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The influence of different forms of camera surveillance and personality characteristics on deviant and pro-social behaviour

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Christina Hoffmann

S0200506

Supervisors

Drs. A.M. Jansen

Department of conflict risk and safety

University of Twente

Prof. Dr. E. Giebels

Department of conflict risk and safety

University of Twente

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Abstract

Personality characteristics of 86 students were measured, who were then randomly assigned to three different camera conditions and one control condition. They were asked to solve a couple of puzzles but were given the chance to cheat in various ways. Apart from that situations were set up in which participants had the possibility to show pro-social behaviour. The results show that cheating behaviour decreases the more control is indicated by the presence and presentation of the camera. Interaction effects of camera condition and personality characteristics on both cheating and pro-social behaviour were found. Further research is needed to use surveillance cameras more efficient.

The influence of different forms of camera surveillance and personality characteristics on deviant ant pro-social behaviour

Camera surveillance is a growing sector in western countries, with the United Kingdom being the leader of this movement. In the UK there are an estimated number of 4.2 million security cameras installed in public places, which leads to the estimation that every UK citizen is viewed on camera up to 300 times a day (Welsh & Farrington, 2009). The use of camera surveillance is still growing with about 15-20% annually. This also implies an enormous economic mass with the UK spending a total of 150 to 300 pounds every year. Welsh and Farrington (2009) point out the positive effects that camera surveillance has on public security and feelings of safety, but there are also studies that did not find evidence for the crime preventive effect of cameras (e.g. Biale, 2008). Considering the immense economic mass, the promising positive results and the possible risks of camera surveillance, it seems reasonable to further investigate the effectiveness of different types of surveillance and efficient ways to use security cameras according to the different purposes they are meant to serve.

Camera surveillance is usually seen as an instrument of situational crime prevention (Welsh & Farrington, 2009). Besides, security cameras may also encourage people to engage in pro-social behaviour like helping others (van Rompay, Vonk & Fransen, 2009). But how does this work? To what extent does camera surveillance really influence people's behaviour and what are the constructs that are important for this influence?

As mentioned above, Welsh and Farrington (2009) refer to situational crime prevention as the main use of camera surveillance. This method of crime prevention is based on the rational-choice-theory, which states that all behaviour, including criminality and deviant behaviour is rational and based on the rating of costs and benefits. According to that, people only engage in criminal or deviant behaviour, if the benefits outweigh the costs (Braga, 2010). The presence of security cameras enhances the risk of being caught and punished, which according to rational choice theory should lead to a decline in crime rates. This theory is supported by several studies. Philips (1999), for example, found CCTV useful especially for the prevention of property crime. Nieto (1997) calls camera surveillance an effective tool in reducing crime and prosecuting offenders. Priks (2010) states a reduction of the overall crime rate in the Stockholm subway of about 20% since installing cameras in high crime stations between 2006 and 2008. According to this study, camera surveillance proved to be especially effective in reducing rational crimes as pickpocketing and armed robberies, while it had no effect on impulse-crimes as assault.

In the current study, we will examine the effects of the function ascribed to a camera being present when people perform a task on which they can cheat. We will compare a surveillance condition to a control condition and two other camera conditions: One in which participants think their behaviour is being monitored by an unknown public that will code their non-verbal behaviour and one in which participants see themselves on a monitor.

In line with the research mentioned above, our first hypothesis is:

Participants, who are told that they are being watched by an authority, cheat significantly less than participants, who are told that they are being watched by an unknown public that is no authority, participants who see their own faces on a monitor and participants in the control condition (without camera).

It can be assumed that telling participants that they are being observed by an authority in order to prevent illegal behaviour and irregularities will enhance the participants' estimation of the risk of being caught and the fear of being punished. Therefore the idea of being watched by an authority should lead to significantly less cheating behaviour.

In general, research has found that the presence of a camera causes people to stick to rules, not only referring to criminal behaviour, but also to other forms of deviant behaviour, as lying or cheating. Van Rompay et al. (2009, p.62) state that "the presence of others can be seen as a social force, affecting feelings, cognitions, and, to some degree, behaviors." As an explanation for this phenomenon, they suggest that people experience the presence of others as demanding, because it makes their behaviour the possible target of evaluation and approval or disapproval of others. The awareness of this triggers what Wicklund and Duval (1971) call self-evaluation. This means that in some situations, the self changes from being the subject of consciousness to being its object. This leads people to reflect over their behaviour and base it on either their own inner values or subjective norms. Beaman, Klentz, Diener and Svanum (1979) observed the same effect. In their study on the effects of self-awareness, they asked children on Halloween to only take one piece of sweets. They found that children acted according to that rule more often when a mirror was placed near the sweets bowl, so that they could see themselves while taking the sweets. Research (Latané, 1981) found that people do not make a difference in whether the presence of others is real, simulated or imagined.

There must be a reason why people experience the presence of others as demanding and stick to rules more willingly in situations where they are being observed by others. Not much is known about moderating effects of personality characteristics on the relationship of the presence of others and rule breaking behaviour. We assume "need for approval" to be one important moderator in this relationship. "Need for approval" describes the motivation to

engage in behaviour that is positively rated by others and to avoid behaviours that are disapproved by others (Millham, 1974). This motivation guides peoples' behaviour in many situations. As people with a high need for approval are more concerned about the impression others get of them, it is a reasonable expectation that the presence of others (or a camera) has a greater influence on the behaviour of participants with a high need for approval, than that of participants with a low need for approval.

The second hypothesis is therefore:

Participants with a high rather than low need for approval cheat significantly less in the presence of a camera (no matter if watched by an authority, an unknown public or watching themselves on a monitor), compared to participants in the control condition.

With regard to effects on pro-social behaviour, research shows that security cameras do not automatically trigger private helping or pro-social behaviour in general. To get a positive effect on pro-social behaviour, Van Rompay et al.(2009) assume that people have to be aware that they are being monitored, which mostly is not the case after they got used to the presence of cameras in open and semi-open places. This is supported by Levine (2000, p.6) who says that, when exploring the effect of cameras on behaviour, "it is important to know whether people realize they are being monitored (…) who they think might be watching them (…) and what kinds of behaviours are acceptable to or punishable by whoever is watching".

In contrast to that, Bateson, Nettle and Roberts (2006, p.412), found that even small cues of being watched such as pictures of eyes on the walls "dramatically increases contribution to a public good in a real world context". As an explanation for this they suggested that cues of being watched, such as eyes and faces, automatically and unconsciously cause an effect of people's perception and trigger the feeling of being watched. These findings have recently been challenged by Carbon and Hesslinger (in press), who could not replicate Bateson et al's results in a similar experiment. It should be mentioned though, that in contrast to Bateson et al. they investigated to what extent images of eyes influenced participant's attitudes and not their actual behaviour. There is proof that attitudes do not necessarily lead to certain behaviours (Zanna, Olson & Fazio, 1980). Bateson et al. (2006) showed that people paid significantly more for the coffee in their offices, when there was a picture of a pair of eyes in the room compared to a picture of flowers. In a similar experiment Ernest- Jones, Nettle and Bateson (2011) found that images of eyes caused people to clear up their tables in a self-clearing cafeteria more often. These results show that even a "minimum cue of observation" (Ernest-Jones et al. 2011, p.2), leads people to more cooperative and pro-

social behaviour. A security camera can in that respect be seen as a minimum cue of observation.

Referring to these results, the third hypothesis is:

Participants, who are observed by a camera (no matter if watched by a authority, watched by a public or watching themselves on a monitor) show more pro-social behaviour than participants in the control condition.

On the other hand, Van Rompay et al. (2009) point out that the use of security cameras can also have negative effects on pro-social behaviour, depending on the reference group. This reference group can consist of people they identify with, who are in the same or similar situation, but in this context the reference group can also be the people watching the videotapes and rating the participant's behaviour. This leads us to the question what other factors make people engage in deviant as well as pro-social behaviour.

Van Rompay et al. (2009) suggest "need for approval" to be an important factor that moderates pro-social behaviour. According to them people strive for the approval and appreciation of others, but the level of "need for approval" is different for everybody which causes different behaviours of people in the same situation. This assumption is supported by Deutsch and Lamberti (1986), who state in their study that participants with a higher need for approval donated more money to charity than participants with low need for approval. Referring to the results of Bateson et al. (2006) and Ernest-Jones et al (2011) it is assumed that the presence of a camera triggers the concepts of need for approval and self-monitoring, causing people to be more reflective about their behaviour. Referring to Rompay et al. (2009) this in turn should lead participants to behaving more pro-social.

Therefore, the fourth hypothesis is:

Participants high rather than low in need for approval show significantly more pro-social behaviour in the presence of a camera (no matter whether they are being watched by an authority, an unknown public that is no authority or see themselves on a monitor) in comparison to the control condition.

A further factor thought to influence pro-social behaviour is self-monitoring. Self-monitoring is a concept that is somehow related to "need for approval". It is assumed that everybody (at least to a certain extent) strives for the approval and appreciation of others. Self-monitoring describes the extent to which people are able to control their own behaviour in order to get this approval (Snyder & Gangestad, 1986). Danheiser and Graziano (1982) say that people high in self-monitoring are more motivated to make their behaviour situationally appropriate than are people low in need for approval. A high score on self-monitoring

therefore means a higher motivation and a higher ability to adjust one's behaviour to a certain situation in order to maintain a positive self-presentation. Danheiser and Graziano (1982) further found that people low in self-monitoring show more consistent behaviour, as they are less affected by situational differences. Therefore it can be expected that participants high in self-monitoring will be more affected by the presence of a camera, especially if they have the idea that their behaviour is monitored by others, than participants low in self-monitoring.

In accordance with that, the fifth hypothesis is:

Participants high rather than low in self-monitoring show significantly more pro-social behaviour when told that they are being observed by others (no matter if the people watching are an authority are not) compared to seeing themselves on a monitor or not being observed at all.

Research also found social-value orientation an important factor that influences pro-social behaviour. There are three different social-value orientations named in the literature, namely cooperative, individualist and competitive. While cooperatives strive to maximise the benefit for others or of all involved parties, individualists long to maximise their own benefit and competitives always try to maximise their own benefit compared to others (Liebrand, Jansen, Rijken & Suhre, 1986). Research generally shows that individualists and competitives show more or less the same behaviour, namely maximising their own benefits in one way or another (e.g. Smeesters, Warlop, van Avermaet, Corneille & Yzerbyt, 2003). Participants in this study will therefore only be divided into pro-socials (which is consistent with coopeartives) and pro-selfs (either individualists or competitives). Research found that people with a pro-social attitude support a greater number of donation goals and engage in a greater variety of donation behaviour than people with an individualistic/competitive attitude (Van Lange, Bekkers, Schuyt & van Vugt, 2007). To date, there has not been any research available that focused on possible interaction effects between different forms of camera surveillance and social value orientation. As Cialdini and Goldstein (2004) point out, norms (social as well as inner ones) can only be activated if one focuses on them and that normative information only predicts behaviour if it is consciously processed. Therefore we assume that personal norms and social-value orientation are activated by cues that make people more self-aware.

According to that, the sixth hypothesis is:

Participants with a pro-social rather than a pro-self social-value orientation will show significantly more pro-social behaviour, if they see themselves on a monitor, in comparison to being observed by others (no matter if these others are an authority or not) and not being observed at all.

Method

Experimental design & conditions

In the experiment the participants were randomly assigned to the four conditions: surveillance by an authority (surveillance by authority), non-verbal behaviour observation (surveillance by public), self-observation without other viewers (self-awareness) and a control condition. They were asked to solve a couple of puzzles, whereby their cheating behaviour was measured. We also established pro-social behaviour is terms of helping the researcher collecting pens that have fallen to the ground, throwing away an empty plastic cup and donating money to the WWF.

In the "surveillance by authority" condition there was a visible surveillance camera (dummy) installed in the room and the participants were told that the recordings of this camera would be watched by an authority to control irregular and illegal behaviour. The same camera was also present in the "surveillance by public" condition, but here the participants were told that the recordings would be watched by an independent party in order to code different types of non-verbal behaviour for a completely unrelated study. In this condition, the paper with the puzzles was shielded for the camera to "guarantee the participant's privacy". In the "self-awareness" condition, instead of a surveillance camera, we used a webcam pointing directly at the participant's face. Via the attached laptop, the participants were able to see their own faces during the whole experiment, but the paper with the puzzles was not in view of the camera. The participants were told that a special computer programme would digitally code their eye-movements for a completely unrelated study. In the control condition, there was no visible camera present in the room. The participants were not told about a camera, but just worked on the puzzles. Unknown to all participants, there was a hidden camera present in all 4 conditions, that recorded what they wrote down and whether they cheated or not.

In total, we had twenty participants in the surveillance by authority condition, twenty-two in the surveillance by public condition, twenty-three in the self-awareness condition and twenty-one in the control condition.

Participants

The participants for this experiment were recruited at the University of Twente, Enschede in the Netherlands. As compensation for their participation, the students were given the choice between a study-credit and five Euros for participating in the experiment plus a maximum of 4,50 Euros which they could earn by solving the puzzles.

The total sample size was eighty-six of which 30 were male and 56 were female. They were either of Dutch or of German nationality and between eighteen and thirty years old. See tables 1 and 2 for details.

Table 1

Demographic data of participants

	Total	mean	Standard deviation
Male	30	-	-
Female	56	-	-
Age	18-30	21.56	2.29
German	41	-	-
Dutch	45	-	-

Table 2

 Demographics per Condition

	female	male	Mean age	SD age	German	Dutch
Surveillance by authority	14	6	21.5	2.48	8	11
Public awareness	11	11	21.36	1.59	9	13
Self-awareness	19	4	22.26	2.78	8	15
control	12	9	21.05	2.11	11	10

The dependent variables

The dependent variables in this study were cheating behaviour and pro-social behaviour. Participants could cheat in three different ways. First, they could copy the answers from the correction sheet that was present in the room. Second, they could continue working after the time was up. Third, they could guess after the time was up in order to earn more money. Guessing was not mentioned in the instructions and can therefore be seen as not strictly forbidden. It is counted as a form of cheating behaviour, because it was explicitly mentioned in the instructions that participants were asked to actually try to solve the puzzles and stop when the time was up. Cheating in this study was handled as a dichotomous variable and was scored per participant with either "yes" (1) or "no" (0). Guessing behaviour was measured the same way. We ultimately composed three variables of this, namely "cheating" (which included "continuing after time up" and "copying answers from correction sheet"),

"guessing" and the combined variable "cheating or guessing" that counted the cases in which participants had either cheated or guessed in any possible way.

Pro-social behaviour in this experiment is defined by cleaning up a plastic cup offered with a drink at the start begin of the experiment, helping the experimenter with picking up some pens they dropped and donating some of the earned money to the WWF. These three variables were measured separately. "Clearing up trash" and "helping" were handled as dichotomous variable that were rated per participant with either "yes" (1) or "no" (0). The variable "percentage of money donated" measured the percentage participants donated from the money they earned during the experiment. It was rated on a continuous scale that ranged from 0 to 100.

The moderators

Apart from the dependent variables and the independent variable "camera condition", we measured personality characteristics that are expected to moderate the effect of "camera condition" on "cheating" and "pro-social behaviour". The most important moderators that were examined in this experiment were "need for approval" and "self-monitoring". Apart from these two, social value-orientation was measured. The instruments that were used to measure theses constructs will be explained in the next section.

Instruments

To measure participant's personality characteristics, we used an online survey that was sent to the participants 24 hours after participating in the experiment. This questionnaire contained a few demographic questions, a need for approval scale (Strahan & Gerbasi, 1972), a self-monitoring scale (Snyder & Gangestad, 1986) and a decomposed game to measure social value orientation.

Need for approval

Need for approval was measured by a scale of 20 statements, for which participants had to indicate how much they agreed with them using a 6-point likert-scale. It contained statements as: "I'm always staying polite, even to people I don't like". It was invented by Straham and Gerbasi (1972) and we used a translated Dutch version of it. Cronbach's alpha for this scale is 0.656, which is an acceptable value for a reliability analyses.

Self-monitoring

The self-monitoring scale, which was originally invented by Snyder and Gangestad (1986) and then translated into Dutch, contained 18 statements for which the participants had

to indicate in how far they agreed with it using a 7 point likert-scale. A typical question of this instrument is: "I can only defend the ideas I believe in." Cronbach's alpha for this instrument was 0.775, which makes it a reliable scale.

Social value orientation

To measure social value orientation, we used a decomposed game. It contained 9 tasks in which participants had to give points to themselves and a fictional other person. They were told that it was better to have more points. They had the choice to divide the points equal and fair or to give themselves more points. They could do that by selecting one out of 3 possible answers per question. In total there were 9 questions like this: a) myself 400 points, the other 400 points, b) myself 500 points, the other 300 points, c) myself 420 points, the other 380 points. Originally there are three different social-value orientation, namely individualistic, competitive and cooperative. As research has found that individualistic and competitive motivated people do not show significant differences in behaviour, we combined these two into one orientation. That leaves us with two social-value orientations, that are called pro-social (which is consistent with cooperative) and pro-self (which is the combination of individualistic and competitive). Participants were rated as either pro-social or pro-self motivated, if they gave a minimum of six consistent answers. That means, that participants who scored at least six out of nine times on pro-social (giving the same points to themselves and the other), they were rated as pro-social. Participants who scored at least six out of nine times on pro-self (giving more points to themselves than to the other) were rated as pro-self.

Manipulation check

As a manipulation check, there was made use of a questionnaire at the end of the experiment that asked participants specific questions about the presence of the camera (e.g. "I was told that the camera is present in the room in order to a. prevent illegal and irregular behaviour b. code my non-verbal behaviour for an unrelated study c. code my eye-movements digitally). In total the manipulation check contained eight questions that referred to the presence of the camera. A participant's manipulation check was rated "sufficient" if at five or more questions were answered correctly. The manipulation check was found sufficiently for 84 of the total 86 participants. The two participants with insufficient manipulation checks were excluded from the analysis.

Procedure

Before the experiment started, the participants were asked to sign the informed consent form. In the form it was stated that the aim of the experiment was to compare the performance

of participants that have been promised a reward for solving a puzzle task to the performance of participants that have not been promised a reward on the same task. While the participants read and signed this form, they were offered a drink in a plastic cup. This was part of the manipulation to see if they threw away this cup when they left the room. The researcher returned with the drink and handed the participant a second form that explained the reasons for the presence of the camera (Participants in the control condition did not get this form.) and asked the participants to behave as naturally as possible in the presence of the camera. The researcher summarised the content of the form once again and answered questions regarding the camera.

After that, the participants were given the situational self-awareness questionnaire and after that they were asked to work on the task. A modulated form of the puzzle task developed by Mead et al. (2009) was used. In the original task, one puzzle consisted of 12 three-digit numbers, while in our version each puzzle contained 24 numbers. They were told that they will receive 50 cent per correctly solved puzzle. In the instructions it was explained to the participants that they were asked to solve nine puzzles consisting of twenty-four numbers with two decimals and that their task was to decide for every puzzle if it contained two number that added up to exactly 10, or not. The instructions included two examples of these puzzles, one that could be solved and one that could not. The participants were instructed to state their decision per puzzle by writing down a "+" or a" –" in the attached table. Figure one gives an example of the puzzles.

Figure 1 *left: solvable puzzle, right: unsolvable puzzle*

The participants had 10 minutes to solve as many puzzles as possible (after that, an alarm clock rang), but they were informed that the researcher would return after 15 minutes and that they should compare their answers to the correct answers that were placed on a table in the experiment chamber. Before the participants started to work on the puzzle task, they were asked to summarise the content of the camera form they read. If they could not do that correctly, the researcher explained it to them once again.

While the researcher handed over the last questionnaires (a distractor questionnaire with some general questions about how they liked the experiment and the manipulation check), she "accidentally" dropped a box with pens and observed if the participant helped her collecting the pens. Then the researcher paid the participants and told them that they had the possibility to donate this money (or a part of it) to the WWF. This was explicitly said and emphasised by a donation-box on the table, but it was made clear that this was completely voluntarily. After that the participants were debriefed and thanked for their participation. At the end of the study all participants received an e-mail with detailed debriefing.

Twenty-four hours after participating in the experiment, the participants received the link to the online survey. They were told that this survey belonged to a different, unrelated study and was given to them to be able to grand them a full credit (or 5 Euro) to minimise the risk that participants consciously linked the survey to the experiment, which might lead to biased answers.

Results

Cheating behaviour and camera condition

In total 10 of the 86 participants engaged in "real" cheating behaviour and 12 guessed one or more answers after the time was up. Guessing was not explicitly indicated as being forbidden, but the instructions stated clearly that participants were asked to try to solve the puzzles, write down their answer and stop when the time was up. The manipulation checks showed satisfying results, indicating that the participants understood the camera condition they were in.

A total of 18 participants either cheated or guessed, some in more than one way, and 66 did neither. Table 3 shows how cheating and guessing behaviour was spread over the three camera conditions and the control condition.

Table 3

Cheating Behaviour per Camera Condition

Cheating behaviour	surveillance	public	Self-awareness	control
Cheating, continuing after time up	0	0	0	6
Cheating, copying from correction sheet	0	3	0	3
Guessing after time up	1	4	2	5
Cheating total	0	3	0	7
Cheating or guessing total	1	6	2	9

A chi square test showed significant differences in cheating behaviour for the 3 different camera conditions and the control condition. In the "surveillance by authority" condition and in the "self-awareness" condition, we counted not a single case of cheating, while 14% of the participants in the "surveillance by public"- and 33% of the participants in the control condition cheated. Guessing behaviour alone did not differ significantly between the conditions, but as described in the methods, guessing was in this experiment seen as a special form of cheating. Therefore a Chi Square test also included the combined variable "cheating or guessing". As it can be seen in Table 4, camera condition does have a significant influence on this variable as well.

Table 4

Results of the Chi Square Test for Cheating and Condition

	N	df	χ^2	p
Cheating	10	3	15.37	.002*
Guessing	12	3	3.89	.273
Cheating or guessing	18	3	11.78	.008*

Hypothesis 1 stated that participants in the "surveillance by authority" condition show significantly less cheating behaviour than participants in the other two camera conditions and in the control condition. To test this, a logistic regression was used on "camera condition" and "cheating or guessing", which compared the "surveillance by authority" condition to the other camera conditions and the control condition. "Surveillance by authority" was therefore used as reference-category. The results show that participants in the "surveillance by authority" condition differed in their cheating behaviour from participants in the "surveillance by public" and the "control condition", but not from participants in the "self-awareness" condition. The results are shown in Table 5

Table 5

Effects of Camera Condition on "Cheating or Guessing"

	df	Std. error	wald	P
Surveillance by public	1	1.13	3.01	.08
Self-awareness	1	1.27	.22	.64
control	1	1.12	5.66	.017*

A comparison of the means shows that participants in the "surveillance by authority" condition cheated or guessed less (*M*=0.05, *SD*=0.22) than participants in the "surveillance by public" condition (*M*=0.27; *SD*=0.46), the "self-awareness" condition (*M*=0.09; *SD*=0.29) and the control condition (M=0.43; SD=0.51). Hypothesis one is therefore confirmed.

Interaction effects of camera condition and personality characteristics on cheating behaviour

We were also interested in interaction effects of camera condition and personality characteristics on cheating behaviour. It was hypothesised that participants with a high rather than a low need for approval would cheat significantly less in the presence of a camera compared to the control condition. To test this hypothesis, we computed the variable "camera present" (which was a dichotomous variable that was rated "1" for all three camera conditions and "0" for the control condition). A logistic regression analysis was run with this new variable and "need for approval" as independent variables and "cheating or guessing" as dependent variable. The results show a trend for this interaction effect (wald (1) = 2.80; *p* = .095). A comparison of the means shows that participants with a low need for approval in fact cheated slightly less (*M* = 0.135; *SD* = 0.35) in the presence of a camera than did participants high in need for approval (*M* =0 .143; *SD* = 0.36). To be precise 13.5 % of the participants low in need for approval cheated or guessed in the presence of a camera, while 14.3 % of the participants high in need for approval showed that behaviour. This finding contradicts hypothesis 2, as this was expected the other way around.

To gain more insight in the moderating effect of "need for approval" we also tested the interaction effects of "need for approval" with every camera condition on cheating behaviour with the control condition being the reference category. As it is shown in table 6, we found the strongest moderating effect with the "self-awareness" condition. Participants with a high need for approval cheated and guessed more (*M* = 0.09; *SD* = 0.30) in the self-awareness condition than participants low in need for approval did in that condition (*M* = 0.08; *SD* = 0.29).

Table 6

Interaction effects of camera condition and personality characteristics on cheating and guessing

	df	Std. Error	Wald	P
Surveillance by authority* need for approval	1	2.90	.68	.409

Surveillance by public*need for approval	1	1.82	1.06	.304
Self-awareness* need for approval	1	2.28	2.80	.094

Camera condition and pro-social behaviour

In hypothesis 3 it was assumed that participants in all camera conditions would show significantly more pro-social behaviour than participants in the control condition. Pro-social behaviour concretely means helping, clearing up their trash and donating parts of the earned money for the WWF.

The results of the logistic regression analysis do not confirm this hypothesis as there is no significant difference in the helping and cleaning behaviour between the different camera conditions and the control condition. As we were interested in the differences between the three camera conditions and the control condition, the reference category here was the control condition. The results are show in table 7. We also examined if the percentage of money the participants donated differed significantly between the camera conditions and the control condition. A one-factor variance analysis shows that there is no significant difference between the conditions (F (3,82) = .311, p = .817). Table 8 compares the means of the 4 conditions.

We did find though, that the mean percentage of donated money appears to be higher (M = 53.7%, SD = 40.4)) in the "camera present" condition, that was generated as described in the last paragraph, compared to the mean percentage in the control condition (M = 44.4%, SD = 43.10), but this difference is not significant.

Table7

Effects of Camera Condition on Pro-Social Behaviour

	helping				Clearing trash			
	df	Std. Error	wald	p	df	Std. Error	wald	p
Surveillance by authority	1	.659	.041	.839	1	.831	.517	.472
Surveillance by public	1	.639	.712	.399	1	.718	.000	1.00
Self-awareness	1	.654	.007	.935	1	.724	.017	.895

Table 8

Means and standard deviation of donation in the different conditions

Camera condition	Mean	Std. Deviation
Surveillance	56.0	43.76
Public	51.1	36.66
Self-awareness	54.0	42.31
Control	44.4	43.10

Interaction effects of camera condition and personal characteristics on pro-social behaviour

Hypothesis 4, 5 and 6 suggested that interaction effects of camera condition and personality characteristics influence pro-social behaviour.

It was expected to find a positive effect of the interaction of the presence of a camera and high "need for approval" on pro-social behaviour. The logistic regression analysis showed a trend for an interaction effect of "camera present" and "need for approval" on clearing up trash (wald(1) = 3.66; p = 0.56). A comparison of the means indicates that participants with high "need for approval" left their cup on the table less often in the presence of a camera (M = 60; SD = 0.50), than did participants low in need for approval (M = 0.73; SD = 0.45). But a comparison of "presence of a camera" and the control condition showed that high "need for approval" participants left slightly more trash behind in the presence of a camera than they did in the control condition (M = 0.58; SD = 0.52). It was also found that participants "low in need for approval" left trash behind less often in the presence of a camera (M = 0.73; SD = 0.45) than in the control condition (M = 80, SD = 0.45). This does not fit the hypothesis, as it seems that the presence of a camera has a bigger influence on participants low in need for approval than it does on participants high in need for approval.

A regression analysis including all camera conditions separately gives further insight in the moderation effect of "need for approval" on camera condition and leaving trash behind. The results of that are summarised in table 9. The interaction between camera condition and "clearing up trash" was moderated by "need for approval" in the "self-awareness" condition. The comparison of the means proves that participants with a high "need for approval" left more trash behind (M = 0.71, SD = 0.49) than participants with a low "need for approval" (M = 0.56, SD = 0.53) in that condition.

The results do not show a moderating effect of "need for approval" between "camera condition" and "helping". The logistic regression analysis of "helping" (dependent variable),

"camera present" (independent variable) and "need for approval" (moderator) shows no significant results (wald (1) = 1.33; *p* = 0.25). The results of the regression analysis including all camera conditions separately are summarised in table 9.

"Need for approval" also seems to have a moderating effect on "camera present" and the percentage of the money they had earned, that participants were willing to donate. An analysis of the variance showed significant results (*T* (1,82) = 5.34; *p* = 0.023). From a comparison of the means, it seems that participants high in "need for approval" donated less in the presence of a camera (*M* = 51.64; *SD* = 43.21) than they did when there was no camera (*M* = 59.49; *SD* = 44.11). The comparison of the means of all camera conditions and the control condition showed that participants with a higher need for approval donated a higher percentage of money in the condition "self-awareness" and in the control condition compared to participants with a low need for approval, while they donated less in the "surveillance by authority"- and the "surveillance by public" condition. See table 10 for details.

These results do not confirm hypothesis 4. There seems to be a moderating effect of "need for approval" on "camera condition" and "clearing up trash", but a high need for approval does not lead participants to clear up their cups more often, as expected, but less often. The same is true for the relationship of "need for approval", "camera condition" and the percentage of money people were willing to donate. A high "need for approval" seems to have a negative effect on this interaction. There was no moderating effect on "helping" and "camera condition".

In hypothesis five it was assumed that self-monitoring has moderating effects on the relationship of "camera condition" and pro-social behaviour, with high "self-monitoring" leading to more pro-social behaviour, if watched by others. To test this hypothesis, we used logistic regression analysis with "camera condition" as independent variable, "self-monitoring" as moderator and "clearing up trash" respectively "helping" as dependent variables.

The results (see table 9) show trends for interaction effects of "camera condition" and "self-monitoring" on "clearing up trash" in the camera conditions "surveillance by authority" and "surveillance by public". Participants with a high score on self-monitoring generally left less trash behind in the "surveillance by authority" condition (*M* = 0.71, *SD* = 0.49) than participants who scored low on self-monitoring (*M* = 0.83, *SD* = 0.41), while they tended to leave more trash behind in the "surveillance by public" condition (*M* = 0.69, *SD* = 0.48) compared to participants with a low score on self-monitoring (*M* = 0.50, *SD* = 0.58).

There were no indications of moderating effect of "self-monitoring" on camera condition and "helping behaviour". Table 9 gives the details.

To test the moderating effect of "self-monitoring" on camera condition and the percentage of money participants were willing to donate, an analysis of the variance was used. It did not indicate any significant results (F (3,78) = 0.77; p = 0.52).

Hypothesis five is therefore not supported by the data, as a high score on self-monitoring does not generally enhance pro-social behaviour, if participants are watched by others.

Table 9

Interaction Effects of Camera Condition and Personality Characteristics on pro-social Behaviour (reference condition = control condition)

	Clearing up trash			Helping		
	df	wald	p	df	wald	p
Surveillance by authority * need for approval	1	1.54	.215	1	.06	.800
Surveillance by public * need for approval	1	.02	.895	1	.85	.355
Self-awareness * need for approval	1	6.67	.010	1	2.61	.106
Surveillance by authority * self-monitoring	1	3.13	.077	1	.82	.726
Surveillance by public * self-monitoring	1	2.90	.088	1	.94	.537

Table 10

Means and Standard Deviations of Percentage Money Donated per Condition for High and Low Need for Approval

	Camera condition	Mean	Standard deviation
High need for approval	Surveillance by authority	51.39	52.09
	Surveillance by public	42.02	36.27
	Self-awareness	60.00	43.98
	Control	59.49	44.10
Low need for approval	Surveillance by authority	59.08	39.44
	Surveillance by public	57.44	37.00
	Self-awareness	48.82	41.96
	control	14.29	19.67

In hypothesis 6 it was further expected that participants with a pro-social rather than with a pro-self social-value orientation would show significantly more pro-social behaviour if they see themselves on monitor in comparison to being observed by others (authority or not) and not being observed at all. This has been tested using a logistic regression analysis with the pro-social behaviours "clearing up trash" and "helping" as dependent variables and "camera condition" and "social-value orientation" as independent variables. As we are interested in difference between the "self-awareness" condition and the other camera conditions and the control condition, "self-awareness" condition was used as reference category. As shown in table 11, the logistic regression analysis does not show any significant moderating effects of social-value orientation on camera condition and helping and clearing up trash. Pro-socials in the "self-awareness" condition do not help or throw away their trash significantly more often than in other conditions.

The variance analysis also does not show any significant moderating effects of social-value orientation on camera condition and donation behaviour (F (3,73) = 1.82; p = 0.15).

Table 11

Interaction Effects of Camera Condition and Social-Value Orientation on Pro-Social Behaviour

	helping				Clearing up trash			
	df	Std. Error	wald	p	df	Std. Error	wald	p
Surveillance by authority* Social-value orientation	1	23205.42	.00	.99	1	1.99	.31	.58
Surveillance by public* Social-value orientation	1	1.45	.07	.79	1	1.73	.38	.60
Control*social-value orientation	1	1.68	.92	.76	1	23205.42	.00	.99

Further results

Apart from the results mentioned above, we found one significant result outside the primarily tested hypotheses. That was, that "nationality" did have a significant influence on cheating behaviour. To be precise, it had an influence on the combined variable "cheating or guessing". Participants of German nationality appeared to cheat and guess significantly more than participants of Dutch nationality (wald(1) = 5.37; p = 0.027).

Discussion

The goal of this study was to examine the effect of different sorts of camera surveillance and certain personality traits on undesired behaviour, represented here by cheating and desired behaviour, represented here by helping, clearing up trash and donating money. Our results support the hypothesis that the way the camera is presented indeed influences people's cheating behaviour. The results prove that undesired behaviour (cheating) decreases with the increasing risk of being caught. These results fit earlier literature, like for example Levine (2000) who stated that the use of security cameras enhances people's visibility and therefore increases accountability which again causes people to engage in less undesired behaviour. Phillips (1999) also confirmed in her study that crime rates decreased in a specific area after the installation of security cameras. Our results even go a bit further than that, as we not only found that presence of a camera in general reduces cheating behaviour, but that cheating behaviour reduces even more, when people are told that the purpose of the surveillance is to prevent and control undesired behaviour and when it was visible to the camera what they wrote. That fits Levine's statement that "the key question has always been visible/invisible to whom?" (Levine, 2000, p.6) as it was obvious in that condition that the participant's behaviour will be rated by an authority while in the other conditions the behaviour was only visible to the participants themselves or a not further specified "public" respectively.

We did not find statistical proof that participants in one condition also guessed more or less than in the others. This can be explained by the fact that guessing was not directly labelled as undesired or forbidden behaviour in the instructions. It was only implicitly mentioned as it was explained to the participants that the aim of the experiment was to compare the performance of participants in different conditions. This indicates that guessing is not wanted as it biases the performance. It is possible though that, because it was not strictly forbidden, participants did not feel as if they were breaking any rules by guessing as much as they were by cheating. Therefore the risk of being caught did not influence their guessing behaviour, but on the videos it still seen at least for a few of them that they did not feel quite comfortable with guessing, but did it anyway.

A new aspect of this study, apart from the use of different camera conditions, was the investigation of interaction effects of camera condition and personality characteristics on cheating and pro-social behaviour. It was hypothesised that high need for approval should lead to less cheating behaviour in the presence of a camera. The results do not supported this assumption. That is inconsistent with Millham (1974), who found a significant correlation of

cheating and need for approval. Williams, Nathanson and Paulhus (2010) also point out that the influence of personality on cheating was very small if detectable at all, which might explain why we did not find this effect..

We did not find sufficient proof for the assumption that the presence of a camera directly influenced participant's pro-social behaviour, which contradicts the results of Bateson et al. (2006), who found that cues of being watched, even minimal ones, caused people to act more pro-social. It was expected that the feeling of being watched would be especially strong in the "surveillance by public" condition as participants in that condition were told that their behaviour would be rated by an unknown public. The results do not show that. There are a couple of explanations for this.

Firstly it is possible that their results are not literally comparable to ours as decorating the room with images of eyes certainly is not the same as using a surveillance camera. It was assumed though that the presence of a camera in combination with telling the participants that they are being observed should serve as a "minimum cue of observation".

What seems more important and more likely is that as Ernest-Jones et al. (2011) already pointed out, this effect disappears when "explicit information about actual anonymity is also provided", which was the case in this study as anonymity of the participants was guaranteed in the informed consent form.

Apart from that, Vohs, Mead and Goode (2006) also found that the thought of money makes people less cooperative. In their study they primed participants in various ways on money and their results show that people reminded of money felt more self-sufficient and show less helping behaviour than participants in the control condition who had not been primed. As participants in our study received 50 cents per correct answer, they were reminded of money and therefore Vohs et-al.'s findings (2006) might also be true for our study and the involvement of money might indeed influence participant's pro-social behaviour.

It is further possible that the effect of the different camera conditions might has been reduced at least for donating by the fact that the researcher presented the donation box in person and informed about the possibility to donate the money right before the action took place. The researcher was present in the room, when the money was donated (or not) and therefore the participants in all four conditions might have experienced the same level of being watched.

We turn now to the moderating effects of personality characteristics on the relationship between camera condition and pro-social behaviour we predicted in hypothesis 4, 5, and 6. People with a high need for approval left more trash behind in the "self-awareness"

condition than did participants with a low need for approval. This is an unexpected outcome and was predicted the other way around in hypothesis 4, because need for approval in general encourages pro-social behaviour and causes people to adhere to social norms like "you should not litter". It was expected that enhanced self-awareness and the feeling of being watched by others triggers this concept en enforces the effect. De Kort, McCalley and Midden (2008) found in their study on persuasive trash cans that increased self-awareness (through a mirror behind the trash can) activated littering norms and reduced littering behaviour, but more research is needed on the interaction effect of self-awareness and need for approval. High need for approval participants also tended to donate more than participants low in need for approval in the self-awareness-condition, while they donated less in the other two conditions.

It is possible that there is not only an interaction of camera condition and need for approval, but also between need for approval and social value orientation. Iedema and Poppe (2001) found that people with varying social value orientation label different kinds of behaviour as socially approved. While people with a more pro-social attitude see pro-social behaviour as more desired by the society, people with a more pro-self attitude in contrast see pro-self behaviour as more desired. As an effect they engage more in the kinds of behaviour that they themselves see as desirable when self-evaluation is triggered. Our results indicated that different camera conditions do activate the concept of need for approval more than others do, but it is possible that interaction effects between this concept and social value orientation influence behaviour together. While pro-social participants with a high need for approval engage in more pro-social behaviour when need for approval is triggered, individual/competitive participants engage in more pro-self behaviour when need for approval is triggered, as they belief that to be more accepted and approved by the reference group. We did not measure this interaction in our study, as our sample size was too small to give reliable results for this three-way interaction.

What is rather striking is the fact that participants who scored high on self-monitoring cleared up their own cup more often in the "surveillance by authority" condition than did participants with a low self-monitoring score, while they cleared up their trash less often in the "surveillance by public" condition. It was expected that participants high in self-monitoring would engage in more pro-social behaviour in both "watched by others" condition. The explanation for that phenomenon leads us back to the problematic of visibility to whom – problematic that Levine (2000) pointed out. Self-monitoring is described as the activation of social norms to guide behaviour in specific situations in order to maintain a positive and generally seen situational appropriate self-presentation (Snyder & Gangestad,

1986). In order to achieve this positive self-presentation, it is important to know which, respectively whose norms should be used as cues for desirable behaviour. Different reference groups do have different descriptive norms, indicating what kind of behaviour is appropriate and accepted or unaccepted by the group (Kallgren, Reno & Cialdini, 2000). It is quite common to leave trash behind in public places and it seems to be widely accepted as "normal" behaviour, while everybody knows that officially leaving trash behind is something one should not do. This seems to be important here as it appears that the surveillance by a public condition triggers more the descriptive norms of the student population, while the surveillance by an authority condition obviously activates the injunctive norms about what one officially should and should not do.

Karakashian, Walter, Christopher & Lucas (2006) did research about how shyness affects social helping and found that shy people are far more frightened of social rejection than are non-shy people, leading them to different behaviours and different motivations. While non-shy people try to gain social approval and therefore actively engage in socially desired behaviour, shy people are more focused on not engaging in socially undesired or embarrassing behaviour. They further found that participants who were rated as shy also scored high on self-monitoring. The correlation between these two concepts could provide an explanation for the fact that participants who scored high on self-monitoring showed no difference in helping behaviour in the different camera conditions.

In hypothesis 6 it was assumed that participants with a pro-social rather than participants with a pro-self social value orientation would show significantly more pro-social behaviour in the "self-awareness" condition than in the other two camera conditions or the control conditions. This hypothesis was not confirmed by our data. It was expected that monitoring themselves on a monitor would cause participants to focus more on themselves and would trigger their inner norms – that would also mean there social value orientation. That the results do not show the assumed moderating effect can have several reasons. First of all it is possible that seeing their own face on a monitor did not cause participants to focus on themselves, for example because they were distracted by the puzzle task and focused on their performance. As mentioned earlier, the presence of the researcher might have influenced pro-social behaviour more strongly than the presence of the camera. Thirdly it is possible that the camera condition did enhance participants' self-awareness and caused them to focus more on themselves, but did just not trigger their social-value orientation. Even the results of Vohs et al. (2006) can be of importance here, as the effect of social value-orientation might be outweighed by the negative effect that money has on pro-social behaviour in general. There

has not been much research on the moderating effects of social-value orientation on the relationship between camera condition and pro-social behaviour and therefore it is difficult to place these results in a literary context. To get more insight in the moderating effect of social-value orientation, more research is needed.

Implications for further research

The study at hand answered a few questions on the field of the effectiveness of different types of camera condition and the circumstances under which they proof especially effective. But it also poses a couple of new questions as our results of the interaction effect on camera condition and personality characteristics appear quite surprising and hard to explain. Therefore more research of the interaction effects and possible three-way interaction between different personality characteristics and camera conditions should be conducted to make reliable statements about for example the role of self-monitoring and need for approval. Therefore the sample size should be significantly larger. It seems that this has been the first experiment to examine interaction effects of different forms of camera surveillance and personality characteristics on pro-social and undesired behaviour. It gives a lot of interesting insights in the field of camera surveillance, but it would be interesting to see these findings to be further investigated.

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