

Web appendix

Propensity Score Matching to define control districts

We identified control neighbourhoods that are highly similar to the deprived neighbourhoods in which the Dutch District Approach was carried out, by means of propensity score matching. Propensity score matching (PSM) is a statistical method to select similar control areas for intervention areas that are the subject of an observational study in which the researchers do not have any control over the assignment of the intervention (as opposed to a randomized experiment). By using propensity score matching for selection of control areas as well as adjusting statistical analyses for remaining confounders, the comparability between intervention and control areas is maximized, except for the implementation of the intervention.

The propensity score indicates the degree of comparability between the possible control area and the intervention area with regard to the problems that are targeted by the interventions (Dehejia & Wahba, 2002; Kawachi & Subramanian, 2007; Oakes & Johnson, 2006). By calculating a propensity score, we predict the chance to have been selected for the intervention for each neighbourhood in the dataset using multiple predictor variables. The propensity score is hence not predicting the effect of the intervention (in the context of this study, mental health), but the score predicts the likelihood that the intervention would have been implemented in that neighbourhood. The most important predictor for the implementation of the Dutch District Approach was the extent of problems regarding employment, education, living circumstances, social integration, and safety. Neighbourhoods that are very similar to the intervention neighbourhoods with regard to this problems will have similar propensity scores. The basis of the matching will be the range of propensity scores of the group of intervention neighbourhoods and not the 'individual' neighbourhood level score. We did vary the degree of comparability between control areas and intervention areas by selecting different groups of control areas, using different ranges of propensity scores.

We used propensity score matching to select control neighbourhoods that are similar to the intervention neighbourhoods with regard to the neighbourhood environment at the time of the start of the Dutch District Approach. Comparability with regard to demographics is guaranteed by including these socio-demographic variables as confounders in the statistical analyses. These variables, such as age, gender, and socio-economic indicators are therefore not included in the calculation of the propensity scores of neighbourhoods. The calculation of the propensity score were based on variables indicating housing circumstances (housing conditions and physical neighbourhood characteristics), social integration (social neighbourhood characteristics), and safety. We used three different datasets to calculate propensity scores, i.e. the data that were used by the national government to select the 40 deprived neighbourhoods that were included in the Dutch District Approach (VROM Syswov & WoON), the datasets used by the National Bureau of Statistics to monitor trends in outcomes of the District Approach (VROM Syswov and GBA), and the national Livability Monitor (Leefbarometer) (also see Table 1). We use the following variables, measured in the beginning of the year 2008 or as close to that date as possible (Table 1);

- Housing conditions
 - % small houses (≤ 3 rooms) in the neighbourhood
 - % old houses (built ≤ 1970)
 - % cheap houses (social housing)

- % residents that reported to be satisfied with their own home
- % apartments in the neighbourhood
- average number of persons per address
- % of houses that have been demolished
- Safety and social neighbourhood environment
 - % residents that reports nuisance from direct neighbours
 - % residents that reports nuisance from other neighbourhood residents
 - % residents that is afraid to be harassed or robbed in their neighbourhood
 - Public order disturbances, violent crimes, theft from cars, and nuisance
- Physical neighbourhood environment
 - % residents that reports graffiti in the neighbourhood
 - % residents that reports vandalism in the neighbourhood (demolition of telephone booths, bus or tram stops, etc.)
 - % respondents that reported to be satisfied with their living environment
 - Vandalism

Table 1. Data sources for variables used to calculate the propensity score in order to select control neighbourhoods, measured on January 1st, 2008 and available for all postal code areas in the Netherlands

Variables	Before used for	Dataset	Obtained thru
<i>Housing conditions</i>			
% small houses (≤ 3 rooms)	Selection deprived neighbourhoods for District Approach & Outcome Monitor District Approach	VROM Syswov 2008	Ministry of the Interior and Kingdom Relations
% apartments	Outcome Monitor District Approach	VROM Syswov 2008	Ministry of the Interior and Kingdom Relations
% old houses (built ≤ 1970)	Selection deprived neighbourhoods for District Approach	VROM Syswov 2008	Ministry of the Interior and Kingdom Relations
% cheap houses (social housing)	Selection deprived neighbourhoods for District Approach & Outcome Monitor District Approach	VROM Syswov 2008	Ministry of the Interior and Kingdom Relations
% residents satisfied with their own home	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
average number of persons per address	Outcome Monitor District Approach	GBA 2008	Not available
% houses demolished	Leefbarometer (dimensie publieke ruimte)	VROM Syswov 2008	Ministry of the Interior and Kingdom Relations
<i>Safety and social neighbourhood environment</i>			
% residents that reports nuisance from direct neighbors	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
% residents that reports nuisance from other neighbourhood	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS

Variables	Before used for	Dataset	Obtained thru
residents			
% residents that is afraid to be harassed or robbed	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
public order disturbances	Leefbarometer (composite safety indicator*)	Leefbaarometer	Ministry of the Interior and Kingdom Relations
violent crimes	Leefbarometer (composite safety indicator*)	Leefbaarometer	Ministry of the Interior and Kingdom Relations
theft from cars	Leefbarometer (composite safety indicator*)	Leefbaarometer	Ministry of the Interior and Kingdom Relations
nuisance	Leefbarometer (composite safety indicator*)	Leefbaarometer	Ministry of the Interior and Kingdom Relations
% residents that reported graffiti	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
% residents that reported vandalism	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
% residents satisfied with living environment	Selection deprived neighbourhoods for District Approach	WOoN 2006	DANS
vandalism	Leefbarometer (composite safety indicator*)	Leefbaarometer	Ministry of the Interior and Kingdom Relations

*Only the composite safety indicator was available to us. This one safety indicator summarized the data on safety issues, such as public order disturbances, violent crimes, theft from cars, nuisance, vandalism, etc.

We base the selection of control areas on the propensity scores calculated, using a narrow and a broad definition;

- The narrow definition selects control neighbourhoods that fall within the same range of propensity scores as the 83 postal code areas that constitute the deprived intervention neighbourhoods, that is 0.06170 to 0.999. There are 77 districts with a propensity score \geq 0.06170 that are not intervention neighbourhoods.
- The broad definition selects neighbourhoods that belong to the 10% of all areas with the highest propensity scores (= 10% with the highest odds to have similar problems as the intervention deprived neighbourhoods), that is propensity score \geq 0.00036. This selection produces 303 control neighbourhoods.

References

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