Does littering beget more littering?

Analysis from a household garbage disposal study

Since time immemorial it has been debated whether lack of littering enforcement in public spaces affects peoples' psyche and creates indiscipline, leading to further erosion of cleanliness in our societies. Many cities therefore adopt aggressive litter removal measures, thus hoping to inherently discourage people from littering less. Inspired by this, Robert Dur and Ben Vollaard conducted a study in Rotterdam, the second largest city of The Netherlands, from December 2010 to February 2011 to answer this age-old question of whether littering begets more littering; and to study continuation of "treatment effects" long after the experiment ended.

The authors ran an experiment whereby in a randomly assigned part of a less-affluent residential area of Rotterdam, public cleaning services were drastically reduced during a period of three months. Using high-frequency data on litter at treated and control locations before, during, and after the experiment, the study examined whether residents littered more when the environment was less often cleaned, how the behavior developed over time, and whether it continued to exist after the treatment was over.

This study concluded that some residents started to clean up after themselves when public cleaning services were diminished. However, it also concluded that the tendency to litter also went up by about 75% - thereby surmising that both forces might be at play at the same time. Another conclusion was to believe in evidence for continuation of treatment effects; whereby people littered more (even with cleaning services having returned to normal) as well as continued to find avenues (and appointments) with local authorities to discard household items that would have otherwise been taken care of by the municipal clearing services. In other words, people did not immediately litter less if the environment was cleaner.

It seems that the study vastly overstated "behavioural spillover effects" and "learning effects", whereby residents purportedly tended to litter more after cleaning services were suspended for 3 months. To begin with, we don't have any analysis of how other factors, most importantly household incomes, might have confounded such outcomes. For example, it's possible that less-affluent neighbourhoods were more reliant on public services in the first place. Or possibly that blue-collar workers didn't have the liberty to take time off from work to especially haul household garbage to offsite municipal locations for disposal.

Another thing to consider is the correlation assumed in the study between household garbage disposal (in outdoor designated spots) and littering patterns. The authors poorly extrapolated such neighborhood patterns to overall littering effects. The study therefore needs to be expanded to include non-residential garbage patterns and commercial neighborhoods. Additionally, a proper randomized study would have accounted for important endogenous variables such as commercial districts, high foot-traffic areas, stations and various other public spaces etc.

Finally, the study fundamentally assumed that people tended to "free ride" on government services. We honestly didn't know much about the local and state tax regimes in these localities. Did people assume they would at least receive basic services in lieu of their taxes? This was an important aspect that should have been addressed while designing the study.

Overall, the study did generalize patterns focused around human behavior. Therefore for us to reconstruct this study, we could implement controls to make it more robust. For example, the study lacked data spanning multiple cities or regions. Or even randomized locations within the city encompassing multiple economic spectrums. Banerjee and Duflo discuss precisely this in Poor Economics, to highlight how most researchers, in order to answer big philosophical questions, prefer multi-country comparisons to enforce non-interference, thus ensuring internal validity in field experiments. Moreover, the study could benefit from a double-blinded experiment - by ensuring that none of the residents as well as the cleaning staff knew they were subjects of a field experiment (it's possible for cleaning staff to be somehow influenced, leading to internal inconsistencies).

In conclusion, while the overall approach of the study was generally in the right direction, we cited a number of internal and external inconsistencies. First, the assumption of behavioral spillover effects was too easily deduced in the study, without discounting any confounding variables that might have interfered with the results. Second, a relationship between household garbage disposal and the overall human behavior of littering patterns seemed to have been extrapolated. Therefore we propose some measures of reconstructing the study to avoid internal inconsistencies and eliminating endogeneity. We propose that the authors expand the study to include many geographies and possibly expand the scope to include non-household littering. We also propose that the authors ensure the experiment is doubly-blinded and consider economic factors of the subjects and cities to realistically model their study more effectively.