Nederlands Studiecentrum
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# Evaluation of intervention related to drug dealing and public disturbances
## Monnikenstraat, Amsterdam


NOVEMBER 2022

**In August 2022, the City of Amsterdam initiated an intervention to decrease the public disturbances due to drug dealing at Monnikenstraat in Amsterdam. To evaluate the effect of this intervention, the NSCR used video footage from public surveillance CCTV cameras.**

The city of Amsterdam considers the consistent drug dealing in the center of Amsterdam – especially in the Red-Light District – to be a problem. This problem includes both the actual drug dealing but also the intimidation, violence, and public disturbance caused by drug dealers. Visitors, people living in the area, and local businesses have all reported issues with groups of dealers hanging around the streets and disturbing the public order. These activities have been an issue for the Municipality of Amsterdam for more than 20 years, but they have increased in frequency in 2019-2020, which called for intervention to stop this development. Therefore, the City of Amsterdam has initiated an intervention (August 2022) to decrease the public disturbances due to drug dealing. This intervention entails the placement of projectors using light to display a text to discourage purchasing drugs from drug dealers and taking pictures of sex workers on the walls and the ground of Monnikenstraat (see Appendix A).

I this study, the NSCR used video footage from two public surveillance CCTV cameras capturing the intervention and the area around in order to evaluate the effect of the intervention. Our aim is to answer the following questions:

- Do we observe *less drug dealers* present after the implementation of the intervention compared to the period prior to the intervention?
- Do we observe *fewer incidences* of public disturbances after the implementation of the intervention compared to the period prior to the intervention?

### Methodology

For the evaluation of the intervention, we used video footage of two existing public cameras facing the intervention area, Monnikenstraat, Amsterdam (see Appendix B). Data were collected over a period of three weeks, one week before the intervention and two weeks during the intervention. We used footage from 5 days (Wednesday-Wednesday[1]) before the intervention and 7 days (Thursday-Saturday) during the intervention. For each of the days, we collected video footage from 8PM - 4AM. Mondays, Tuesdays, and Sundays were not part of the sample since the intervention was not in operation on these days.

[1] The installation lights were being installed the initial Wednesday of the intervention so data collected from this day was included in the pre-intervention data.



NSCR conducts fundamental scientific research into crime and law enforcement. Our research is substantively innovative, methodologically state-of-the-art and contributes to the solution of major societal issues in the field of security and justice.

NSCR is part of the Institutes Organisation of the Dutch Research Council (NWO).

We first developed a behavioral codebook by watching a subset of the footage (see Appendix C). This codebook details relevant behaviors and contextual variables that are visible in the video footage. Encoded behaviors included different types of public disturbance, such as taking pictures of sex workers, interpersonal conflicts, throwing up or peeing on the street, and littering. The contextual variables were the crowding level, the weather, presence of police or hosts, and the presence of dealers.

The codebook was tested for inter-rater reliability by selecting 26 time points of two busier days, to make sure we involved enough positive cases to adequately test the compliance in coding. For each of these 26 time points, two coders independently coded the presence and absence of the variables in the codebook in order to ensure the reliability of the measures. This analysis found that the variables in the codebook were reliable[2].

After developing the codebook, we sampled a one-minute segment every fifteen minutes of the collected footage for analysis. This amounted to a total of 768 observational segments. In 3 of these segments the video footage froze or was turned away, and the final number of observations thus amounts to 765 one-minute segments. We used the developed codebook to encode each of the sampled observation segments by registering the presence and absence of relevant behaviors and context variables within each segment. These encodings are the basis for the further analysis. Additionally, all researchers visited the camera site and surrounding areas both before and during the intervention. This allowed identification of any blind angles and limitations of each camera and to better understand the dynamics of Monnikenstraat and the surrounding areas. These in-person observations informed some of the points raised in the discussion.

## Results

First, a visual examination was conducted of the dependent variables (drug dealer presence and public disturbances) before and after the intervention. Second, a statistical analysis of the influence of the intervention on the dependent variables was analyzed while taking the influence of control variables such as crowding, day of week, and time of night into consideration.

### Visual analysis

Figure 1 shows the percentage of observations where a drug dealer was present before and after the intervention. The figure shows that while we observed drug dealers both before and after the light intervention was installed, there appear to be fewer segments where drug dealers were observed after the intervention compared to before. The biggest change appears just before midnight. Before the intervention, there was a steep increase in segments with drug dealers observed from 23:00 and onwards. After the intervention, however, there is a continuous decrease in segments with dealers present from 23:00 until the observation period ends. We observed the presence of drug dealers in about 10% of the observation periods prior to the intervention and in 6% of the observation periods after the intervention was implemented.

[2] The only measure that failed to reach adequate interrater reliability was the consumption of alcohol. Here, the coders found it difficult to identify which beverages were alcoholic and which were not. For this reason we have decided to not include the variable measuring alcohol consumption in the later analysis.

Figure 1. Drug dealer presence by hour of the day before and after the intervention

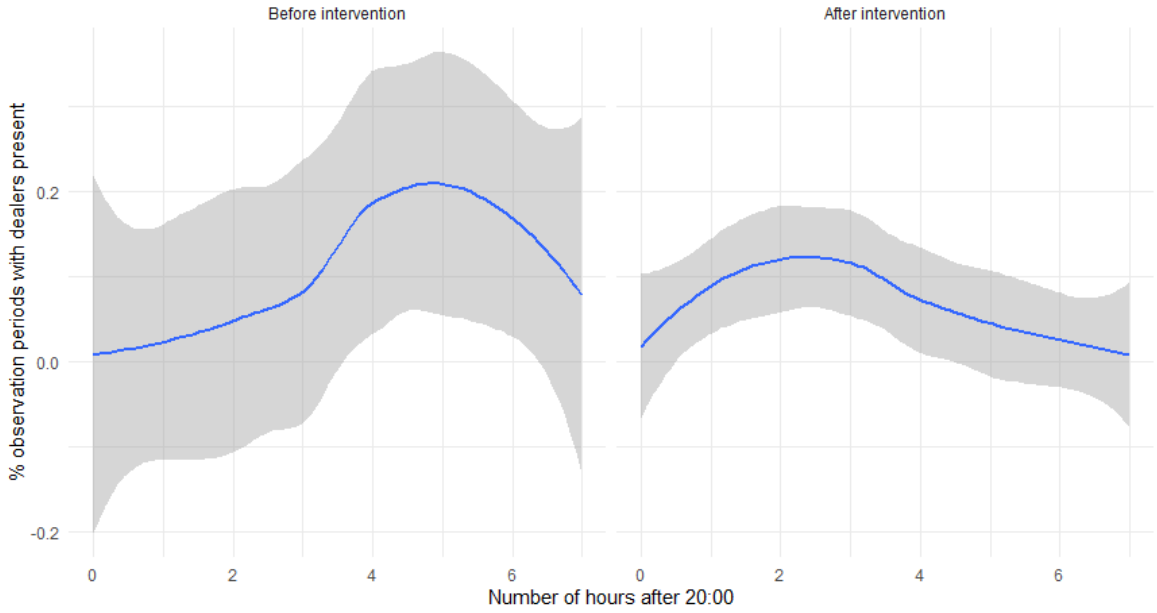
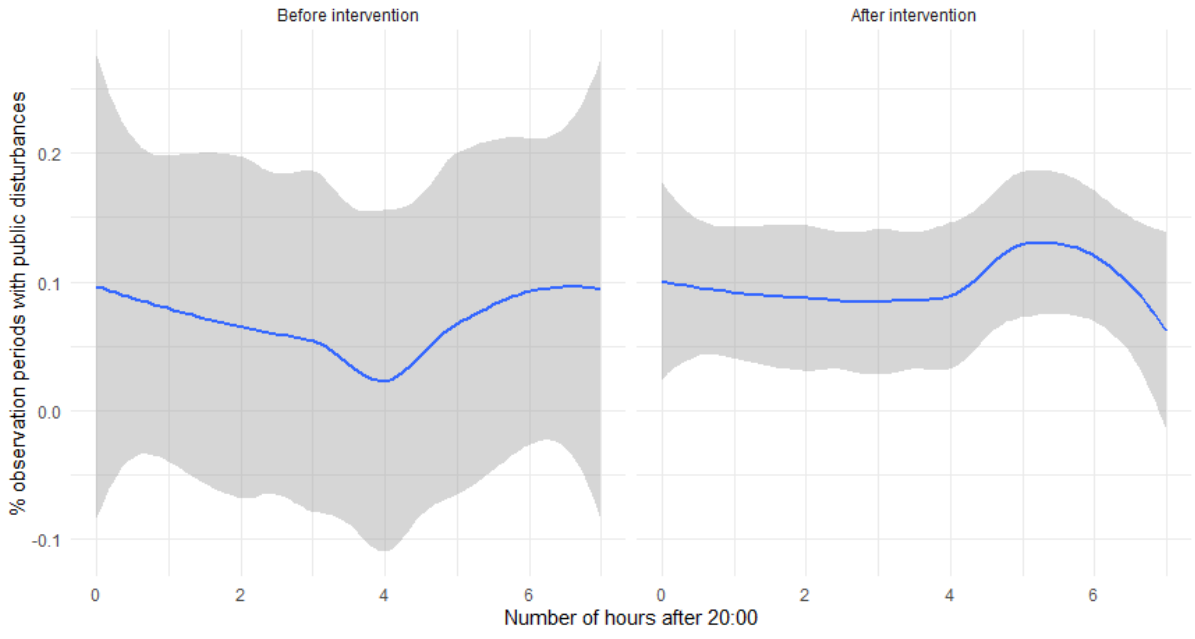



Figure 2 shows the percentage of observations with at least one instance of the public disturbance behaviors before and after the intervention. The figure shows that the public disturbances were present throughout the night both before and after the intervention was implemented. There appears, however, to be a slight increase in the number of segments with public disturbances after the intervention compared to before the intervention was implemented. The difference appears to be especially pronounced after midnight where the number of public disturbances decrease for the observations before the intervention and increase on the observations after the intervention. We observed at least one public disturbance in 7% of the observation periods prior to the intervention and in 10% of the observation periods after the intervention was implemented on Monnikenstraat.

Figure 2. Public disturbances by hour of the day before and after the intervention



## Statistical analysis

The second part of the analysis is a statistical test of the changes in the presence of drug dealers and public disturbances before and after the intervention was implemented on Monnikenstraat. Here, we use a linear probability model to investigate if there is a statistically significant difference in the presence of drug dealers and public disturbances on Monnikenstraat before and after the intervention. One of the major benefits of this approach is that it allows us to take a number of control variables (crowding, day of week, and time of day[3]) into account when investigating the relationship between the intervention on Monnikenstraat and each of the two outcome variables.
Presence of drug dealers

We found that there was a statistically significant decrease ($p = 0.04$) in the number of observations with drug dealers present after the intervention was implemented. This is similar to what was shown by Figure 1. The reduction in presence of drug dealers on Monnikenstraat was statistically significant when we controlled for the number of people observed on the street, the day of the week, and the time of the day. With all of these factors taken into account, the chance that drug dealers are observed is 4.1 percent point lower after the intervention has been implemented compared to before. Initially, we were also asked to observe the number of drug deals before and after the intervention. The results, however, remained inconclusive due to the low number of drug-dealing interactions captured on camera.

## Public disturbances

There was a not a statistically significant change in the number of observations with public disturbances observed after the implementation of the intervention on Monnikenstraat. This is different from what was visually apparent in Figure 2. The difference in public disturbances before and after the intervention was therefore not statistically significant when we controlled for the crowding, the day of the week, and the time of the day. To investigate the connection between public disturbances and the presence of drug dealers on Monnikenstraat, we furthermore included the presence of drug dealers on the street as a predictor of public disturbances. This analysis showed that the presence of drug dealers was not a statistically significant predictor of public disturbances.

## Discussion

The analysis found that there was a decrease in the frequency of observed drug dealers after the light-based intervention was installed. It thus appears that the light-based installation successfully deterred the drug-dealers from Monnikenstraat. The analysis found no difference in the number of public disturbances observed before and after the intervention was installed. Following the statistical analysis, we can therefore conclude that one of the two measured outcomes changed after the light-based intervention was implemented.

While the intervention appears to have impacted the presence of the drug dealers on Monnikenstraat, we do not know if it actually reduced their drug dealing behaviors or if the dealers simply moved to a different area beyond the Monnikenstraat cameras. During on-site visits, it was apparent that the dealer's area of "business" was fluid. We observed that the dealers rarely remained positioned in one place for an extended length of time. Additionally, while on site we witnessed multiple drug dealing interactions that were not stationary as the dealers walked alongside the potential buyers.

[3] Police/host presence and weather were inconclusive due to the rarity of variation in the observed segments.

By solely relying on video footage for the analysis, our conclusions are limited to what we were able to observe from the camera's static view. As such, our conclusions are only related to the number of dealers caught on camera, and thus not to the number of dealers in the area as a whole. We could not observe whether the number of dealers decreased in the whole area, or if there was a displacement effect. In order to establish if the number of dealers decreased or they were displaced to areas outside the intervention areas, additional observations of the surrounding area would be necessary.

The analysis also finds that the presence of drug dealers is not a statistically significant predictor of public disturbances. The goal of the intervention, however, was to decrease drugs dealer presence in the street in order to decrease public disturbance. This raises questions about the assumed causal effect of drug dealers and public disturbances, and as such whether the intervention achieved its goal. Additional research is encouraged to explore the relationships between drug dealers and their activities and public disturbances.

### Limitations

Through site visits, it became clear that drug dealing interactions occurred over a variety of locations, however, the analysis for this project was limited to the camera's view. From the analysis of the video footage we could also see that some dealers were aware of the camera's presence as they pointed to the camera or kept their heads down when they were in the camera's view, which raises questions about not only what happens outside the intervention area but also outside the camera area. Additionally, it was difficult to identify who the drug dealers were. We primarily relied on repeated viewings of potential dealers but many of the behaviors we defined as dealer behaviors (e.g., lingering, scanning the crowd) overlapped with other activities in the Red Light District (e.g., waiting for friends, nervous customers of the sex workers in the street) potentially creating misidentification of dealers.

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## Appendix A – Intervention light installments

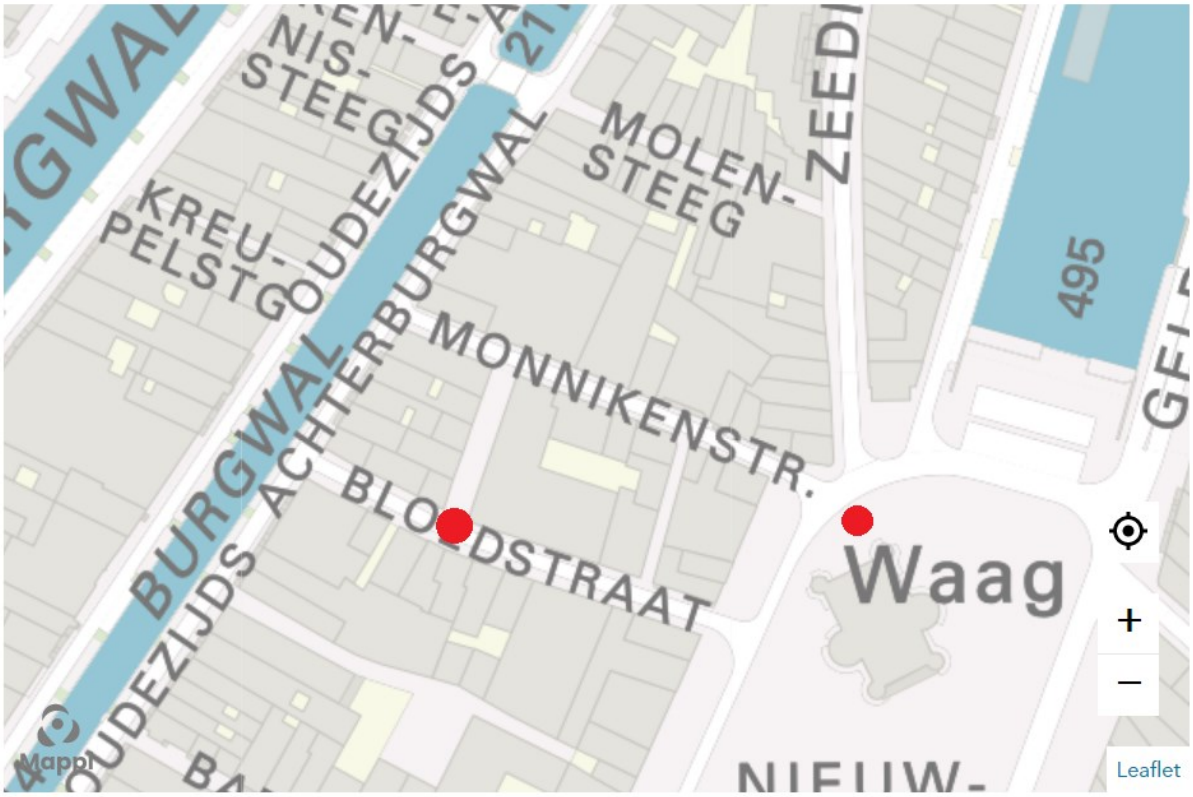
Image 1. Intervention light installation for drug dealing.


Image 2. Intervention light installation for taking photos of sex workers.

## Appendix B – Location of intervention street and specific cameras

Image 1. Intervention area, Monnikenstraat, Amsterdam.


Image 2. Location of the used cameras, both facing the intervention area.



## Appendix C – Behavioral codebook

### CODING PROCEDURE

- We have footage from 6 days (Wednesday-Wednesday, 27/07/2022-03/08/2022) before the intervention and 9 days (Thursday-Saturday, 04/08/2022-14/08/2022) after the intervention is implemented.
- We have twelve hours a day of footage, from 20:00:00-04:00:00. We do not evaluate whole days because the intervention light is only on from 20:00:00-04:00:00.
- We will not code whether the windows are open/not, because they are always open, except for 4AM-8AM.
- We code in segments of 15 minutes. At the beginning of the segment, we count the amount of people present (crowding). After, we code for one minute (e.g. 04:00:00-04:01:00).
- Whenever the camera turns and/zooms, we code the next available minute continuously within the segments.
- Whenever the camera zooms because any public disturbance is occurring but the camera does not turn, we do code this. In these cases, we will use the first available shot that we can use to code crowding.

### GENERAL CODE BOOK

| *Code* | *Definition* |
|---|---|
| coder_code | 1 = Mel; 2 = Jo |
| camera | 0 = 047_Zeedijk_Nwmarkt_Monnickenstr_Taxist; 1 = 048_Bloedstr_Gordijnenstg<br><br>Due to filming at different camera angles, we zoom in all Nieuwmarkt camera (see screenshot). |
| date_observation | Note the date that the video was recorded (e.g., 13.08.22). |
| clock_time_video_starts | Note the clock time when the video starts (e.g., 04:00:01). |
| time_observation_starts | Note the video time (not clock time) when the observation of the segment starts.<br><br>Make sure you start at the right clock time.<br><br>The videos of 16:00:00 start at clock time 15:59:59. The observations will start xx:00:01, xx:15:01, xx:30:01, xx:45:01.<br><br>The videos of 16:00:26 start at clock time 16:00:24. The observations will start xx:59:36, xx:14:36, xx:29:36, xx:44:36. |
| weather | 0 = not raining, 1 = (heavy) raining. |

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| | We code raining as heavy raining. Drizzling is coded as not raining. |
| crowding | Number of people present at the beginning of the observation (screenshot).<br><br>We **do** count:<br>- All people visible on the street<br>- We only count people fully on the street, and not partially in the doorway<br>- When a part of the body is visible, we also count this<br>- We do count people on bikes<br>- Police officers<br><br>We **do not** count:<br>- We do not count people in cars, because we do not know how many people are in.<br>- We do not count babies in strollers.<br><br>For the Nieuwmarkt camera, we draw line due to visibility issues. We draw the line at the front of the first staircase at the right side of the street. Note, we still count instance public disturbances and police beyond this point. |
| public_disturbance_drugdealing | 0 = no, 1 = yes.<br><br>We define drug dealing as the exchange as product (usually in tiny bag, if visible) and money or open wallet.<br><br>Note: If dealers_presence is 0 (none), code -99. |
| public_disturbance_conflict | 0 = no, 1 = yes.<br><br>We define a conflict from aggregated hand gestures up until fighting.<br><br>If it is clear that people are friendly towards each other and acting like fighting, we **do not** code it as a conflict. |
| public_disturbance_taking_pictures | 0 = no, 1 = yes.<br><br>Whenever someone is taking pictures from sex workers, we code this.<br><br>When people take pictures of others, but not of sex workers, we **do not** code this as taking pictures. |

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| public_disturbance_peeing_puking | 0 = no, 1 = yes. |
| public_disturbance_alcohol_consumption | 0 = no, 1 = yes.<br><br>Alcohol consumption is not allowed in this area of the city. We code alcohol consumption whenever any individual is drinking alcohol.<br><br>Indications that it can be an alcoholic drink:<br>- Chugging a drink<br>- If multiple people are drinking (or smoking pot) in a group, it is more likely that it is an alcoholic drink<br>- Time of night<br>- Drunk behaviors<br><br>We **do not** code if the person is holding an alcoholic drink but does not consume. We **do not** code if we cannot determine if the drink is alcoholic and no contextual clues are provided. |
| public_disturbance_rollingjoint | 0 = no, 1 = yes.<br><br>We code people who are rolling or clearly smoking a joint. If we cannot detect if it is a joint or a cigarette, we code no. |
| public_disturbance_littering | 0 = no, 1 = yes.<br><br>If the same person that litters, picks it up afterwards, we **do not** code it as littering. |
| public_disturbance_begging | 0 = no ,1 = yes. |
| public_disturbance_other | comment. |
| police_host_presence | 0 = no, 1 = police present, 2 = host present, 3 = both.<br><br>If one or more police officer(s) is/are present, code 1. If a police car/bus is driving by and/or stopping, also code yes.<br><br>If one or more host(s) is/are present code 2.<br><br>If both police and host(s) are present, code 3. |
| dealers_presence | 0 = no, 1 = yes.<br><br>We identify the presence of dealers as following: |

| | |
|---|---|
| | - Person is alone<br>- Person is scanning crowd with their head<br>- Person is not constantly looking at one point<br>- Relaxed and open body posture<br>- Person is alert and attentive<br>- If we coded an individual as a dealer before and the same person appears again<br><br>If applicable: they leave their position when police approach and/or police approaches them without there being an incident.<br><br>This list is a guidance for identifying dealers. If we observe individuals that do not meet all criteria, but is we clearly identify the person as being a dealer, we do code them. If needed we will scan forward or backward in the film to help identify contextual clues if an individual is a dealer or not. Try to keep this limited due to time limitations. |
| dealers_interacting | 0 = no, 1 = yes, -99 = irrelevant.<br><br>Whenever a person identified as a dealer interacts with a stranger in the crowd (not another dealer), but no visible transaction takes place (see public_disturbance_drugdealing) , we code yes.<br><br>Note: If dealers_presence is 0 (none), code -99. |
| time_observation_ends | Note the video time (not clock time) when the observation of the segment ends.<br><br>Make sure you end at the right clock time.<br><br>The videos of 16:00:00 end at clock time 15:59:59. The observations will end xx:01:01, xx:16:01, xx:31:01, xx:46:01.<br><br>The videos of 16:00:26 end at clock time 16:00:24. The observations will end xx:00:34, xx:15:34, xx:30:34, xx:45:34. |
| comments | Please note anything that may be important for the quality of the case, weird stuff, potential outliers, etc.<br><br>When you are unsure about the coding, add a comment so we can discuss the case. Please also note whenever we checked the uncertain cases. |