ideas 42

Trashing Misconceptions About Behavior

Reducing Waste in New York City Public Housing

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About ideas42

We are a non-profit looking for deep insights into human behavior—why people do what they do—and using that knowledge in ways that help improve lives, build better systems, and drive social change. Working globally, we reinvent the practices of institutions, and create better products and policies that can be scaled for maximum impact.

We also teach others, ultimately striving to generate lasting social impact and create a future where the universal application of behavioral science powers a world with optimal health, equitable wealth, and environments and systems that are sustainable and just for all.

For more than a decade, we have been at the forefront of applying behavioral science in the real world. And as we've developed our expertise, we've helped to define an entire field. Our efforts have so far extended to 40 countries as we've partnered with governments, foundations, NGOs, private enterprises, and a wide array of public institutions—in short, anyone who wants to make a positive difference in people's lives.

ideas42's economic justice portfolio works closely with the communities we serve to design and advocate for behaviorally informed solutions that make it easier for people facing economic hardship in the U.S. to exercise their power for individual, community, and systems change. We envision a U.S. where a shared, behaviorally informed narrative of poverty removes inequities that prevent all people from leading fulfilled lives of their own definition.

Visit ideas42.org and follow @ideas42 on Twitter to learn more about our work. Contact Matthew Darling at matthew@ideas42.org with questions.

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Executive Summary

People who live in dense urban environments often enjoy increased wages, a variety of entertainment options, and many potential friends amongst their neighbors. But living close to others also has drawbacks in that we can encounter the negative consequences of our neighbors' activities. We see their litter in the sidewalk, step on dog waste that was not disposed of, or smell trash that has been left out too long. Minimizing these negative consequences is an important function of city government, and cities look for ways to make city living more pleasant, especially in city-operated public housing. But what, if any, policies would be effective?

Recently, many city governments have been incorporating insights from behavioral science to help design new policies and programs to solve important problems. Behavioral science uses research from psychology, economics and other academic disciplines to help policymakers rethink how they approach old problems. Behavioral science helps to provide a framework for thinking through how others see the world, and use that knowledge to redesign programs.

As part of a series of community-based research activities conducted as part of the Mayor's Action Plan for Neighborhood Safety, ideas42 received support from partners at New York City Housing Authority (NYCHA), the Research and Evaluation Center at John Jay College, and the Mayor's Office of Criminal Justice (MOCJ) to address resident quality of life concerns arising from improper disposal of household trash, litter, and dog waste on NYCHA grounds. NYCHA is the largest manager of public housing in North America, and provides housing to 1 in 15 New Yorkers.

Diagnosis

After visiting NYCHA developments in three boroughs (Brooklyn, Bronx, and Manhattan), we found significant evidence of improper trash, litter, and dog waste disposal throughout the common spaces, all of which can understandably impact quality of life for residents. We conducted in depth interviews with over 50 NYCHA residents in order to better understand their context, leading us to the the following insights:

1. ***Most residents use large trash bags, which do not fit in the buildings' chutes.*** Residents who use these bags have to choose between improper disposal of trash in these bags, or walking an inconvenient distance to an approved dump site.
2. ***In the absence of policy or infrastructure solutions, residents have developed their own norms for trash disposal.*** Residents have coordinated with each other to dump trash at convenient locations close to their buildings. While posted signs discourage this behavior, both residents and staff recognize that this is the only convenient alternative.
3. ***Even a small amount of trash is salient.*** Because of the high population density of NYCHA developments, even a small percentage of people throwing their trash or litter

away improperly results in a substantial amount of trash. This results in misperceived social norms ("Everyone litters.") that demotivate residents to dispose trash properly.

4. ***Small hassles can undermine good intentions to pick up dog waste and have a big impact on outcomes.*** Even when people are motivated to clean up after their dog, doing so requires that they have easy access to plastic bags for picking up the dog waste, and outdoor trash cans for quick deposits.
5. ***Unenforced fines exacerbate problematic behaviors.*** Signs that note that people who violate litter, trash, and dog waste disposal laws can be prosecuted and fined are posted on NYCHA properties. But these fines are not—and cannot be—effectively enforced. Presenting these choices primarily in the context of fines discourages peoples' intrinsic motivation to take care of the shared environment.

Designs

Based on these insights, we designed a set of interventions to improve trash disposal at NYCHA sites. We worked with NYCHA staff to develop these interventions, and also showed early version to NYCHA residents to make sure that we incorporated their feedback.

Designs included:

- ***Installation of large, moveable trash containers (tilt trucks) and trash cans in convenient locations.*** This change to NYCHA's infrastructure and policy meant that trash disposal, especially for large trash bags, would be much more convenient for NYCHA residents.
- ***A package of posters to inform people of the new policy and encourage them to use the new infrastructure.*** These posters gave NYCHA residents guidance for disposing different types of trash, reminded dog walkers to bring pick-up bags, and discussed unpleasant effects resulting from improper disposal. **Previous communications had only told residents what not to do**, with the desired behavior often unspecified (people were told not to put trash bags in locations, but not told where to put them). **The new signs gave guidance about what residents should do**, recognizing that people were often motivated to take care of their environment.

Results

The effectiveness of these designs were tested in a randomized controlled trial. 27 sites were selected to receive the intervention package during the summer, while 26 other sites did not receive the package until later. A team of research assistants monitored trash, litter, and dog waste at NYCHA developments for ten weeks before we launched the interventions, and for 10 weeks afterwards, allowing us to examine how the amount of trash changed as a result of the intervention.

After receiving the intervention package, we saw substantial decreases in the amount of trash at NYCHA developments:

- the average number of household trash bags left outside of disposal sites ***decreased by 25%***,
- the average number of litter pieces ***decreased by 16%***
- the average instances of dog waste per site ***decreased by 11%***.

Conclusions

Providing easier access to trash disposal infrastructure, complemented by behavioral communications, significantly reduced the amount of trash, litter, and dog waste on the grounds of NYCHA developments that received the intervention. This demonstrates that new structures and resources can create real behavioral change, and suggests that quality of life issues are caused by a lack of available channels for socially and environmentally conscious behaviors, rather than by any inherent negative behavioral tendencies. Previously, residents did not have a clear option for proper disposal of standard trash bags. Providing a new option reduced problem behavior.

The NYCHA community can be a valuable resource in designing new infrastructure. NYCHA residents are eager to improve their community and were helpful in giving us feedback throughout the process of this project. However, many felt that their concerns were not consistently heard by NYCHA administration. Robust infrastructure that caters more to NYCHA residents' needs can create measurable change, a first step to improving overall quality of life. The infrastructure and communication intervention tested here serves as a proof of concept that new resources can create measurable change on quality of life outcomes of interest. Further efforts to involve the community in the placement, rollout, and promotion of future infrastructure changes in this vein would likely have greater impact. Understanding peoples' lived experiences is necessary for designing interventions that can improve them.

Introduction

Public Housing in New York City

Public housing refers to housing units that are subsidized by the government through public funds. According to the United States Department of Housing and Urban Development (HUD), "public housing was established to provide decent and safe rental housing for eligible low-income families, the elderly, and persons with disabilities."[1] While public housing is a federally funded program, the properties are owned and managed at the local level by housing authorities.

The New York City Housing Authority (NYCHA), is the largest public housing authority in North America. NYCHA was created in 1935 to provide decent, affordable housing for low- and moderate-income New Yorkers. ***NYCHA is home to 1 in 15 New Yorkers*** with 381,159 residents currently living under its roof.[2] ***If NYCHA were a city, it would rank 32nd in population size*** in the United States—beating out St. Louis, Cincinnati, and Pittsburgh in terms of population. NYCHA is New York City's largest landlord, overseeing 7.9% of New York City's rental apartments.

Affordability is a key aspect of NYCHA. The average rent is 30% of the household's income, with HUD subsidizing the remainder of the rent for residents. The average family income of NYCHA residents is $25,007; the average monthly family contribution for rent is $533 and approximately 40.8% of NYCHA households have fixed incomes.

Scope of Project

As part of a series of community-based research activities conducted as part of the Mayor's Action Plan for Neighborhood Safety, ideas42 received support from partners at New York City Housing Authority (NYCHA), the Research and Evaluation Center at John Jay College, and the Mayor's Office of Criminal Justice (MOCJ) to address quality of life concerns for New Yorkers living in public housing developments. After identifying priority concerns for NYCHA residents related to individual actions, the aim was to use our behavioral diagnosis and design methodology to develop scalable solutions to mitigate issues affecting quality of life. One widespread and highly visible concern for residents was related to the improper disposal of household trash, litter, and dog waste on NYCHA grounds.

[1] https://www.hud.gov/topics/rental_assistance/phprog

[2] https://www1.nyc.gov/assets/nycha/downloads/pdf/NYCHA-Fact-Sheet_2019_08-01.pdf

Welcome to NYCHA

The New York City Housing Authority, better known as NYCHA, is the largest public housing authority in North America.

How big is NYCHA?

If NYCHA were a city, it would rank 32nd in population size in the United States; that's **larger than Sacramento, Atlanta and Miami**

NYCHA is NYC's largest landlord—7.9% of the city's rental apartments *(2017 NYC Housing and Vacancy Survey)*

Home to **1 in 15 New Yorkers** or 564,301 residents

NYCHA Facts

The average **rent is 30% of the household's income;** the U.S. Department of Housing and Urban Development subsidizes the remainder of the rent

The average public housing family income is $25,007 and **NYCHA residents pay an average monthly rent of $533**

40.8% of residents are enrolled in government social programs like SNAP, SSI, veteran's benefits pensions, etc.

NYCHA was created in 1935 to provide decent, affordable housing for low to moderate-income New Yorkers.

Why B-Sci?

Behavioral science is the study of how people make decisions and act within a complex world. It draws from decades of research in economics, psychology, and neuroscience to help us understand *why* people behave the way they do. Behavioral science lets us understand and explain issues like the NYCHA trash problem in ways that other methodologies do not. One of the most important things we learn from behavioral science is that context matters. If we are going to design effective policies and programs, we need to first understand decision-making and behavior and then shift the context to help people make and follow through on the best decisions for themselves, and for society. To know what solutions will work, we approach every new problem with a thorough analysis of the specific context, with an eye to pinpoint features of the environment that contribute to behavioral bottlenecks. This exercise guides the design of scalable solutions best positioned to make a positive impact. Solutions often involve shifting the context itself, including changes to the environment or situation in which people are making decisions.

Applying a Behavioral Lens

The Problem

Through site visits to NYCHA developments in three boroughs (Brooklyn, Bronx, and Manhattan), meetings with development leaders, interviews with residents and staff, and review of relevant documents and literature, we found significant evidence of improper trash, litter, and dog waste disposal, all of which could impact quality of life for residents.

Trash is a constant presence in NYCHA developments. Residents complain that small collections of household trash left in hallways, staircases, and outside the main door of their building makes the areas smell bad and attracts rats. Development caretakers share in their frustration, reporting they are often unable to complete all their work duties because of the time spent clearing trash. Piles of large trash items can be found in front of most buildings, even when signs are posted urging tenants to place bags elsewhere. Residents often throw items of household waste out of their apartment windows, contributing to the litter on the grounds. Dog waste left on NYCHA property was consistently reported across developments, on sidewalks, in the grassy areas, and even indoors. People often let their dogs roam around the NYCHA development property without a leash, and then don't pick up their dogs' waste. (Note, however, that there were several anecdotal reports that non-NYCHA residents who live nearby are the drivers of this behavior in some developments).

Behavioral Diagnosis

Our behavioral diagnosis process helps us to understand the contextual features and behavioral barriers that contribute to each problem, which in turn allows us to design a more targeted intervention. The first step in this process was ***behavioral mapping***—after reviewing available literature on the topic, the ideas42 team drafted decision-action maps for each problem focus, which were used to generate hypotheses about the factors contributing to the problem.

We then conducted ***contextual reconnaissance*** by visiting NYCHA properties to conduct additional interviews with residents and staff members, as well as direct observations of resident behavior. The sample of residents that we interviewed was broadly representative of NYCHA's population, which was important to ensure we were hearing perspectives that reflected the views of most NYCHA residents. The team also used the Amazon Mechanical Turk (MTurk) platform to conduct online surveys with a larger non-NYHCA population about their attitudes and behaviors towards some aspects of disposing of trash and pet waste that we felt were generalizable beyond the NYCHA context. Their responses were used to supplement and contextualize findings from interviews with NYCHA residents and staff. Through these activities, a number of insights emerged.

Insight 1: NYCHA policy and infrastructure makes it very difficult for residents to throw out trash correctly.

During site visits, we observed three main categories of household waste at NYCHA: small trash, medium trash, and large trash.

- ***Small trash:*** Trash that is thrown away into small wastebaskets, and stored in small bags, such as grocery bags.
- ***Medium trash:*** Trash that is thrown away into tall trash cans, and stored in large trash cans (10 or more gallons).
- ***Large trash:*** Furniture and other bulky items that do not fit in separate containers.

Most trash is "medium-sized trash". However, the trash compactor chutes on each floor of NYCHA buildings, still colloquially referred to as "incinerators," are too small to accommodate medium trash. People produce more trash today than they did 50-80 years ago when many NYCHA developments were built; residents report taking out medium-sized trash bags a minimum of 2-3 times per week. NYCHA trash policy does not directly address medium-sized trash, but the implicit recommendation is that all trash items that do not fit in the trash compactor chute should be discarded at the drop sites designated for large, bulky items. There are few drop sites, often 2-3 per development. Depositing full garbage bags at a drop-site several blocks away is unenjoyable, physically intense, and time-consuming; residents are unlikely to do this multiple times per week. As NYCHA policy overlooks the category of medium-sized trash, residents are left without a practical and convenient option for correct disposal.

Trash compactor chutes in many buildings are too small to accommodate medium trash.

Insight 2: In the absence of policy or infrastructure solutions, residents have developed their own norms for trash disposal; NYCHA staff clean up from these locations, sending mixed signals to residents.

Caretakers and porters maintaining the buildings recognize residents' needs and the inconveniences posed by official NYCHA policy, and so do not enforce it. These mixed signals leave residents unsure of which guidelines to follow; in the absence of a convenient and consistently enforced policy, residents have developed their own informal systems to manage their trash needs. They follow cues from other residents who drop off garbage bags in easily accessible locations, such as at the front and side of buildings, near parks, and in other green spaces. These informal locations are implicitly endorsed by management staff who regularly pick up trash left there. NYCHA signs that explicitly prohibit trash disposal at specific locations have backfired, and now largely serve as signposts for convenient places to drop off trash. People are strongly motivated by what others around them do, and both resident and staff behavior suggests these "no-drop" areas are in fact acceptable drop areas. The actions of others, or ***social norms***, provide informal guidelines that are especially powerful when other guidelines are absent, ambiguous, or confusing.

"No-drop" areas have become common locations where residents dispose of trash.

Insight 3: Even a small amount of trash is salient, feeding misperceptions about normal behavior that promote improper trash disposal.

Many residents expressed the perception that trash is "everywhere." However, given the population density of NYCHA developments, the visible trash must be only a small portion of the total trash generated each day. Yet even a small amount of trash is ***salient***, because it is highly visible when left out in common spaces and affects quality of life at NYCHA. Residents vividly remember instances of trash left out, which informs their perception that most people leave trash out incorrectly. However, such infractions are outliers (albeit highly salient outliers) and do not represent the actual norm. In other words, the perception (*most* residents don't follow the rules) is worse than the reality (*some* residents don't follow the rules); this ***misperception of the norm*** has the potential for perpetuating undesirable behavior within the group. People mainly dispose of trash incorrectly for reasons of convenience—it is often easier to leave trash out than to follow guidelines. When the perception of the norm makes it seem like most other people leave trash out in the same way, the context effectively reinforces the behavior.

Abandoned household waste in hallways, staircases and outside the main doors of buildings.

Insight 4: Small hassles can undermine good intentions to pick up dog waste and have a big impact on outcomes.

In order to pick up dog waste, dog owners need both the intention and the tools, yet many people suffer an ***intention-action gap***—they generally have an intention to pick up, or want to be a person who picks up, but they are not able to consistently follow through on their intention. We found evidence that lack of follow-through is typically attributable to hassles: forgetting to bring or buy bags, or initially remembering but being derailed along the way by other concerns that are more pressing. People forget, or de-prioritize, actions they intend to do because mental resources are limited when living in a context of chronic scarcity, because poverty itself is a drain on people's mental resources, causing chronic scarcity (Mullainathan and Shafir, 2013). Scarcity makes the additional costs (both mental and financial) of having to buy, store, and remember to take bags each time greater than they may appear at face value. These cognitive and financial stressors are layered on top of the automatic disgust response when picking up dog waste, another drain on cognitive and emotional resources. These ***emotional hassles*** are another way that the context makes it harder for people to follow through on their general intention to pick up dog waste.

Dog owners do not consistently follow through on picking up dog waste.

Insight 5: Incentives or punishments (such as fines) can undermine intrinsic ethical motivations, and subsequent unenforced fines exacerbate problematic behaviors.

Motivation to pick up dog waste can be either intrinsic (rewards or costs that are purely personal and subjective, like joy, fulfilment, or pain) or extrinsic (rewards or costs that derive from outside the person, like money, power, or prestige). In the MTurk survey, we found the two strongest predictors of whether someone intends to pick up dog waste are the belief that owners should pick up because it is their responsibility, and the belief that owners should pick up because it sets a good example for others. These are intrinsic, moral motivations to pick up that appear to rise above any demographic or extrinsic factors in forming the intention to pick up. Most people and policy-makers have an intuitive mental model that extrinsic incentives (like fines or rewards) simply add to intrinsic motivation in a clean way. However, studies have shown that rather than being additive, extrinsic and intrinsic motivations actually interact. Introducing extrinsic motivations without considering these interactions can actually have harmful effects by undermining intrinsic motivation. The primary mechanisms NYCHA currently uses to influence dog owners are signs that notify of fines and enforcement by the police. Signs about dog waste fines ***frame the decision*** as a financial one, rather than an ethical one. Shifting the framing in this way subtly undermines the intrinsic motivation to pick up. It changes the decision from one that reflects on your character to one that reflects on your bank account (if actually enforced).

However, this policy also goes largely unenforced, and residents are aware that fines for not cleaning up dog waste are rarely if ever given out. This lack of enforcement has allowed ***new social norms*** to take hold. Amidst conflicting signals, people look to their peers more often to understand what normal or acceptable behavior is. Even if people are aware leaving dog waste is technically illegal, it has become accepted as a thing that "everyone" does. Without real financial, legal, and social costs to avoid, the lack of enforcement and new norms that have filled the vacuum result in a context that ***lacks extrinsic motivation*** for an individual to pick up, to the detriment of the community. This type of social dilemma is a classic ***tragedy of the commons***, or a situation with a shared resource (in this case, the communal space at NYCHA) where the individual and collective incentives are at odds. Addressing this issue would require either building stronger extrinsic incentives or working to cultivate a context that builds, encourages, and reinforces the ethical reasons for picking up.

Behavioral Design

Based on our diagnosis insights, our design approach was guided by the following principles:

- ***Make it easy:*** Trash disposal should be easy and convenient.
- ***Make it clear:*** Messaging from the administration and signage should be prominent and very clear.
- ***Make it motivational:*** Efforts to motivate residents should be predicated on their intrinsic values, not their desire to avoid penalties.

Design ideas were evaluated by partners for potential impact and feasibility. We moved ahead with user testing in two broad intervention areas: communication and infrastructure. Visual communications, such as new signs or poster campaigns, received the highest ratings from stakeholders who believed they would be both effective and feasible. However, despite lower feasibility scores, many of the most supported interventions were infrastructure changes to NYCHA buildings.

Based on the feedback we received from project stakeholders, as well as additional research into the viability of infrastructure and policy changes, we settled on the installation of large trash containers (tilt trucks) and trash cans in convenient locations, combined with a communication package, as the most likely to have substantial impact on trash-relevant behavioral problems. We believed large trash containers in convenient locations at the front and/or side of buildings would help with the primary problem related to trash waste: the difficulty NYCHA residents have in throwing out "middle sized trash" that does not fit in the trash chutes. Providing a clear location for disposal of trash gives residents an alternative to depositing trash in informal drop sites near their apartment buildings. While this infrastructure intervention does not specifically target dog waste behaviors, we emphasized the issue in the visual communications and provided additional trash cans for disposing of dog waste and litter on the development grounds.

This infrastructure intervention was ultimately a compromise due to challenges in implementing a more desirable infrastructure change—enlarging the openings of trash chutes within NYCHA buildings, which would allow residents to dispose of larger items such as the common 13-gallon trash bags used by many households.

Through user testing several communications prototypes with residents and staff, several insights emerged on how to make the design, tone, and content of messaging interventions most impactful within the context of NYCHA developments:

1. ***Differentiate from other NYCHA communications.*** Anything to differentiate both the message and its source from the typical NYCHA approach, tone, or aesthetic will make the message more likely to be received positively, or received at all, by residents. Residents view any messaging through a lens shaped by their attitudes towards NYCHA, which limits most messages from getting through to have the desired impact on behavior.

2. ***Make it stand out.*** Fewer signs or notices would make each one stand out more; if unable to reduce the amount of signage, making key messages more salient (either through graphic design or placement) will make them more likely to garner residents' attention. Residents perceived an overabundance of rules and signs at NYCHA and report they don't pay attention because they assume they have seen a sign before or because they don't think the message is relevant or consequential to them.
3. ***Take a different tone.*** Taking a different tone—including avoiding all-caps, avoiding commands, using personal and respectful language, and using humor—will make messages more likely to stand out and be received positively by residents. Residents perceive NYCHA's typical tone as harsh, punitive, and bureaucratic.
4. ***Emphasize community.*** Residents were most receptive to messages that used framing that made them feel like part of a community.
5. ***Don't forget the rats.*** Including rats in the framing of messages also showed significant promise for motivating residents and making the underlying message about trash salient.
6. ***Include visuals and text.*** Residents preferred signs that included a balance of visuals and text, rather than relying heavily on one or the other.

These insights guided the design of the communication package component of the final intervention.

Communication Package Designs

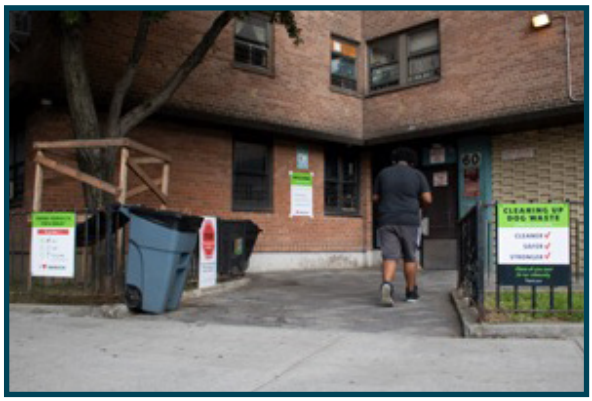
Full-size versions of each of the designs below can be found in the Appendix.

Intervention

Implementation Plan

The full intervention package, decided in consultation with NYCHA property managers, included providing 100-gallon Tough Guy or Rubbermaid tilt trucks (1-2 per building), 50-gallon Rubbermaid trashcans (2-3 per building), and a full suite of posters (6 inside versions for lobbies and floors and 3 outside versions) to provide sufficient coverage to reach all residents in the development. NYCHA provided locks and chains to secure the trash cans and tilt trucks in place.

NYCHA property managers were given guidance on the placement of posters inside and outside of buildings, and suggested locations in the front and/or at sides of buildings for installing trashcans and tilt trucks. Ultimately, property managers were allowed to use their discretion concerning the best placement of these items to be convenient for residents and maintenance staff. Developments were given a launch week in late June to put out intervention materials; however, in practice it took several weeks for the majority of treatment sites to roll-out the intervention. Development staff directly managed the roll-out of implementation materials, with direction and follow-up reminders from NYCHA.



Evaluation Strategy

Fifty-three NYCHA developments targeted for Neighborhood Rat Reduction programs in the Bronx, Manhattan, and Brooklyn were randomly assigned to be treatment sites (n=27), which would receive the infrastructure and communication intervention package, and control sites (n=26), which would not. Including a set of randomly assigned comparison sites would allow us to control for variability in the NYCHA development populations and management as well as the seasonal and temporal effects of trash and litter disposal on their grounds. Similarly, implementing the intervention across a set of treatment sites would allow us to evaluate the average effect of the intervention, positioning us better to generalize the findings, rather than looking at changes to an individual NYCHA development.

A team of 12 research assistants was trained to count individual trash bags, pieces of litter, and instances of dog waste visible during site visits, as well as to interview residents on their perceptions of trash and dog waste and their perceived quality of life. Observation and survey data were collected weekly for all treatment and control sites for at least two months before the intervention was launched. Research assistants also conducted fidelity checks by reporting whether tilt trucks, trashcans, and posters were seen during each week's visit. Data collection continued two months after implementation, for a total four-month period of data collection.

Weekly site assignments were rotated among research assistants to account for differences in counting practices and days/times of data collection. Research assistants had discretion of when they visited sites during the week (including weekends); as a result, data was collected on all days between the hours of 7am and 8pm. All research assistants visited all sites in the sample to reduce individual bias.

Baseline data patterns were similar between treatment and control sites, confirming that randomization was effective and ensuring balance across groups. In general, counts of trash, litter, and dog waste are highly correlated with each other; sites that have high amounts of trash also tend to have high amounts of litter and dog waste. Litter and dog waste are strongly correlated with population, household trash less strongly. Trash, litter, and dog waste tend to accumulate on weekends.

Data Collection by the Numbers

Research assistants served a crucial role in leading on-the-ground project research. This overview is meant to illustrate the scope of research assistant data collection activities.

Research Assistant Count

257,757 **pieces of litter**

74,079 **improperly disposed trash bags**

55,631 **pieces of dog waste**

Study Scope

20 weeks of observation

12 research assistants

5,760 hours of on-the-ground data collection

2,160 total visits to NYCHA development sites

53 randomly assigned *Rat Mitigation Zone* (RMZ) sites across ***3*** boroughs

Control Group: ***26***
Treatment Group: ***27***

» Broken Doors: A Future Opportunity

Originally, we applied our methodology to examine an additional NYCHA quality of life issue: broken doors at building entrances.

- ***The problem:*** People use inappropriate methods to enter NYCHA buildings, either pulling or propping doors open, or intentionally damaging doors to allow them to be opened without a key. In interviews, NYCHA residents and staff estimated that up to 75% of building doors are broken at a given time. Maintenance workers reported that repaired doors are frequently broken again within a day.
- ***Behavioral Diagnosis:*** We found that building policies do not serve residents who lack keys to their lobby doors. NYCHA policies create a number of obstacles intended to bar entry to non-residents, for example requiring tenants to be listed on NYCHA leases to receive keys, requiring heads of households to liaise with management on behalf of all other household members, restricting the number of keys issued to a given household, and requiring residents to make payments to request additional and replacement keys. These policies create obstacles for many individuals residing in NYCHA buildings, too. Property managers estimated that between 10-40% of residents are not listed on NYCHA leases, and are therefore ineligible to receive keys. Residents also did not understand the procedure for requesting keys, and found NYCHA's policy of charging a larger fee for each additional key requested confusing. Several residents also described the fees as being too costly. Furthermore, intercom systems are frequently non-functional. In the absence of functioning intercom systems or the ability for tenants to "buzz" people in remotely, residents without keys and visitors must wait outside buildings for others to unlock the doors for them. As a result, the locked doors impose real costs on both residents and their guests.
- ***Behavioral Design:*** We recommended distribution of spare lobby door keys to authorized households, along with simplification and better communication of NYCHA's key policy, to help residents access the building without resorting to breaking the doors. While NYCHA policy restricts access to keys and prohibits distributing keys to non-residents, we believe a short-term, limited "free replacement key" policy, as well as changing the graduated pricing system for replacement keys to a nominal flat rate, would substantially increase NYCHA residents' willingness to acquire new keys and reduce the number of lobby door breakages. These policies should also be communicated to residents in a manner that makes the steps required to get a key very clear and actionable. However, the distribution of lobby door keys was believed to be in conflict with NYCHA's legal responsibilities to residents, and ultimately project stakeholders opted not to pursue this solution.

Results

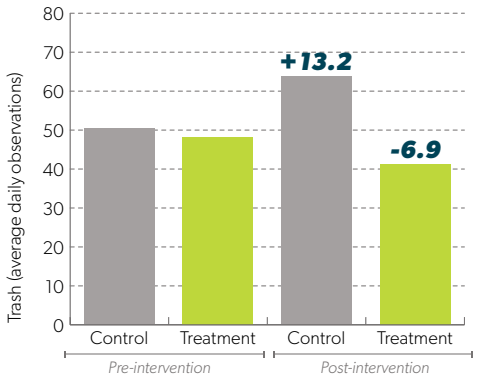
Although we set dates for the intervention to be implemented across sites, we found in reality the median rollout time for installing the intervention completely was about 3.5 weeks, due to substantial delays in developments installing intervention components. Accordingly, while we do not see any changes in July, the first calendar month of the intervention (during which many treatment sites had not yet received the intervention), we do see consistent changes across all measures in August.

We conducted difference-in-differences negative bino-mial regression analyses controlling for data collection fixed effects such as research assistant, site, day of week, and hour. Since rollout of the intervention elements was delayed and variably implemented by property managers across sites, we believe the effects of receiving this intervention, as confirmed by fidelity checks for tilt trucks, are best reported with a one-week lag to account for adjustment to the infrastructure changes and timing of data collection. Based on this analysis, ***the average number of household trash bags per site decreased by 25%, the average number of litter pieces decreased by 16%, and the average instances of dog waste per site decreased by 11% at treated sites.*** These are all statistically significant changes in our primary outcomes.

The intervention provided fundamental infrastructure upgrades at treatment sites. This had the strongest effect on sites that were dirtier than average in the baseline, supporting the conclusion that basic resource provision, as tested by this intervention, may be sufficient to have impact in some sites. On the other hand, others likely require more tailored, robust infrastructure upgrades to show impact. We observed that site-level differences (size, demographics, social

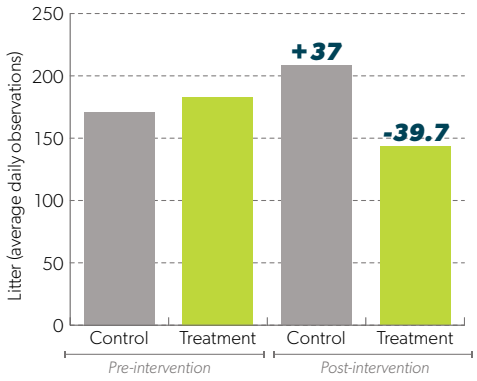
TRASH BAGS PER SITE
decreased by 25%

Change in Trash Observations



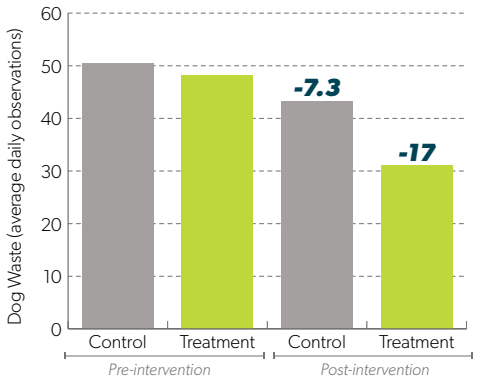
LITTER
decreased by 16%

Change in Litter Observations



DOG WASTE
decreased by 11%

Change in Dog Waste Observations



norms) can make some sites more challenging to impact; however, we are not able to make conclusions about those differences through this evaluation. Catering to the specific needs of residents and being responsive to environmental norms may help close the gap for impact.

Despite measurable objective changes in trash, litter, and dog waste, there was no measurable impact on perceived amounts of each indicator, or perceived overall quality of life among surveyed residents. This suggests that the reductions, although significant, may not have been perceptible to residents. Furthermore, improving quality of life at NYCHA is likely to require a more complicated and difficult set of interventions than those aimed reducing trash, litter, and dog waste.

While we verified intervention roll-out at individual development level based on fidelity checks by research assistants (e.g. any tilt truck or poster seen on site), we did not systematically measure adherence to the spirit of the intervention (e.g. did all buildings of the development have tilt trucks, trashcans, and a variety of posters in sight?). Although we observed a significant impact of our intervention across treatment sites on average, anecdotally we are aware of a high degree of variability in implementation intensity, reflecting the reality of working with many different property managers and staff across many NYCHA developments. Since we do not differentiate between these degrees of implementation in our evaluation, this variability is likely to suppress the average intervention effect across treatment sites, which may have been stronger if the implementation process had been more strongly measured or controlled. We also don't know what other factors or characteristics about development sites may have contributed to the intervention being only partially delivered, just as we can't make conclusions about what aspects of the intervention package had the biggest impact on outcomes.

> ***A NYCHA tenant told me that the new tilt trucks and trash cans have made things cleaner.***
>
> – Research assistant, ideas42

> ***Residents have mentioned to me that the tilt trucks are making a significant difference in trash disposal.***
>
> – Research assistant, ideas42

> ***Some residents from high trash/litter/dog waste sites noticed that since the tilt trucks and trash cans were placed, people have been more mindful of their environment and their community that they want to keep clean.***
>
> – Research assistant, ideas42

Paths We Did Not Take

- ***Custom in-home trash containers*** could promote subdivision of household trash that better aligns with the size of the compactor chute in NYCHA buildings. Households would be able to collect the same amount of trash as they do in larger trash bags, but in smaller bags as dictated by a container that only fits multiple small bags. Providing residents with a custom-built trashcan would allow them to collect a large amount of trash while maximizing their use of the NYCHA compactor chute, reducing the need for cleanup of large trash bags left outside the building.
- ***Enlarge openings in trash chutes*** to allow residents to dispose of larger items such as the large kitchen trash bags used by many residents. Existing trash chutes date back to the building's construction and are not large enough to accommodate the larger modern trash bags readily available at convenience stores in the surrounding communities. Larger openings to the trash chutes on every floor, or at least on the first floor of every building, would give residents more options to dispose of their trash easily and conveniently. This design complemented NYCHA's planned activities, but the required approval by the New York City Fire Department (FDNY) could not be obtained within the intervention period. However, this is still being explored by NYCHA.
- ***Pet waste stations*** placed strategically would make it easier for dog owners to pick up after their pets by supplying them with all the resources they need to complete the task, and serve as salient reminders of owners' responsibilities to their community. Stations would make dog waste bags accessible to dog owners and provide a receptacle in which to dispose of them.
- ***Dedicated dog runs***, including spaces for dogs to run and play, dog waste bags, and space for dog owners to sit could be designed specifically to meet the needs of NYCHA dog owners. Dedicated areas would be attractive for dogs and their owners, and might help concentrate dog waste to an area where there are accessible bags and stronger norms about picking up.

Ultimately, we did not pursue these designs, based on stakeholder input and project constraints.

Recommendations

Providing easier access to trash disposal infrastructure, complemented by behavioral communications, significantly reduced the amount of trash, litter, and dog waste on the grounds of NYCHA developments that received the intervention. This demonstrates that new structures and resources can create real behavioral change, and suggests that quality of life issues are caused by a lack of available channels for the behaviors NYCHA residents prefer to engage in, rather than by any inherent behavioral tendencies. Previously, residents did not have a clear option for proper disposal of medium sized household trash; providing a new option reduced problem behavior.

> ***People say NYCHA this and that, but what are you contributing? We have to work together; this is our home, we have to take care of it. Other places are beautiful because the people work together.***
>
> – Resident, Morris Houses

Supplementing efforts already underway with the behavioral recommendations below can increase the effectiveness of any future quality of life improvements:

1. ***Implement permanent, sustainable, and structural solutions.*** For bags of household trash, enlarging trash chutes on each floor, or even on just the first floor, will go a long way in providing a long-term solution.
2. ***Prioritize convenience for residents.*** Placing trashcans in convenient and accessible locations will ensure residents use them regularly.
3. ***Provide consistent access.*** Ensure that resources are available to residents consistently and that each site has adequate resources and support for successful implementation.
4. ***Provide weekend, night time, and seasonal supports.*** Household trash piles up quickly, and summer and springtime can exacerbate the impact of any accumulated trash.
5. ***Ensure adequate support at higher-need sites.*** Some sites and residents require a higher level of care. In senior only buildings, address their mobility issues with additional trash collection services, or make disposal locations more convenient.
6. ***Draw on residents' sense of community to motivate behavior.*** Residents are eager for upgraded resources and infrastructure, but also appreciate the sense of community they find at NYCHA developments.
7. ***Consider last mile effects.*** While changing resident behavior is an important angle, monitor staff behavior for any unintended consequences that interventions may be having.

Conclusion

Finally, housing administrators should include residents in all stages of the design and implementation of new programs and policies. This project's success depended on feedback from NYCHA residents. NYCHA residents helped us decide what problems to focus on, informed our diagnosis process, and provided us with feedback about our designs. Making effective changes requires that the community is bought in to the new changes, and also requires that information from the community effectively reaches the people designing new programs. Without community input and feedback, programs can be designed around false beliefs about a community and its values or norms. Our interactions with NYCHA residents showed us how much they care about their environment, and their lived experience led us to identify the infrastructure changes we suggested. Working with NYCHA residents helped us understand the real barriers in place, leading us to effective solutions that we otherwise may have overlooked.

Appendix

Site Selection and Evaluation Design

Fifty-three NYCHA developments that had been pre-selected by NYCHA for participation in Neighborhood Rat Reduction programs in the Bronx, Manhattan, and Brooklyn were chosen to participate in this study. These developments were further divided into two groups: 27 of the developments formed a treatment group, which would receive the infrastructure and communication intervention package, and the remaining 26 formed a control group, that would not receive the intervention. Evaluation results were determined by a statistical analysis of differences in the amount of trash and pet waste that was observed at facilities in each group. Differences in responses to a resident survey were also analyzed.

To ensure that the observed differences were a result of the intervention, and not the result of differences between the developments that were included in each group, developments were assigned to one or the other group at random (although care was taken to ensure that the groups included similar numbers of large and small developments, as well as similar numbers of developments from each borough). Random assignment is a strategy that prevents researchers' biases from influencing the formation of the groups.

Evaluation Results

As discussed in the main report, we find substantial reductions across all three of our variables of interest, including:

- A 25% reduction in the number of bags of household trash observed lying around the development.
- A 16% reduction in the amount of litter observed on development premises;
- A 11% reduction in dog waste observed on pathways in and around developments.

These findings are based on a differences-in-differences negative binomial regressions of the form:

$$Y_{i,t} = \beta_0 + \beta_1 Intervention_{i,t} + \beta_2 Treated\_Lag_{i,t} + + \beta_3 week_t + \beta_4 site_i + \beta_5 \theta_{i,t} + \varepsilon_{i,t}$$

Where "Intervention" represents whether or not a site has received the intervention, "Treated Lag" is a one-week lag period after receiving the intervention, "week" and "site" are temporal and geographic fixed effects, θ is a vector of other controls, and ε is the error term. In our reported results we include controls for the research assistant who collected the data, as well as the day of week, and hour of day for each observation.

This specification allows us to measure the effects of receiving the intervention on a given site. Because we are controlling for both "week" and "site" fixed effects, any differences observed should be due to the intervention itself, not differences between sites or seasonal effects.[3]

Below, we report the results of the regressions across five models we tested in our analysis. Model 1 includes no controls beyond the week and site fixed effects. Models 2, 3 and 4 include the research assistant, day of week, and hour fixed effects, respectively. Model 5—our primary specification—includes all three additional fixed effects.

Trash

	Model 1	Model 2	Model 3	Model 4	Model 5
Treated	-0.44*** (0.09)	-0.26*** (0.08)	-0.37*** (0.08)	-0.42*** (0.09)	-0.25*** (0.07)
Treatment Lag	-0.03- (0.17)	0.01 (0.15)	0.06 (0.16)	0.02 (0.16)	0.01 (0.15)
Site Fixed Effects	X	X	X	X	X
Week Fixed Effects	X	X	X	X	X
Research Assistant Fixed Effects		X			X
Day of Week Fixed Effects			X		X
Hour Fixed Effects				X	X
Pseudo R2	0.04	0.08	0.05	0.05	0.08

*** - p<0.01 ** - p<0.05 * - p<0.10

Litter

	Model 1	Model 2	Model 3	Model 4	Model 5
Treated	-0.28*** (0.08)	-0.16*** (0.06)	-0.23*** (0.08)	-0.27*** (0.08)	-0.16*** (0.05)
Treatment Lag	-0.16- (0.13)	0.03 (0.09)	-0.11- (0.13)	0.09 (0.12)	0.02 (0.09)
Site Fixed Effects	X	X	X	X	X
Week Fixed Effects	X	X	X	X	X
Research Assistant Fixed Effects		X			X
Day of Week Fixed Effects			X		X
Hour Fixed Effects				X	X
Pseudo R2	0.04	0.09	0.05	0.05	0.10

*** - p<0.01 ** - p<0.05 * - p<0.10

[3] Goodman-Bacon, A. (2018). Difference-in-differences with variation in treatment timing (No. w25018). National Bureau of Economic Research.

Dog Waste

	Model 1	Model 2	Model 3	Model 4	Model 5
Treated	-0.28*** (0.07)	-0.12** (0.05)	-0.22*** (0.08)	-0.22*** (0.07)	-0.11** (0.05)
Treatment Lag	-0.15 (0.14)	-0.18* (0.09)	-0.07 (0.13)	-0.11 (0.13)	-0.17* (0.09)
Site Fixed Effects	X	X	X	X	X
Week Fixed Effects	X	X	X	X	X
Research Assistant Fixed Effects		X			X
Day of Week Fixed Effects			X		X
Hour Fixed Effects				X	X
Pseudo R2	0.04	0.08	0.05	0.05	0.08

*** - $p<0.01$ ** - $p<0.05$ * - $p<0.10$

The effects are robust and consistent across all specifications. Our primary specification, Model 5, is typically somewhat smaller than our results with no or fewer controls. We generally do not see any effects from the treatment lag variable, consistent with our belief that the intervention effects would not happen immediately. However, we do see slight negative effects in Model 2 and Model 5, suggesting that changes in behavior linked to cleaning up dog waste may have occurred within the first week.

Communication Package Designs

TAKING YOUR DOG FOR A WALK?

Do you have...?

Dog

Leash

Pick-up Bags

Please do your part to make Baruch cleaner. Remember to take doggie waste bags (or even just old grocery bags) before leaving your home!

I ♥ BARUCH

Trash doesn't

FIT?

Take it to the large containers outside of your building.

Did you know?

90% OF THE TRASH YOU COLLECT FITS INTO THE TRASH CHUTE.

MOST BARUCH RESIDENTS USE THEIR TRASH CHUTE AT LEAST ONCE A DAY.

Join us in making Baruch cleaner.

It's simple:

Small bags are the easiest way to collect trash. Take them to the chute on your floor.

Use **large trash bags** sparingly. Take them to the containers outside of your building.

Take **bulky items** to the drop site or contact the Management Office.

HELP US KEEP RATS OUT!

1. Use the trash compactor regularly.
2. Avoid leaving trash in hallways and staircases.
3. Don't litter or throw trash out of windows. Rats love eating litter.

Whose side are you on?

I ♥ BARUCH

"We have to work together. This is our home. We have to take care of it."

Please ***do your part*** by following these guidelines:

small items and bags

medium and large trash bags

bulky items

use trash compactor on your floor

use large containers outside of your building

use drop site

for help, contact management at 718-707-7771

I ♥ BARUCH