Buerger, 2003).

Altogether, the current study will utilise the framework predicting privacy concerns which was developed by van Zoonen (2016). Additionally, the three proposed application fields of AR in policing (navigation, notification, facial recognition) will function as the type of information the police officer receives (Cowper & Buerger, 2003). In fact, it seems that the framework predicts that personal data used for surveillance purposes raise citizens' privacy concerns. Taking into account the FBI's proposed applications for AR in daily policing, one can suggest that the facial recognition condition used for surveillance purposes entails highly

personal data. In addition to that, considering that AR-glasses entail a constantly recording camera this type of technology seems to raise the highest concerns.

Therefore, taking all the above into account, it is predicted that participants in the AR-glasses-facial recognition condition have higher privacy concerns compared to the participants in the traditional-facial recognition condition and the mobile phone-facial recognition condition. In other words, it is hypothesised that when the police officer utilises the gathered information for facial recognition, the usage of AR-glasses by the police will lead to higher privacy concerns of citizens compared to the usage of no technology or mobile phones (H4).

Methods

Study Design

This online experiment used a 3 (type of technology: traditional vs mobile phone vs AR-glasses) x 3 (type of information: navigation vs notification vs facial recognition) between-subjects factorial design. The Dependent Variables were 'willingness to cooperate' and 'privacy concerns', whereas the Independent Variables were 'type of technology' and 'type of information'. 'Legitimacy' is predicted to be a moderator of the effect of type of technology on willingness to cooperate.

Participants

The sample of the current study consisted of 189 participants. However, based on two exclusion criteria, 54 cases were filtered out. Exclusion criteria included the completion of the questionnaire. If participants did not finish the questionnaire, their responses were excluded (n = 49). A second criterium was accepting the informed consent. Some participants did not agree with the informed consent and were, thus, forwarded to the last page (n = 5). Hence, the final sample of this study comprised 135 participants, whereby 64% (n = 87) were female and 36% (n = 48) were male. The average age of the participants was approximately 33, including ages ranging from 14 to 76 (M = 32.91; SD = 16.43). Two participants did not fill out their ages, however, they were not excluded from the study to keep as much data as possible. With regards to the nationality, 90% (n = 121) were Dutch, 9% (n = 12) were German, and 1% stated to be of different nationality. The majority, namely 52% of the participants were living in a city (n = 70), whereas 46% were living in a town (n = 62). The remaining 2% indicated 'other' (n = 3). Furthermore, 46% (n = 62) of the participants were students, whereas 44% (n = 59) of the participants were working. The remaining 10% indicated 'other' (n = 14). Students of the University of Twente in the Netherlands received 0.25 SONA-points as compensation for their

efforts to take part in this study. Lastly, participants were randomly allocated to nine different conditions of the online experiment (see Table 1).

Table 1

Allocation of Participants to the Conditions

Condition	Participants (*n*)
1. Traditional-navigation	14
2. Traditional-notification	18
3. Traditional-facial recognition	13
4. Mobile phone-navigation	15
5. Mobile phone-notification	16
6. Mobile phone-facial recognition	14
7. AR-glasses navigation	16
8. AR-glasses-notification	15
9. AR-glasses-facial recognition	14

Procedure

Online experiment. Before the online experiment was published and distributed, the study was ethically approved by the BMS ethics committee of the University of Twente, the Netherlands. Importantly, the questionnaire, as well as the videos, were in Dutch to ensure a realistic display of a Dutch police officer. Therefore, it was crucial for participants to speak and comprehend Dutch. At first, participants were informed about the study by means of a short introduction of the experiment. However, they were not fully informed but received a cover story in which the actual goal of the study was initially withheld. The cover story entailed that this research is intended to assess citizens' attitudes of the Dutch police, not including the intention of testing AR. Included in the introduction was an informed consent, informing the participants about their rights which they had to agree to in order to take part (see Appendix A). After giving informed consent, participants were forwarded to the online questionnaire and randomly allocated to one of the nine conditions. Participants were then asked to answer questions with regards to different variables which were measured (see Appendix B). Subsequently, the participants had to watch a short video clip of the police officer explaining his daily work activities. After watching the video and answering all the remaining questions regarding the constructs, participants were forwarded to the last page. There, they were thanked for their participation and were fully debriefed about the actual goal of this study, namely the

investigation of citizens' attitudes regarding the usage of technology by the police with special attention to AR-glasses (see Appendix C).

Manipulation. To each of the nine conditions belonged one specific video, each video entailing different types of information (navigation, notification, facial recognition) using different types of technology (traditional, mobile phone, AR-glasses). Overall, the videos had a length of approximately one minute, presenting a police officer who was explaining his daily duties including the type of technology and the purpose of these devices, namely the type of information. In the type of technology condition, the police officer was either using his knowledge, his mobile phone or AR-glasses whilst explaining what he does with the technology accordingly. Then, the officer explained the type of purpose he is using the technology for, namely either as a navigation device, for receiving live notifications, or as a facial recognition device. For example, one participant could have been in the traditional-navigation condition, in which the police officer was using no technology to navigate around the area. Contrastingly, another participant could have been in the AR-glasses-facial recognition condition, in which the police officer was wearing AR-glasses and was explaining that he can use these glasses for scanning faces he/she encounters to find wanted suspects. All in all, the videos were recorded in a manner that they are highly similar to ensure standardization and avoid bias. For the script of the videos, see Appendix D.

Measures

Demographics. To begin with, demographics such as age, gender, nationality, occupation, and current area of residency (city, town, other) were requested.

Citizens' willingness to cooperate. In order to measure citizens' willingness to cooperate, three items were included in the questionnaire (see Appendix B). The items were derived from an already validated questionnaire developed by Sunshine and Tyler (2003). Participants were asked to indicate the likelihood of action with regards to statements like 'Call the police to report a crime occurring in your neighbourhood?'. The items were measured on a 5-point Likert-scale ranging from 1 (very likely) to 5 (very unlikely). In order to calculate an average score, the three items were added together. A high score on this scale indicated that participants were likely to cooperate.

Legitimacy. Perceived legitimacy of the police was measured using 21 items which were developed by Tyler and Fagan (2006). However, these 21 items were split up in three different categories, namely 'obligation', 'trust', and 'confidence' (see Appendix B). The category 'obligation' entailed items like 'You should do what the police tell you to do even

when you do not like the way they treat you'. Further, the category 'trust' included items like 'I trust the leaders of the Dutch police to make decisions that are good for everyone in the city'. Lastly, the category 'confidence' entailed items like the following 'You can usually understand why the police who work in your neighbourhood are acting as they are in a particular situation'. Next to that, the items were measured on a five-point Likert-scale ranging from 1 (totally disagree) to 5 (totally agree). To get an overall score of the 21 items, the items were added, and an average score was calculated. Overall, a high score on this scale indicated that participants were perceiving the police as a legitimate authority.

Privacy. Privacy was measured using one item which was derived from a questionnaire developed by Heen, Lieberman, and Miethe (2017). The item was measured on the same Likert-scale as legitimacy, ranging from 1 (totally disagree) to 5 (totally agree). Participants were asked to either agree or disagree with the following statement depending on the condition they were in: 'The use of knowledge/a mobile phone/AR-glasses by the police violates my personal privacy' (see Appendix B). A high score on this scale indicated that participants believed that the use of either method invades their privacy.

Results

Preliminary Analyses

Table 2 presents the means, SDs, Cronbach alphas, and inter-correlations among the variables under investigation.

Table 2

Means, Standard Deviations, Cronbach's alpha, and Inter-Correlations of the Variables

	M	*SD*	*α*	1.	2.	3.	4.	5.
1. Gender	1.64	.48		--				
2. Age	32.91	16.43		-.31**	--			
3.Willingnes to Cooperate	4.13	.75	.83	.11	.14	--		
4. Legitimacy	3.58	.37	.81	.25**	-.08	.35**	--	
5. Privacy	2.66	1.09		-.03	.13	-.18*	-.23**	--

Note. N = 135, N_{age} = 133, Pearson's r was calculated to examine the correlation between all variables *p<.05, **p<.01, two-tailed. For gender, 1 = male; 2 = female.

Scale analyses. As depicted in Table 2, one can see that overall the measures have high internal reliability. With regards to the sub-scales of legitimacy, 'obligation' was found very

reliable to use (α = .86), 'trust' was found very reliable to use (α = .83), as well as 'confidence' was found very reliably to use (α = .80). Further, the factorability of the legitimacy scale was examined. The Kaiser-Meyer-Olkin measure of sampling adequacy was .87, which is above the recommended value of .6, as well as Bartlett's test of sphericity was significant, χ^2 (210) = 1298.16, $p < .001$. Eigenvalues indicated that five factors are underlying the items. However, using the elbow criteria, one can extract three factors. The first three factors explained 53.38% of the variance in total. Accordingly, the first factor explained 35.56% of the variance, the second factor explained additional 9.79%, whereas the third factor explained 8.03% of the variance. Taking into account all five factors, 63.96% of the total variance was explained. Nonetheless, the three-factor solution was preferred because of, first, its prior theoretical support, and second, by looking at the scree plot and using the elbow criteria from which one could extract three factors. Lastly, it was preferred because of the difficulty of interpreting the factor loadings of the items and not sufficient, clear loadings on the fourth and fifth factor.

Descriptive statistics. With regards to the descriptive statistics, participants indicated to perceive the police as a legitimate authority and to be very likely to cooperate. Further, on average participants seemed to be neutral with regards to their privacy concerns.

Correlation analyses. Correlation analyses revealed five significant correlations among the Dependent and Independent Variables. First of all, gender was negatively associated with age. As expected, willingness to cooperate was positively associated with legitimacy, having the highest significant correlation amongst the study variables. Also, willingness to cooperate was negatively associated with privacy. Finally, legitimacy had a positive association with gender, as well as a negative association with privacy.

Hypothesis Testing

Legitimacy and willingness to cooperate. First, to test the prediction that there is a positive effect of citizens' perception of the police as a legitimate authority on citizens' willingness to cooperate (H1), a linear regression analysis was conducted. The Dependent Variable was willingness to cooperate, whereas the Independent Variable was legitimacy. A simple linear regression revealed that legitimacy predicted willingness to cooperate, $b = .700$, t (134) = 4.32, $p < .001$. Legitimacy also explained 35% of the variance, $R^2 = .35$, F (1, 134) = 18.64, $p < .001$. Altogether, the results indicate that when legitimacy increases, so does the willingness to cooperate. Therefore, the first hypothesis can be accepted.

Moderation analyses. Second, to test the prediction that there is a positive main effect of type of technology (traditional, mobile phone, AR-glasses) on citizens' willingness to

cooperate (H2) and to test whether legitimacy moderates this effect (H3), a UNIANOVA was run. The Independent Variables were type of technology and legitimacy, whereas the Dependent Variable was willingness to cooperate. Results revealed that there was no significant main effect of type of technology on citizens' willingness to cooperate, F (2, 129) = 2.84, p = .062. Hence, the second hypothesis can be rejected. Furthermore, there was a significant effect of legitimacy on willingness to cooperate, F (1, 129) = 19.10, p < .001. Lastly, results revealed that there was no significant interaction effect of legitimacy on the relationship of type of technology and citizens' willingness to cooperate, F (2, 129) = 2.75, p = .068. Therefore, the third hypothesis can be rejected too. Nonetheless, the interaction effect turned out to be marginally significant, and hence, the data has been explored further.

Correlation analyses of legitimacy and willingness to cooperate for each type of technology revealed two significant correlations. To begin with, in the traditional condition, legitimacy and willingness to cooperate were significantly correlated, r (45) = .51, p < .001. Moreover, in the mobile phone condition, legitimacy and willingness to cooperate were significantly correlated too, r (45) = .34, p = .023. Whereas in the AR-glasses condition, legitimacy and willingness to cooperate were not significantly correlated, r (45) = .16, p = .286. Depicted in Figure 1 one can see that for participants in the traditional and mobile phone condition the willingness to cooperate was dependent on their legitimacy perceptions. Specifically, the more participants viewed the police as legitimate, the more they were willing to cooperate. However, the willingness to cooperate was the most dependent on legitimacy perceptions for participants in the traditional condition compared to the other two conditions. Objecting the third hypothesis, one can see that the willingness to cooperate was not dependent on legitimacy perceptions for participants in the AR-glasses condition.

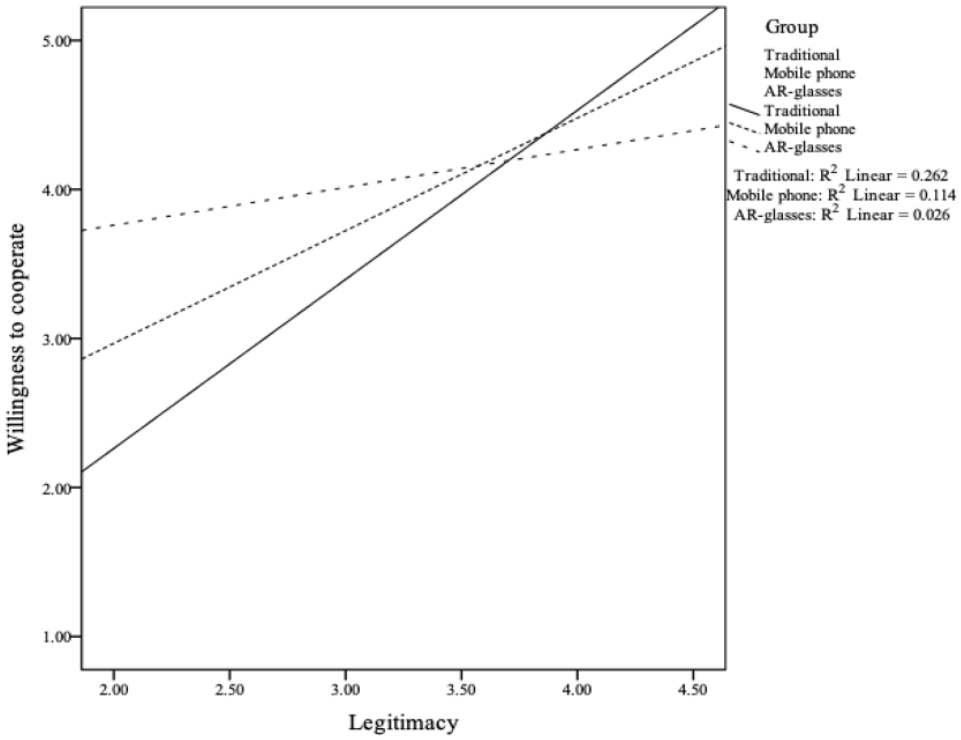

Figure 1. Interaction graph of willingness to cooperate and legitimacy for each of the three types of technology.

Facial recognition conditions and privacy concerns. The final hypothesis, which states that when the police use the gathered information for facial recognition, the usage of AR-glasses will lead to higher privacy concerns of citizens compared to when the police do not use any technology or mobile phones (H4), was tested by conducting a planned comparison One-Way ANOVA. The Independent Variable was type of information and type of technology (condition 3: traditional – facial recognition; 6: mobile phone - facial recognition; 9: AR-glasses - facial recognition) and the Dependent Variable was Privacy Concerns.

Results revealed that there were significant differences between the three groups with regards to their privacy concerns, F (2, 40) = 8.24, MSE = 1.10, p = .001. Since the Levene Test demonstrated that the homogeneity of variance assumption was not violated (p = .151), the hypothesis tests were based on equal variances. To begin with, there was a significant effect for the first comparison, which contrasted the AR-glasses facial recognition condition with the traditional – and mobile-phone- facial recognition condition, t (38) = 2.65, p = .012. The second contrast tested whether the mobile phone-facial recognition condition and the AR-glasses facial recognition condition were significantly different from the traditional facial recognition condition, which was found to be significant, t (38) = -3.99, p < .001. Lastly, the third contrast

compared the mobile phone-facial recognition condition with the AR-glasses-facial recognition condition. This comparison turned out to be not significant, t (38) = -.72, p = .477. Hence, these results suggest that participants in the technology conditions (mobile phone and AR-glasses) scored significantly different from participants in the traditional facial recognition condition. Concretely, participants in the traditional-facial recognition condition (M = 2.23, SD = .93) scored between 1.27 and 1.55 scores lower compared to participants in the mobile phone-facial recognition condition (M = 3.50, SD = 1.23) and the AR-glasses facial recognition condition (M = 3.78, SD = .97; see Figure 2). Therefore, the fourth hypothesis can be partially accepted.

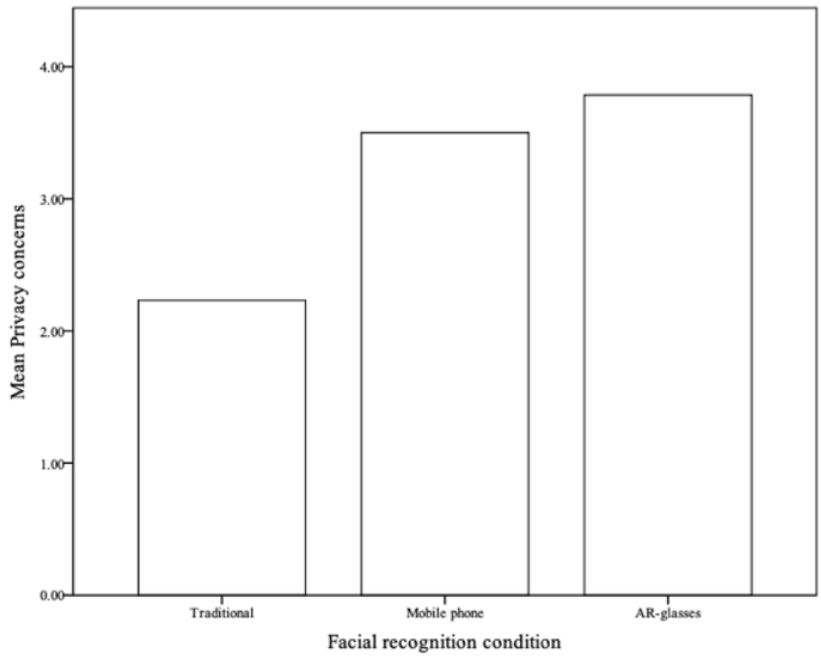

Figure 2. Means of the privacy concerns of the three facial recognition conditions (Condition 3,6,9).

Additional Explorative Analyses

Legitimacy and gender. A t-test revealed that there were significant differences between gender and their mean scores on legitimacy, t (133) = -2.98, p = .003. To be more specific, men scored lower (M = 3.46, SD = .43) than women (M = 3.65, SD = .37), indicating that men perceive the police as less legitimate than women do.

Type of technology and privacy. A UNIANOVA revealed that there were significant differences between the types of technology (traditional, mobile-phone, AR-glasses) with regards to their privacy concerns, F (2, 132) = 7.14, p = .001. Post hoc comparisons using the Bonferroni correction indicated that the mean score of the traditional condition (M = 2.17, SD

= .93) was significantly lower compared to the mean scores of the mobile-phone condition (M = 2.88, SD = 1.09, p = .005) and the AR-glasses condition (M = 2.91, SD = 1.10, p = .003). However, the mean scores of the mobile phone condition and AR-glasses condition did not differ significantly (p = 1.00). These results suggest that participants in the mobile phone and AR-glasses condition were more concerned with their privacy compared to participants in the traditional condition.

Type of information and privacy concerns. Using UNIANOVA analyses, it was tested if there are differences between the type of information (navigation, notification, facial recognition) and whether participants raised privacy concerns. Analyses revealed that there were significant differences between the types of information and resulting privacy concerns, F (2, 132) = 7.782, p = .001. Post hoc comparisons using the Bonferroni correction indicated that participants in the facial recognition condition scored significantly higher on privacy concerns (M = 3.20, SD = 1.10) than participants in the navigation condition (M = 2.42, SD = .87, p = .002) and participants in the notification condition (M = 2.43, SD = 1.02, p = .002). These results suggest that participants were concerned with their privacy with facial recognition technologies, whereas they were neutral when the police used technology for navigation and notification purposes.

Discussion

The current study aimed to assess citizens' attitudes as the police are considering implementing new technologies in daily policing. Specifically, this study investigated citizens' willingness to cooperate with the police, their legitimacy perceptions as well as their concerns of privacy with a focus on the implementation of AR-glasses. All in all, legitimacy seems to be a predictor of willingness to cooperate. Furthermore, legitimacy does not seem to moderate the effect of type of technology on willingness to cooperate. Nonetheless, the interaction was marginally significant, indicating that there may be an influence of legitimacy on the effect of type of technology and willingness to cooperate. More specifically, it seems that there may be an influence of legitimacy on the traditional and mobile phone condition and their willingness to cooperate but not on the AR-glasses condition. Lastly, participants raised privacy concerns in the facial recognition condition when the police were using a mobile phone or AR-glasses.

Hypothesis Testing

Legitimacy and willingness to cooperate. As predicted results suggest that there is an association between the perception of legitimacy and citizens' willingness to cooperate with

the police. In specific, the more citizens viewed the police as a legitimate authority, the more they were willing to cooperate with the police. This finding is in line with previous research, suggesting that legitimacy predicts citizens' willingness to cooperate (Bolger & Walters, 2019; Tyler & Fagan, 2008).

Hence, further improving citizens' view of the police as a legitimate authority might increase their cooperation, and therefore, be a protective factor against crime (Tyler, 1990; Tyler & Blader 2003). Specifically, increasing legitimacy perceptions of the police can be done indirectly by, for example, increasing perceptions of procedural fairness (Tankebe, 2012). However, there seem to be other variables affecting citizens' willingness to cooperate, because legitimacy only explained one-third of the variance, pointing to other influences. For instance, Tankebe (2009) conducted a study and found that citizens' perception of the effectiveness of policing is a precursor for their willingness to cooperate. Hence, effectiveness of policing should be included in future studies.

Type of technology and willingness to cooperate. Second, results showed no positive effect of type of technology (traditional, mobile phone, AR-glasses) on citizens' willingness to cooperate. As prior suggested, the more the police use effective methods, the more are citizens willing to cooperate. However, there was no support for this prediction, indicating that there were no differences between the conditions with regards to their willingness to cooperate. This indicates that no matter if or what kind of technology the police are using, the citizens are equally likely to cooperate. Therefore, technology, such as AR, does not seem to positively affect citizens' willingness to cooperate. However, this is inconsistent with previous research since studies indicated that when the police use effective methods citizens are more likely to cooperate (Tankebe, 2009).

Inconsistencies in the current and previous research could be due to missing measures. For example, perceived effectiveness of technologies implemented in policing could have a great influence on citizens' willingness to cooperate, as research has shown (Tankebe, 2009). Since perceived effectiveness of the technology was not taken into account, one cannot know if the citizens actually regard such technologies as effective. Therefore, future research should consider including measures for perceived effectiveness of the police in general as well as measures for the effectiveness of technology used by the police.

Interaction model with legitimacy. Since, as previously shown, willingness to cooperate is associated with legitimacy, legitimacy was added to the model in order to see if legitimacy moderates the main effect. The interaction effect, however, turned out to be non-significant, indicating that legitimacy does not influence each of the groups' willingness to

cooperate. However, since the moderation was marginally significant, it suggests that legitimacy might influence citizens' willingness to cooperate between the three types of technology as implied by prior research. Interpreting the marginal interaction depicted in Figure 1, one can see that legitimacy perceptions had a higher influence on citizens' willingness to cooperate in the traditional and mobile phone condition compared to citizens in the AR-glasses condition. One can see that the more they viewed the police as legitimate, the more they were willing to cooperate. In contrast, for citizens who have encountered the police using AR-glasses their willingness to cooperate seemed to not depend on their legitimacy beliefs. Again, the overall interaction was not significant, therefore, the results should be interpreted keeping this in mind.

The finding that the traditional- and mobile phone groups' willingness to cooperate may be dependent on their legitimacy perception is consistent with previous research. A meta-analysis of Walters and Bolger (2018) has shown that citizens' willingness to cooperate primarily depends on their perceptions of the police as a legitimate authority. In specific, higher perceptions of legitimacy lead to an increased willingness to cooperate (Tyler & Fagan, 2008; Walters & Bolger, 2018). Inconsistent with previous research is, however, the fact that the willingness to cooperate was not dependent on legitimacy perceptions of citizens who encountered the police using AR-glasses. It would be, thus, interesting to investigate which other factors might influence citizens' willingness to cooperate when the police use AR-glasses. Specifically, research should focus on what the differences are between using no technology and a mobile phone compared to the use of AR-glasses and citizens' willingness to cooperate.

In fact, inconsistencies with previous research might be due to missing variables in the overall model. The fact that the moderation was marginally significant even though the main effect of type of technology on the cooperation was non-significant, might indicate the influence of confounding variables. Tyler (1990) suggested in the PBMR that, next to legitimacy perceptions, perceptions of procedural justice are explaining citizens' willingness to cooperate. In fact, research on procedural justice has found that citizens are more likely to cooperate with the police when they perceive that they are treated in a fair and respectful way (Murphy, 2013; Sunshine & Tyler, 2003). For instance, several studies have found that the use of efficient technologies, such as BWC's led to higher levels of procedural justice (White, Gaub, & Todak, 2017; White, Todak, & Gaub, 2018). Increased levels of procedural justice when using technology can be explained by 'public self-awareness theories'. These theories claim that officers equipped with technology, for instance BWCs, become more self-conscious

of their behaviours which makes them treat citizens more fairly and respectfully (Demir, Apel, Braga, Brunson, & Ariel, 2018). Thus, specifically procedural justice might be an important precursor for willingness to cooperate in combination with technology, and hence, should be considered in future research.

Facial recognition and privacy concerns. Lastly, it was predicted that citizens raise their privacy concerns when the police use AR-glasses for facial recognition purposes compared to when they use their knowledge or mobile phones. In fact, results only gave partial support for this prediction. Results indicated that when the police officer was using a mobile phone or wearing AR-glasses for facial recognition, citizens were more concerned with their privacy compared to when the police officer was not using any technology. Accordingly, additional explorative analyses revealed that citizens in the traditional condition had fewer privacy concerns than citizens in the mobile phone or AR-glasses condition regardless of the type of information. Further explorative analyses revealed that participants in the facial recognition condition were the most concerned with their privacy compared to participants in the navigation and notification condition. Thus, not only the type of technology seems to be important, but also the type of information the officer is receiving. Altogether, it can be derived that citizens are neutral about whether they perceive their privacy as violated when the police use no technology, but they do raise privacy concerns when the police use technology. Also, facial recognition technologies seem to raise privacy concerns in citizens, whereas notification and navigation purposes do not raise privacy concerns as much as facial recognition.

These results are in line with the predictions of the framework which was developed to assess citizens' privacy attitudes with regards to implemented technologies by authorities (van Zoonen, 2016). In line with this framework, technologies which are assessing personal data, such as facial recognition techniques and usage of data for surveillance purposes, lead citizens to raise higher privacy concerns compared to when the data is impersonal and used for service purposes. However, it was prior predicted that AR-glasses raise the highest privacy concerns (Cowper & Buerger, 2003).

In fact, these findings can be explained by two effects. Firstly, an effect called 'privacy of location and space effect' which holds that people have the right to stay anonymous and surveillance-free in public spaces (Custers, 2016). Since citizens faced with technological devices for facial recognition purposes were more concerned with their privacy compared to citizens faced with no technology, it might indicate that the use of technology in public violates citizens' right of anonymity. The second explanation could be an effect called 'function creep effect' which describes the mistrust citizens have towards authorities using new technologies

for surveillance purposes (Custers, 2016). Accordingly, using technologies, such as mobile phones and AR-glasses for facial recognition purposes and the resulting privacy concerns could lead to mistrust towards authorities. As mentioned prior in the literature review, citizens expressed worries about their personal privacy when the government used advanced technologies since it affects the balance of the power between citizens' and government (Nakar & Greenbaum, 2017).

Hence, the increase in privacy concerns could lead to negative attitudes towards the police and distrust regarding the governments' use of technologies. Correlation analyses in the current study indicated that willingness to cooperate was negatively correlated with privacy concerns. In fact, studies have shown that high degrees of distrust towards the government and its use of technology lead to consequences like less willingness to cooperate (Miller & Toliver, 2014; Sousa et al., 2017). Technologies used by governmental authorities, thereby, need to be assessed in detail before their implementation in order to avoid a decrease in the government's popularity (Margalit, 2019). Altogether, future research should thoroughly assess whether privacy concerns with regards to technology and specifically AR negatively influence citizens' willingness to cooperate with the police.

Additional Explorative Analyses

Moreover, explorative analyses revealed differences between the two genders with regards to their perception of the police as a legitimate authority. The current research and other studies have shown that men view the police as less legitimate than women do (Miller & Davis, 2008). This might be because men are more likely to have encounters with the police than women (Crocker, Hartford, & Heslop, 2009). More frequent encounters with the police, in turn, may change the citizens' perception of the police (Walters & Borger, 2019).

Additional Limitations and Future Research

However, there are some limitations to the study. One major limitation is the sample size. Statistics designed to detect differences between groups should have at least 30 participants per cell, leading to approximately 80% statistical power (Voorhis & Morgan, 2007). Hence, this study's sample size should be at least 270, since there were nine different conditions/cells. Since this study comprised only half the size of the desired sample size, some results might have turned out to be less informative. Thus, a more appropriate sample size is recommended. Not only the sample size but in general a more heterogeneous sample with regards to the demographics could be informative. Including a more heterogeneous sample

could be identified by including more demographic variables, such as social class, and a farther distribution of the questionnaire. Research indicates that lower social classes often live in economically deprived areas where they are more likely to have encounters with the police, which might lead to different perceptions of the polices' legitimacy (Walters & Borgers, 2019).

Further, it was intended to keep the videos for the nine different conditions as similar as possible to ensure standardisation and avoid bias. The videos were of good quality, but it could be that the videos were slightly too similar, and the manipulation was not as strong as intended. The similarity of the videos might have affected the manipulation since the participant could have missed one detail of importance which differentiated the conditions from each other. Therefore, improving the manipulation can be done in the following ways. First, the videos could entail a longer sequence where the police officer is explaining the technology and its purposes more elaboratively. Second, the videos could entail a sequence where the participants can see the officer's perspective, and thus, see what the officer sees on the phone/AR-glasses. Third, future studies could intensify the manipulation by using Virtual Reality (VR) glasses. It was prior intended to let the participants wear VR-glasses which was, however, not possible due to the current circumstances regarding the COVID-19 pandemic and the resulting social distancing rules. In fact, VR-glasses have been shown to produce a sense of actual presence in the participants' mind, making the participant feel more immersed with the digital world (Bowman & MacMahan, 2007). Hence, if the participant feels more immersed, the manipulation might be stronger and more realistic, resulting in more conclusive results.

Finally, inconsistencies with previous research might be also due to the validity of the legitimacy scale. Factor Analyses using the Eigenvalue criteria revealed that there were five underlying factors and not as expected three factors. Notably, the items were translated from English to Dutch, which could have resulted in such discrepancy. Hence, translation flaws might have affected the answers given by the citizens, and therefore, could have affected the results.

Conclusion

This study was the first investigating possible consequences which might arise because of the implementation of AR-glasses in daily policing, such as citizens' willingness to cooperate, their legitimacy perceptions, and privacy concerns. It was tested whether the use of AR-glasses positively affects citizens' willingness to cooperate as well as whether this effect is stronger when they perceive the police as a legitimate authority. Also, it was tested if they

raise privacy concerns because of the use of facial recognition methods with AR-glasses. All in all, results suggest that citizens view the police as a legitimate authority and are willing to cooperate, no matter if the police are using supportive technology such as AR-glasses or not. However, it seems that citizens' raise privacy concerns when the police are using technology for purposes such as facial recognition. Taking the study's findings into account, it can be recommended that the police could implement AR-glasses in daily policing since citizens' willingness to cooperate and legitimacy perceptions do not seem to be negatively influenced compared to already implemented methods (no technology or mobile phone). Nevertheless, the police should avoid implementing technologies for facial recognition purposes.

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Appendices

Appendix A

Informed consent

“Heel fijn dat u wilt deelnemen aan dit onderzoek genaamd 'Burgerperceptie van de Nationale politie’! Met dit onderzoek krijgen we graag een indruk van hoe u over de politie denkt.

Allereerst wordt u gevraagd een aantal algemene vragen over de politie in te vullen om vervolgens een korte video te bekijken van een agent die zijn manier van werken aan u uitlegt. Aansluitend willen we u vragen een aantal vragen over de video te beantwoorden. Dit onderzoek zal in totaal ongeveer 15 minuten in beslag nemen.

Deelname is compleet vrijwillig en u kunt ten alle tijden stoppen zonder dat dit consequenties heeft. Alle data zal worden geanonimiseerd. De data zal veilig worden opgeslagen en niet gedeeld worden met anderen dan de onderzoekers van de Universiteit Twente en de Politieacademie. De verantwoordelijke onderzoekers zijn Amelie Schleich, Sam Polman en Lisanne Eberhardt. Miriam Oostinga is de begeleider van dit onderzoek vanuit de UT en Wendy Schreurs vanuit de Politieacademie.

Indien u bovenstaande informatie heeft gelezen en bereid bent mee te doen aan het onderzoek gebaseerd op de hiervoor genoemde condities, kunt u op ‘volgende’ klikken.”

Appendix B

Questionnaire items

Legitimacy (5-point Likert scale)

Obligation:

In hoeverre bent u het eens met de volgende stellingen:

Q1: Over het algemeen is de politie een legitieme autoriteit en men moet de bevelen van de politie gehoorzamen.

Q2: U zou de keuzes van de politie moeten accepteren, ook al vindt u deze niet juist.

Q3: U moet doen wat de politie zegt, zelfs wanneer u de reden voor deze keuze niet begrijpt.

Q4: U moet doen wat de politie zegt, zelfs wanneer u het niet eens bent met deze keuze.

Q5: U moet doen wat de politie zegt, zelfs wanneer u het niet fijn vindt hoe de politie u behandelt.

Trust:

Q6: Ik heb er vertrouwen in dat de politie haar taken goed uitvoert.

Q7: Ik vertrouw erop dat de leiders binnen de politie keuzes maken die goed zijn voor iedereen in de stad.

Q8: De basisrechten van de mens worden goed beschermd door de politie.

Q9: De politie geeft om het welzijn van iedereen waarmee zij te maken hebben.

Q10: De politie is vaak oneerlijk (reverse scored)

Q11: Sommige dingen die de politie doet, brengen onze stad in verlegenheid (reverse scored)

Q12: Er zijn veel dingen die veranderd moeten worden aan de politie en haar beleid

Confidence:

Q13: Wanneer ik met de politieagenten die werken in mijn buurt zou praten, denk ik dat zij dezelfde standpunten hebben over veel zaken.

Q14: Mijn achtergrond lijkt op de achtergrond van de meeste agenten in mijn buurt.

Q15: Meestal kan ik begrijpen waarom de politie in mijn buurt op deze wijze haar taken uitvoert in een bepaalde situatie.

Q16: Over het algemeen vind ik de agenten in mijn buurt aardig.

Q17: Als de agenten uit mijn buurt mij zouden kennen, zouden de meesten mijn normen en waarden respecteren.

Q18: De meeste agenten in mijn buurt zouden waarderen wat ik toevoeg aan mijn buurt.

Q19: De meeste agenten in mijn buurt zouden mijn levensstijl goedkeuren.

Q20: Ik ben trots op het werk van de politie.

Q21: Ik ben het eens met veel waarden die bepalen waar de politie voor staat.

Willingness to cooperate (5-point Likert Scale)

" Hoe waarschijnlijk is het dat u …"

Q1: De politie belt om een misdrijf in de buurt te melden

Q2: De politie helpt om een verdachte van een misdrijf te vinden door de politie informatie te geven

Q3: Gevaarlijke of verdachte activiteiten in uw buurt doorgeeft aan de politie

Privacy concerns (5-point Likert Scale)

Q1: Gebaseerd op de video van de politieagent die u zojuist gezien heeft, heeft u het gevoel uw privacy wordt geschonden wanneer politieagenten hun kennis en ervaring en die van hun collega's gebruiken?

Q2: Gebaseerd op de video van de politieagent die u zojuist gezien heeft, heeft u het gevoel dat uw persoonlijke privacy wordt geschonden door het gebruik van een mobiele telefoon als informatiebron door de politie?

Q3: Gebaseerd op de video van de politieagent die u zojuist gezien heeft, heeft u het gevoel dat uw persoonlijke privacy wordt geschonden door het gebruik van augmented reality brillen als informatiebron door de politie?

Demographics

Q1: Wat is uw leeftijd?

Q2: Wat is uw geslacht?

Q3: Wat is uw nationaliteit?

Q4: Bent u (Student, Werkende, anders)

Q5: Waar woont u momenteel? (Stad, Dorp, anders)

Appendix C

Debriefing

„ Ontzettend bedankt voor uw bijdrage aan dit onderzoek! Druk alstublieft op 'Volgende' om het onderzoek af te ronden.

Het doel van deze vragen was het analyseren van bepaalde gevoelens die u over de politie heeft afhankelijk van de technologische middelen die zij gebruiken. Deze gevoelens hebben betrekking op onder andere de neiging om mee te werken met de politie, privacy, politielegitimiteit en vertrouwen. Mocht u vragen hebben over de procedure of de uitkomst van het onderzoek, neem dan gerust contact op met een van de onderzoekers.(s.polman@student.utwente.nl; a.c.schleich@student.utwente.nl; l.eberhardt@student.utwente.nl).

Nogmaals bedankt namens Lisanne Eberhardt, Amelie Schleich en Sam Polman.”

Appendix D

Scripts for the videos

Eerste deel video

- Traditioneel
    - *De agent loopt rond - 5 seconden*
    - *Close-up van de agent - 5 seconden*
    - *De agent kijkt om zich heen en maakt aantekeningen - 5 seconden*
- Mobile
    - *De agent loopt rond - 5 seconden*
    - *De agent haalt zijn telefoon uit zijn zak - 2 seconden*
    - *Close-up van de telefoon - 3 seconden*
    - *De politie krijgt meldingen op zijn telefoon en gebruikt deze - 5 seconden*
- AR bril
    - *De agent loopt rond - 5 seconden*
    - *De agent zet zijn AR-bril op - 2 seconden*
    - *Close-up van de AR-bril - 3 seconden*
    - *De agent raakt zijn AR-bril aan, stopt met lopen en kijkt in zijn bril - 5 seconden*

Tweede en derde deel video

Algemene introductie van de politieagent in iedere scenario.

- *Goedendag! Ik ben Peter en werk nu al een aantal jaar als politieagent in deze stad. Samen met mijn collega's doe ik mijn best om de inwoners van deze stad zo goed mogelijk te helpen. Daarbij proberen wij elke dag deze buurt een beetje veiliger te maken.*
- *Hoe ik te werk ga? Nou, …*

Navigatie traditioneel:

De agent staat een aantal meter van je af. Hij zegt: 'Ik ben opgegroeid in deze stad dus ik kan mijn weg hier goed vinden. Omdat ik de meeste plekken in de buurt goed ken, is het eenvoudig voor mij om snel te gaan naar waar ik moet zijn. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen

voor een winkeldiefstal. Doordat ik precies de juiste sluiproutes kende, waren we er binnen *no time*.'

Navigatie telefoon:

De agent staat een aantal meter van je af. Hij heeft zijn telefoon in zijn hand. Hij zegt: 'Ik gebruik mijn telefoon om te zien waar ik moet zijn. Omdat mijn telefoon mij precies laat zien waar ik naartoe moet, is het eenvoudig voor mij om snel te gaan naar waar ik moet zijn. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Doordat mijn telefoon precies aangaf welke sluiproutes we konden nemen, waren we er binnen *no time*.'

Navigatie AR bril:

De agent staat een aantal meter van je af. Hij draagt een AR-bril. Hij zegt: 'Ik gebruik mijn augmented reality bril om te zien waar ik moet zijn. Omdat mijn AR bril mij precies laat zien waar ik naartoe moet, is het eenvoudig voor mij om snel te gaan naar waar ik moet zijn. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Doordat mijn AR-bril precies aangaf welke sluiproutes we konden nemen, waren we er binnen *no time*.'

Point of interest traditioneel:

De agent staat een aantal meter van je af. Hij zegt: 'Ik ben opgegroeid in deze stad en ben daardoor goed op de hoogte van de criminele activiteiten die in de buurt plaatsvinden. Omdat ik op de hoogte ben van de plekken waar de meeste criminaliteit voorkomt, weet ik waar ik moet beginnen met kijken wanneer er iets gaande is. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien ik wist bij welke winkel vaker wordt gestolen, waren we er binnen *no time*.'

Point of interest telefoon:

De agent staat een aantal meter van je af. Hij zegt: 'Ik gebruik mijn telefoon om op de hoogte te zijn van de criminele activiteiten die in de buurt plaatsvinden door middel van notificaties. Omdat mijn telefoon mij onmiddellijk op de hoogte stelt van waar veel criminaliteit plaatsvindt, weet ik waar ik moet beginnen met kijken wanneer er iets gaande is. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel

mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien mijn telefoon aangaf bij welke winkel vaker wordt gestolen, waren we er binnen *no time*.'

Point of interest AR bril:

De agent staat een aantal meter van je af. Hij zegt: 'Ik gebruik mijn augmented reality bril om op de hoogte te zijn van criminele activiteiten die in de buurt plaatsvinden door middel van notificaties op de glazen van mijn bril. Omdat mijn AR-bril mij onmiddellijk op de hoogte stelt van waar veel criminaliteit plaatsvindt, weet ik waar ik moet beginnen met kijken wanneer er iets gaande is. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien mijn AR-bril aangaf bij welke winkel vaker wordt gestolen, waren we er binnen *no time*.'

Gezichtsherkenning traditioneel:

De agent staat een aantal meter van je af. Hij zegt: 'Ik ben opgegroeid in deze stad, ken praktisch iedereen en kan zo de bekende criminelen eenvoudig herkennen. Omdat ik veel mensen uit deze buurt herken, worden bepaalde zaken eenvoudiger voor mij. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien ik de verdachte kende en direct wist hoe het gezicht eruit zag van degene die we zochten, hadden we de winkeldief binnen *no time*.'

Gezichtsherkenning telefoon:

De agent staat een aantal meter van je af. Hij zegt: 'Ik gebruik mijn telefoon om een gezichtsherkenning scan uit te voeren op elk gezicht dat ik invoer, zodat ik bekende criminelen eenvoudig kan herkennen. Omdat mijn telefoon een gezichtsherkenning functie heeft, worden bepaalde zaken eenvoudiger voor mij. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien ik de gezichten van de mensen in de winkelstraat kon fotograferen en direct door het gezichtsherkenning programma kon halen, hadden we de winkeldief binnen *no time*.'

Gezichtsherkenning AR bril:

De agent staat een aantal meter van je af. Hij zegt: ‘Ik gebruik mijn augmented reality bril om het gezicht te scannen van de mensen die ik zie, zodat ik bekende criminelen eenvoudig kan herkennen. Omdat mijn AR-bril een gezichtsherkenning functie heeft, worden bepaalde zaken eenvoudiger voor mij. Ik heb laatst nog een situatie meegemaakt, waarin mijn collega en ik werden opgeroepen om zo snel mogelijk naar de hoofdstraat te komen voor een winkeldiefstal. Aangezien ik de gezichten van de mensen in de winkelstraat kon scannen met mijn AR bril en direct door het gezichtsherkenning programma kon halen, hadden we de winkeldief binnen *no time*.’