Come Out and Play: Public Space Recovery, Social Capital, and Citizen Security*

Matías Braun† Francisco Gallego‡ Rodrigo R. Soares§

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Abstract

This paper explores the effects of upgrading deteriorated public squares on economic and social outcomes. We implemented an experiment whereby public squares were randomly selected to be renovated in 28 fragile neighborhoods of the metropolitan area of Santiago, Chile. We find that, after the intervention, households in treated neighborhoods increased their use and maintenance of public space and experienced an increased sense of ownership over their neighborhoods. Treated neighborhoods also experienced improvements in public security both in the public square and in the neighborhood. There is also evidence of impact on trust and participation in community organizations and a reduction in leisure outside the neighborhood. The results are stronger in neighborhoods with low initial levels of public security but with relatively higher initial levels of social capital. We find that certain physical features (presence of public lighting, presence of a close public transportation stop, and absence of economic activities related to alcohol consumption) affect the strength of the treatment. All these suggest that the effect of upgrading public spaces is highly dependent on other characteristics of local communities.

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†Universidad de los Andes; e-mail: *mbraun.ese* at *uandes.cl*.

‡PUC-Chile; e-mail: *fgallego* at *uc.cl*.

§Insper and Columbia University; e-mail: *r.soares* at *insper.edu.br*.

1 Introduction

The idea that public space and infrastructure are central to long-run local development is a key feature of several policies and programs (Rajan, 2019). Expanding access and improving the quality of public space, for example, is currently at the top of the social agenda for governments in many middle-income countries, particularly in Latin America (CEPAL, 2007). However, it is not obvious how to actually improve local spaces, what features make these interventions more effective, and how individual behavior responds to the urban environment. The popular situational anonymity hypothesis, for instance, posits that local environmental conditions – both physical and social – influence individuals and help determine the level of social capital and criminogenic potential of neighborhoods. Philip Zimbardo's famous unpublished experiment, chronicled in a 1969 Time Magazine article (Feburary 28, 1969, "Diary of a Vandalized Car"), conjectured that the different fates of cars left unattended in Palo Alto and the Bronx were driven by "the ecological differences between places where anonymity ruled versus those where a sense of community dominated" (Zimbardo, 2008). In the Bronx – where anonymity supposedly ruled – the unattended car started being vandalized within minutes of the beginning of the experiment, while in Palo Alto – where a sense of community supposedly dominated – it remained untouched until the end of the experiment. Based on this single piece of qualitative evidence, Wilson and Kelling (1982) proposed what became known as the "Broken Windows" theory of crime. According to this theory, greater public disorder is conducive to crime and detrimental to social capital accumulation because it leads individuals to think that there are low levels of social control in neighborhoods, incentivizing behavior that otherwise would not have been considered. Broken windows, abandoned houses and public squares, litter on the sidewalks, and disorderly behavior would, therefore, signal a context of low social capital, disengaging individuals from local social interactions and attracting further anti-social behavior, including crime.

This theory became extremely popular in policy circles, motivating various celebrated interventions focused on cleaning up public spaces and reducing disorderly behavior. New York's successful reduction in crime starting in the 1990's, for example, has been traditionally linked to a series of "Broken Windows" measures implemented by commissioner William J. Bratton under mayor Rudolph Giulinani (see, for example, "Crime Stoppers," by David C. Anderson, New York Times, February 09, 1997). Similarly, the reduction in crime in Bogotá, Colombia, during the late 1990's and 2000's has been usually associated with a multifaceted program that included a strong "Broken Windows" component (see, for example, Llorente and Rivas, 2005). More generally, social disorder and lack of social cohesion have been repeatedly identified as key factors contributing to the high levels of urban violence in Latin America, where well over half of the poor population lives in cities (Fay, 2005). Most of the housing of the poor in urban areas is located in isolated and confined zones, with high levels of insecurity and lack of public goods. The idea that these could lead residents to a vicious cycle of social inactivity, withdrawal into the private sphere, and low social capital seems therefore appealing.

The first objective of this paper is to explore the social effects of recovering public spaces in fragile areas of a developing country. To this end, we designed and implemented a randomized intervention on the recovery of deteriorated public spaces in Santiago, Chile. The experiment allows us to analyze the causal impact of the renovation of previously deteriorated urban areas in vulnerable neighborhoods on

a series of measures of use of public space, social capital, housing values, perceived quality of life, and crime. We are able to analyze the impact on the area immediately surrounding the location subject to the intervention as well as spillovers onto adjacent areas. The experiment was conducted in cooperation with the NGO *Fundación Mi Parque*. *Mi Parque*'s agenda is to improve the lives of poor families in Chile by renovating deteriorated and abandoned public squares in vulnerable neighborhoods. Three aspects of *Mi Parque*'s intervention are particularly relevant. First, it uses a bottom-up approach. Families and communities are involved since the early stages of the design of the renovated public squares, with the intention to foster the community's sense of ownership and long-term maintenance of the public space. Second, *Mi Parque* funding is usually obtained from public-private partnerships through the Corporate Social Responsibility program. Third, the direct participation of the community in the construction and the high population density of targeted neighborhoods results in very low costs per beneficiary (between US$5 and US$20).

The recovery of public spaces may nevertheless affect local populations through different mechanisms. Thus, the second objective of this paper is to better understand whether the effects of the intervention studied vary depending on local environmental conditions. For example, the situational anonymity hypothesis and the "Broken Window" theory discussed before suggest that social capital is a key mediating mechanism to explain potential impacts on public security. We study heterogeneous effects considering local physical conditions (such as the presence of public lighting, the presence of public transportation stops, and the type of businesses located close to the park) and other baseline characteristics. In addition, we also analyze whether treatment effects depend on individual characteristics.

The sample of the experiment includes 56 public plots that needed recovery. The list of plots came from the *Mi Parque* NGO. The plots were stratified in pairs using a classification provided by *Mi Parque* considering their characteristics and locations. One plot was treated in each stratum. Plots randomized into the treatment group were not renovated simultaneously due to logistical and financial constraints. Thus, the first implementation started in May 2012 and the last one was concluded in November 2014. We also collected data from local communities through one baseline and one follow-up survey. Baseline data for the treatment and control plots within each stratum were collected roughly two weeks before the intervention started in the treatment plot. The construction of the park finished typically one to two months after the baseline survey. Then, four to five months after the intervention, we interviewed again the same households that were interviewed at baseline (both in the treatment and control groups). Our baseline sample includes 1,530 households, corresponding to a random sample of between 25 to 30 households living around each of the 56 plots (an average of 27.3 households per plot).

We collected baseline and follow-up data on socioeconomic and demographic characteristics, housing conditions, perceptions of insecurity, social capital, family relations, life satisfaction, use of time, leisure, and participation in community activities. The attrition rate between the baseline and endline surveys was 20.1%. Additionally, in order to check the effectiveness and durability of the intervention, we visited treated and control plots and collected qualitative data roughly two years after the last renovation was concluded. These data include the physical status of the plots at that point in time along various dimensions: whether they were in good state; whether they had green areas, benches, a playground, and trash cans; whether they seemed safe; and whether they seemed to contribute to the quality of life in the neighborhood, among others.

To estimate treatment effects we compare households in neighborhoods that live in areas where the plots were recovered with households in the control group. We compute effects in seven families of outcomes using the answers to the follow-up surveys: use of park, park maintenance, trust and relations with neighbors, ownership and use of neighborhood, participation in community associations, perception of security and crime in the park, perception of security and crime in the neighborhood, home investments and value, quality of life, and leisure outside the neighborhood. We present p-values using both standard single hypothesis testing and adjusted for multiple hypotheses testing using a step-down procedure (Romano and Wolf, 2005, 2016). We also present treatment effects using inverse probability weighting (IPW) and Lee bounds, given that attrition is slightly higher for the control group (21.9% versus 18.2%). Finally, relying on the machine learning procedure suggested by Chernozhukov et al. (2018), we present a heterogeneity analysis exploring household, park, and neighborhood characteristics.

We report six main sets of results. First, we find that treated plots significantly improved the use and maintenance of the park. In the case of the use of the park, point estimates imply an improvement of 0.46 standard deviation (σ hereafter) in our index with respect to the control group. In turn, our estimate of treatment effect on park maintenance is equivalent to 0.31σ. These results imply that the recovery of public space actually translated into a change in the demand for the park, which remained in a better state of maintenance several months after the treatment was implemented. Moreover, using data from our visits to the parks more than two years after the treatment was implemented, we find visible differences in treated parks with respect to the control group along several dimensions: parks had more green areas (0.60σ), benches (0.36σ), playgrounds (0.40σ), and trash cans (0.45σ). Treated parks also seemed to contribute more to the quality of life in the neighborhood (0.48σ) and to be more conducive to socialization (0.36σ). This suggests that the treatment was "real:" it was really implemented, it increased demand by local populations, and it improved the equipment and attributes of the park in a significant and permanent way.

Furthermore, we find a significant impact on neighborhood use and ownership, with an estimated treatment effect of 0.11σ. This implies that the treatment translated not only into park use but also in a more general use of public space in the neighborhood and a higher sense of belonging, suggesting that public space recovery has effects that go beyond the actual park. Second, we find effects on two dimensions of social capital: trust and relationships with neighbors (0.08σ) and participation in community organizations (0.12σ). Third, we find that the program produced improvements in public security both in the neighborhood and in the park. The estimated treatment effects imply improvements of public security of 0.12σ in the park area and 0.06σ in the neighborhood. Fourth, we find a decrease of 0.07σ in leisure outside of the neighborhood. Fifth, we do not find effects on home investments and value and quality of life. Overall, these results suggest an improvement that goes beyond the effects located exclusively on the park, which is consistent with the role of public spaces not only for actual use but also for measures related to social capital and crime in the neighborhood.

Finally, we find heterogeneous treatment effects correlated with several initial conditions of parks and neighborhoods: (i) some environmental factors around the park seem to enhance the impact of the treatment on social capital and security outcomes: the existence of public lighting in the park, the existence of public transportation stops, and, to a lesser extent, the absence of business around the park related to alcohol consumption (liquor stores, night clubs, etc.); (ii) neighborhoods with lower initial levels of

security measures saw stronger impacts on most dimensions; (iii) neighborhoods with higher initial levels of social capital also saw stronger impacts on several dimensions. These results give support to the idea that interventions focused on the renovation of deteriorated public spaces operate through several mechanisms and reinforce the idea that they affect broader outcomes of neighborhood life than just those directly related to the use of the public space itself.

The paper contributes to several lines of research. Despite its popularity in policy circles and the media, there is surprisingly little evidence on the effectiveness of "Broken Windows" interventions, particularly so on its public space component. Literature on the topic has been either qualitative or has relied on regression analysis without clear sources of identification, and has focused mostly on the policing component (e.g., Harcourt, 1998; Sampson and Raudenbush, 1999; Corman and Mocan, 2005; Harcourt and Ludwig, 2006; Meares, 2015; Peters and Eure, 2016). [1] Previous non-experimental literature has analyzed various aspects of the correlation between public space recovery and socioeconomic outcomes. Campos-Vázquez (2011), for example, uses propensity score matching to analyze the effect of a national public space rehabilitation intervention in urban areas of Mexico on social capital and perceptions of security. He finds significant differences in social capital outcomes across treated and control areas two years after the intervention, and also some temporary effects on perceptions of security. A series of papers using multivariate regression analysis reaches similar conclusions when looking at the relationship between access to green areas and interactions with neighbors/use of public areas (Coley et al., 1997; Kuo et al., 1998; Walker, 2004; Maas et al., 2006), or between access to green areas, public space appearance, and objective and subjective measures of security (Kuo and Sullivan, 2001; Braga and Bond, 2008; Donovan and Prestemon, 2010).[2]

None of the evidence cited above is experimental and, with the exception of Campos-Vázquez (2011), none explores a natural experiment or has a clear source of identification. Given the problems inherent to correlational studies and the limitations of propensity score methodologies such as the one used by Campos-Vázquez (2011), there remains the possibility that unobservable characteristics correlated with treatment status contaminate the results reported by this literature. This would be the case, for example, if the presence of green areas and the quality of public space were endogenous to local social capital, which would be expected if more cohesive communities were better able to provide local public goods (along the lines implicitly suggested by Zimbardo, 2008). The contribution of our paper, therefore, in addition to using a randomized evaluation, is to study the impact of the intervention along many different dimensions, providing a more comprehensive view of the social effects of these types of programs.

[1] Harcourt and Ludwig (2006) interpret the "Moving to Opportunity" program as a natural experiment on the relocation of families from disorderly neighborhoods to less disadvantaged and disorderly communities. We interpret the "Moving to Opportunity" program as including various other components – to name two important ones, a wealth shock to families and increased social isolation within destination neighborhoods – so we are wary of interpreting it as a natural experiment on the "Broken Windows" effect. Engel et al. (2014) conduct a series of laboratory experiments that show some support for the basic logic underlying the "Broken Windows" theory. They show that, in a repeated game, individual contributions are permanently higher – up to the next to last round – when the initial contributions of other members in the first round are experimentally manipulated to be higher (random treatment).

[2] Based on an informal matching strategy and using endline data only, IADB (2010) finds that a project of slum urbanization in Brazil increased ownership and access to public services. But this project involved a multifaceted intervention, including land titling, paving of roads, and access to public water systems, among others. There is also some correlational evidence examining the relationship between access to green areas and quality of public spaces and individual outcomes, such as physical and mental health and house prices (Maas et al., 2006; Joh et al., 2012; Branas et al., 2011; Lutzenhiser and Netusil, 2001; Irwin, 2002; Vandegrift and Lahr, 2007; Biao et al., 2012).

Moreover, understanding the ways in which the recovery of public spaces affects outcomes may help understand the relevance of attributes of the park and neighborhoods. We find suggestive evidence that initial conditions and complementary factors seem to play a relevant role.

The remainder of the paper is structured as follows. Section 2 describes the intervention. Section 3 explains the randomization design, the data collected, and our empirical analysis. Section 4 presents and discusses the results. Finally, section 5 presents some concluding remarks.

2 Research Design and Methods

2.1 The *Mi Parque* Intervention

The intervention we analyze was conceived and implemented by *Fundación Mi Parque*. *Fundación Mi Parque* is an NGO founded in 2007 by a group of Chilean architects, focused on the recovery of public squares in poor neighborhoods. These architects "brought together their social concerns and experiences in a project that sought to improve the conditions of the public surroundings in poor communities" (from the NGO's own stated history, available from https://www.miparque.cl/historia/, translated by the authors). The main goal of *Mi Parque* has been to shift the policy and civil action in poor communities from a focus on the household to a broader focus on the public space where individuals and families interact. By April 2022, *Mi Parque* had already implemented 378 projects of public square recovery in 16 different regions of Chile, benefiting directly communities adding up to more than 1,000,000 individuals.[3]

In short, *Mi Parque* seeks to recover public spaces and green areas in vulnerable neighborhoods. The goal is to transform deteriorated public spaces using participatory strategies from the design up to the construction stages. Once a location is chosen, the basic protocol for community participation includes two main steps: (i) five meetings between residents and *Mi Parque* staff to design the physical intervention; and (ii) community participation in the construction of the park in a one-day collective activity. The renovated squares include, typically, new sidewalks, green areas planted with grass and trees, a playground for children, and benches.[4] Thus, the final outcome of the intervention is the transformation of deteriorated public spaces according to designs developed together with local communities, conceived to respond to their particular demands.

Mi Parque's expectation is that the renovated public spaces should lead to a broader and more intensive use of the square, bringing healthier habits and increased socialization among family members and neighbors. Increased interactions in the use of the public space, coupled with the previous meetings held by the NGO, should also encourage neighbors to better maintain the public space and to coordinate other social actions. Various expected outcomes of the intervention are aligned with the "Broken Windows" theory of crime and antisocial behavior. By renovating degraded public squares and incentivizing interactions and coordination among neighbors during the planning and construction stages, the intervention aims at improving both the physical and social infrastructure in poor urban communities. According to the "Broken Windows" theory, both these dimensions should reduce anonymity and

[3]It has been very influential in the urban policy debate in Chile and Latin America more broadly, leading even to some expansions of the model to Argentina and Uruguay since 2017.

[4]The intervention is funded through public-private partnerships involving donations from large corporations, including, in the past, the likes of Google, Coca-Cola, Starbucks, General Electric, Levi's, Disney, and UPS, among others.

increase social capital, therefore improving social control and reducing crime.

Summing up, the main aspects of the program are a couple of days of activities among neighbors – five days of discussion and planning and one day of joint construction work – plus the actual recovery of a square that becomes available for public use in the neighborhood. The main expected outcomes from the intervention are, therefore:

- increased use and maintenance of the recovered public space;
- increased use of the neighborhood;
- improved social capital, due both to the joint activities developed among neighbors and to more interactions in the use of public space; and
- improved public safety, due to increased social capital, reduced anonymity, and increased public presence and ownership of public space.

Other indirect results of the intervention may include:

- increased investment in public goods, due to increased social capital and to better coordination of efforts among neighbors;
- increased investments in private housing infrastructure, due to potential complementarities between public and private investments; and
- improved health and quality of life, due to healthier leisure habits and more outdoor activities.

2.2 Experimental Design

In order to better understand the impacts of its initiative on local communities, *Fundación Mi Parque* agreed to randomize a set of its interventions implemented between May 2012 and November 2014. The randomization process was designed and supervised by our research team.

We randomized the *Mi Parque* intervention using a pair-matched randomized controlled trial. The treatment assignment process was implemented in two stages. First, in early 2012, 29 pairs of plots were generated from a set of 58 eligible plots that fulfilled the eligibility criteria of *Mi Parque*. Plots were eligible for the intervention when they were deteriorated public spaces located in vulnerable neighborhoods of the metropolitan area of Santiago. The pairs of plots were generated based on a similarity index including characteristics of the plot (such as size and equipment) and an index measuring the socioeconomic status of the neighborhood.[5] Within each pair we, randomly assigned one plot to the treatment group and one plot to the control group. Then, as the construction process started in some parks, several of the pairs were dropped from the sample because either it was not possible to recover the treatment plot due to logistical or economic reasons, or because the municipality intervened in the control plots before the construction process in the treatment plot began. Then, *Mi Parque* provided replacement pairs

[5]Specifically, the similarity index considered three dimensions: (i) SES of the neighborhood of the plot (SES group accordingly to the 2002 Chilean census, the share of households owning a car according to the 2002 Chilean census, and distance to the closest police station); (ii) characteristics of the plot (including the type of homes surrounding the plots – houses versus apartment buildings –, size of the plot, location of the plot in the neighborhood – center or in the border –, and the state of the plot; and (iii) connectivity of the park (access to subway and to the main bus routes).

of plots to be allocated between treatment and control groups. At the end, out of the 58 original plots, the final sample included 36 (i.e., 18 pairs of plots), and 20 additional extra plots (i.e., 10 pairs of plots) were added to the experimental sample. This leaves us with a sample of 28 pairs and 56 plots to be studied in the experiment.

Our ex-ante power calculations implied that we needed a sample of between 25 to 30 households per plot in order to achieve minimum detectable effects of the order of 0.2 standard deviations (with statistical power set to 0.8). We therefore randomly sampled 25 to 30 households living close to each plot. We wrote a list of households around the plot and then randomized the households to be interviewed. These households were interviewed at the baseline, around two weeks before the intervention, and at the endline, four to five months after the end of the intervention.

By randomly assigning the treatment at the plot level and randomly selecting households within each plot neighborhood, the research design guarantees that we have two groups of neighborhoods and households – treated and control – that are, in expectation, comparable in terms of observable and unobservable characteristics. This enables the identification of the causal effect of the *Mi Parque* intervention by simply comparing households across treatment and control neighborhoods. In addition, random assignment within pairs of plots has another advantage: since the intervention does not take place at the same time across all plots but is staggered over a period of roughly two years, the design allows data to be collected simultaneously at the pair level, ensuring that external aggregate conditions remain balanced between the treatment and control groups. We discuss below balance across treatment and control groups.

2.3 Data

Data in this study comes from three main sources for both treatment and control plots: a baseline household survey roughly two weeks before the construction started in the treatment plot in each stratum, one follow-up household survey four to five months after the construction of the treatment plot in each stratum, and data from one visit of our research assistants to treatment and controls parks about two years after the last construction.

The baseline and follow up surveys included eight modules with questions on socioeconomic and demographic characteristics, housing conditions, perceptions of insecurity, incidence of crime, social capital, family relations, life satisfaction, use of time, leisure, and participation in community activities (including the intervention itself). Questions were fashioned after similar questions traditionally used in some well known household surveys in Chile, such as the National Survey of Urban Public Security, the Bicentennial Survey Adimark-UC, the National Health Survey, the Global Physical Activity Questionnaire, and a previous survey designed by *Fundación Mi Parque*.

Enumerators were instructed to interview the head of the household, who was supposed to respond to all questions regarding other members of the household. Enumerators were carefully selected, comprising mostly of senior undergraduate students in social work and sociology. All enumerators participated in a one-day intensive training session. They were instructed not to identify themselves as members of *Fundación Mi Parque* to interviewees. The questionnaire was also designed trying to avoid any obvious connection between the interview and the renovation project implemented by *Mi Parque*. These efforts

aimed at preventing response biases from a feeling of gratitude toward the NGO.

After questionnaire responses were collected, the data went through processes of scrutiny and back-check that looked for inconsistencies and missing information (sometimes involving telephone calls to households to double check certain answers, and sometimes involving re-interviewing some households, when, for example, questions were not answered by the head of the household). Once this review process was finalized, the data were converted into digital format by two independent digitizers (in case discrepancies were detected, the problem was sorted out by a third person, after consulting the original paper forms from the survey).

Since we have a large number of survey questions dealing with the different aspects of the intervention, our main analysis groups the outcome variables into 10 mutually exclusive summary indices that reflect different hypotheses (following the approach by Finkelstein et al., 2012):

- Use of Park;
- Park maintenance;
- Confidence and relations with neighbors;
- Ownership over and use of neighborhood;
- Participation in community associations;
- Perception of security in the park;
- Perception of security in the neighborhood;
- Home Investments and Value;
- Quality of Life; and
- Leisure outside the Neighborhood.

The original questions that are included in each of the aggregate categories are listed in the Appendix Table 1. We calculate the average for the standardized responses to questions that compose each index. We standardize the responses to each question according to:

$$Y_{st,i} = \frac{Y_i - \bar{Y_c}}{\bar{\sigma_{y_c}}}, \tag{1}$$

where Y_{st} is the standardized version of Y, $\bar{\sigma_{y_c}}$ is the standard deviation of Y for the control group, and $\bar{Y_c}$ is the mean of Y for the control group.

We change the sign of some of the variables so that an increase in each variable implies an improvement in the relevant dimension. Then, we calculate the average within each category as:

$$Y_z = \frac{\sum_{i=1}^{n} Y_{st,i}}{n}, \tag{2}$$

where z indicates an aggregate category, i indicates responses to an item that is part of the category of outcomes z, and n is the total number of items within the category of outcomes z.

Finally, in order to check the effectiveness and durability of the intervention, we sent research assistants to treated and control plots roughly two years after the last renovation was concluded. The assistants were asked to take notes on first impressions on the current status of the plots along various dimensions: whether they were in good state; whether they had green areas, benches, a playground, and trash cans; whether they seemed safe; and whether they seemed to contribute to the quality of life in the neighborhood, among others. We sent two research assistants to each plot and each of them provide independent assessments of the plot. Research assistants were not informed about whether the plots they visited belonged to treatment or control groups.[6]

2.4 Balance and Attrition

In order to study the validity of random assignment, we test for differences between treatment and control groups in a number of baseline variables both for the complete sample and for the subsample of individuals who we were able to contact in the follow-up survey. For each case, we present summary statistics for individuals in each group and the mean-difference test after controlling for the stratification variables.

Table 1 presents descriptive statistics at the baseline for the initial sample and for the sample included in the follow-up survey. At the baseline, we have the 1,530 households included in our experiment. The sample is comprised of households who have are on average lived 22 years in the neighborhood. Most of the households are headed by women (56%), the average household size is 3.4, and most heads of household work (83%) and own their houses (81%). On average, the household head has 10.3 years of schooling and monthly household income is about CLP$367,000 (US$708). The households are located, on average, 80 meters from the park. The numbers in column 2 show that the values for the sample in the follow-up survey, which includes 1,223 households, are very similar.

Table 2 provides balance tests for the sample included in the baseline survey. When comparing individuals in the control and treatment groups, we observe that they are very similar in terms of most variables at the baseline (Panel A). We only observe differences in years living in the neighborhood (24 years in the treatment group compared to 19 in the control group), and in our index of participation in organizations (with a difference of 0.06σ in favor of the control group). However, when correcting for multiple hypotheses testing (following Romano and Wolf, 2005, 2016), the only variable with a significant difference is time living in the neighborhood.

We observe an attrition rate of 20.1% in the follow-up survey. The attrition rate in the follow-up survey was 18.2% for the treatment group and 21.9% in the control group. In addition, this difference is statistically different from 0. Appendix Table 2 presents the correlates of attrition in the follow-up survey. Most variables are not statistically significant. Household size, time living in the neighborhood, and our index of home investments and value have negative impacts on attrition, while the perception of security in the park has a positive and statistically significant impact. In turn, Panel B of Table 2 presents differences between the control and treatment groups in the follow-up survey. Again, the only statistically

[6] We collected data for 25 pairs of parks because due to security concerns regarding three pairs from the sample.

significant difference is related to years living in the neighborhood. This suggests that attrition does not create a significant imbalance in terms of observable characteristics between treatment and control groups. Nevertheless, we also present treatment effects estimated using inverse probability weighting and Lee bounds to analyze the robustness of our results to potential biases from attrition.

All in all, our reading of these results is that there are no systematic differences between treatment and control groups in most of the relevant variables. These results imply that the main cost of attrition relates to sample sizes and to having a lower-powered experiment without significant changes in observable characteristics.

2.5 Empirical Strategy

The random assignment of treatment across eligible plots allows us to estimate the effect of recovering the public squares by simply comparing average outcomes across treated and control groups. Nevertheless, to increase the precision of our estimates, our preferred strategy to estimate the causal impact of *Mi Parque* follows Duflo et al. (2008) and adopts a regression specification that controls for various baseline characteristics of households. With that goal, we use the following model:

$$Y_{1,i} = \alpha + \beta T_i + Y'_{0,i}\gamma + Z'_{0,i}\omega + \delta_i + \epsilon_i, \tag{3}$$

where $Y_{1,i}$ is an outcome of interest after treatment for household i, T_i is a dummy variable indicating that the household lives near a treatment plot, $Y_{0,i}$ is a vector of outcome variables at the baseline, $Z_{0,i}$ is a vector of baseline household characteristics (including gender and years of education of the household head, time living in the neighborhood, household size, a dummy for whether the head of the household is working, monthly household income, and distance from the household to the park), δ_i are strata fixed effects, and ϵ_i is a random error term. Since treatment assignment is random, β yields an unbiased estimate of the average treatment effect of the *Mi Parque* intervention on $Y_{1,i}$. To account for the correlation in outcomes across households within the same neighborhood, we cluster standard errors at the neighborhood level. In addition, to account for multiple hypotheses testing, we also calculate standard errors using a step-down procedure (Romano and Wolf, 2005, 2016). We also present treatment effects using inverse probability weighting (IPW), to account for the higher attrition in the control group (21.9% versus 18.2%, although the attrition is mostly balanced across observables). Besides, we estimate bounds of the treatment effects following the procedure suggested by Lee (2009), which assumes monotonicity on the effect of attrition on the direction of the bias. This procedure implies that the group that suffers less from sample attrition should be trimmed at the quantile of the outcome variable that corresponds to the share of 'excess observations' in this group. Thus, depending on whether the trimming is from above or from below, we estimate upper or lower bounds on the treatment effects. Notice that, in contrast to IPW estimates, Lee bounds do not depend on observable variables to model the potential impact of attrition. These two alternative procedures give estimates that are robust to potential differential attrition using different assumptions and, therefore, provide two independent approaches to evaluate the robustness of estimated treatment effects.

Finally, we present a heterogeneity analysis to understand whether treatment effects are systematically

higher for households, parks, and neighborhoods with specific characteristics. We include the following variables in this analysis: distance from home to the park; years of schooling of the household head (as a proxy for socioeconomic status); whether the park had access to a public transportation stop; whether there were businesses that could be associated with risky behaviors (such as liquor scores and night clubs) located near the park; whether there was good public lighting in the park; and average of all outcomes at the neighborhood level at baseline. The idea of all these interactions is to identify potential heterogeneity of effects considering different dimensions at the individual, park, and neighborhood level. We use the machine learning procedure suggested by Chernozhukov et al. (2018) in this heterogeneity exercise. The procedure generates "proxy predictors" for the conditional average treatment effect (CATE), i.e. the difference in the expected potential outcomes between treatment and control groups conditional on covariates. We include all the covariates in $Y_{0,i}$ and $Z_{0,i}$ and the above-mentioned potential determinants of heterogeneity. With these estimates, we examine which of the covariates are correlated with the heterogeneity in treatment effects by comparing the average characteristics of the most and the least affected groups (this procedure is called Classification Analysis, CLAN, in Chernozhukov et al., 2018).

3 Results

In this section, we present the main results of the estimation of treatment effects. We first report estimates of the effects on dimensions mostly related to the actual implementation of the treatment (i.e. the recovery of the public space), using both data from the follow-up survey and from the visits of our research assistants to the parks two years after the last plot was recovered. Next, we present treatment effects for the main outcomes related to the intervention. We then present some robustness checks that control for the potential effects of attrition using IPW and estimating Lee bounds. Finally, we present estimates of heterogeneous treatment effects.

3.1 Treatment Effects on Park Infrastructure, Use, and Maintenance

Table 3 presents the impacts of the treatment on park use and park maintenance. We see these two dimensions as the ones more closely related to actual "take-up" of the intervention, as they represent direct impacts on the park. Column (1) presents a statistically and economically significant treatment effect on park use of, on average, 0.46σ when compared to control areas. Appendix Table 3A presents treatment effects for the different variables included in this summary index (with estimates robust to MHT), so that one can look in more detail at the specific dimensions that are driving this effect. In this case, results imply that there are statistically significant effects for all questions included in the summary index. The effects are somewhat larger for use of the park by small children and for the frequency of children playing and families walking in the park, with magnitudes of more that 0.50σ. The smallest effects is estimated for the frequency of adults using the park, but even this effect is sizeable, at 0.33σ.

The second row presents, in turn, a significant impact on perceptions of park maintenance, of the order of 0.31σ. Significant effects are also present in the three questions included in the summary index (Panel B of Appendix Table 3), with the largest impact on reductions in the presence of garbage. Interestingly, there is also an increase in the perception that neighbors should be responsible for the maintenance of

the park.

Next, we present treatment effects using the information collected by our research assistants two years after the last treatment was implemented. This is an important check of the effectiveness and durability of the intervention. Results imply that treated plots had significantly better aspect when compared to control plots even at least two years after the intervention. All the effects are presented for standardized variables. In particular, treated parks typically had more green areas, benches, playground equipment for children, and trash cans, as expected from *Fundación Mi Parque*'s original conception of the intervention. The estimates for other dimensions such as general looks of the park and whether it had a hard ground esplanade also suggest non-trivial effects, but these are not statistically significant. Finally, our research assistants rated the public spaces in terms of more subjective perceptions and the results are reported in the last three rows of Table 4. Results suggest that the treated parks look significantly more welcoming for the neighbors and seem better able to contribute to the wellbeing of local population, though there seems to be no impact on the perception of a safe environment. These capture more subjective views on the appearance of the park.[7] We read this as evidence that the renovation of the public parks indeed represented a substantial change in terms of appearance and usability of public space, particularly in the period immediately after the intervention, as we still observe noticeable changes two years after the last treatment was implemented.

In summary, the evidence in this section suggests that the intervention improved the park in a significant way, be it measured in terms of the provision of infrastructure, of park use by people in the neighborhood, or of perceptions of quality. With these results in hand, we move on to study the effects on other outcomes that may be affected by this recovery of public space.

3.2 Treatment Effects on Main Outcomes

Table 5 presents the results of the treatment on other outcomes related to our theory of change: social capital, crime, use and ownership of the neighborhood, participation in community organizations, home investments and value, quality of life, and leisure outside the neighborhood.

Estimates in the first row present results for neighborhood use and ownership. The results indicate that the significant effects on park use and perceptions documented before come together with an increased sense of ownership over the neighborhood and an increased use of neighborhood areas more generally. Treatment is associated, on average, with an increase of 0.11σ in this variable. Results in Panel C in Appendix Table 3 imply that the results for this summary index are driven by effects on scratches in the neighborhood (with smaller effects on the presence of garbage in the neighborhood, in contrast to the effect identified for the park itself, reported in panel B) and by an increase in the frequency of children and families using the neighborhood. There is also an effect on positive perceptions of the neighborhood as a good to live in, but this effect is not statistically significant.

The second and third rows present estimates of the effects on trust and participation in community organizations, respectively. The second row reports impacts on trust and social capital, with a point estimate

[7] It may be possible that our research assistants were biased when evaluating the perceptions of the places, however it seems unlikely that there was any systematic bias, since we do not find evidence of impacts on the perception of being in a safe environment and, in principle, they did not know which parks belonged to treatment or control. In addition, they reported that there were public signs of *Fundación Mi Parque* in two parks only.

of about 0.08σ for confidence on and relationships with neighbors, and 0.12σ for participation in community associations (both robust to MHT). When looking at the components of the summary index of trust and relationship with neighbors, the only dimension for which we observe a significant effect is trust in known people, with a point estimate of 0.19σ. The impacts on other dimensions are substantially smaller (Panel C in Appendix Table 3). The effect on participation in organizations, in turn, seems to be explained not only by increases in participation in the neighborhood council (which has a coefficient of 0.11σ but is not actually statistically significant), but also by increases in participation in other community organizations (Panel D in Appendix Table 3). This suggests that the increase in participation is not mechanically driven by the intervention (which operates through neighborhood councils), but by increases in participation in other organizations as well.[8]

Despite the moderate impacts on social capital, results in the fourth row of Table 5 show that estimated effects on perceptions of security in the park improve by 0.12σ (statistically significant even considering MHT). When analyzing the components of this index (Panel E, Appendix 3), the impacts are related to improvements in security both in weekdays and weekends, in different moments of the day (with largest impacts during the early mornings and afternoons and evenings), and with reductions in vandalism, shootings and fights, drug dealing, and drug and alcohol consumption in the park.

In column (5), we move to the impacts of the treatment on security in the neighborhood. We find an improvement in security in treated areas of 0.06σ when compared to the control group. This is smaller than the effects for security in the park discussed before, but it is still significant and relevant. Actually, this results does not support the idea that insecurity and crime could have moved from the park to other nearby areas. When looking at treatment effects on specific dimensions of the index (Panel F, Appendix 3), we find that the dimensions with the largest impacts are the number of thefts without violence, number of muggings, probability of suffering violent and non-violent burglaries, and the perception of crime growth in the neighborhood. These results show that the park recovery project affects the equilibrium crime rate in local communities, perhaps by displacing the supply of criminals to more distant areas. It may be the case that the improvement in the park and the higher level of use of the neighborhood increase the perceived risk to commit crimes in nearby areas.

Next, rows 6 and 7 in Table 5 show the results for investments in home improvement and quality of life. Point estimates, although positive, are very small and not statistically significant .[9]

Finally, row 8 presents results for leisure activities outside of the neighborhood (including both activities inside the house and in other areas of the city). This allows us to identify potential substitution effects, in particular related to the increase of time spent in the park and in the neighborhood, as reported before. Point estimates imply a reduction in the index of leisure outside of the neighborhood of -0.06σ when compared to the control group. Results in Panel J of Appendix Table 3 imply that this is mainly driven by a significant reduction in the time spent at home by adults (of about -0.19σ, which is actually statistically significant even accounting for MHT). We do not find large or significant effects on people going to other

[8] If we look into the effects on the type of organization in which individuals participate, the larger increases are documented for sports clubs and religious organizations, with no impacts on political parties, housing committees, and parents, older people, and women groups.

[9] Panels G and H in Appendix Table 3 present treatment effects for different questions used to construct these summary indices. While some of them are statistically significant at conventional levels, none is robust to correcting inference for MHT.

areas outside of the neighborhood. Thus, these results confirm that the recovery of public space seems to have moved people outside of their homes and into the neighborhood and the park.

In order to analyze the potential effects of attrition on our estimates, we implement two exercises: (i) in Appendix Table 4, we present treatment effects using inverse probability weighting to account for differential attrition rates; and (ii) in Appendix Table 5 we estimate Lee (2009) lower- and upper-bounds of treatment effects. Results using IPW confirm the pattern presented in the main exercises, with some exceptions that typically point to slightly larger point estimates (e.g., for participation in community associations). Still, these changes are of second order of importance. In terms of the Lee bounds, if we focus on the lower bounds of the absolute values of treatment effects, we find that all of them are statistically different from 0 for the variables that were statistically significant in Tables 3 and 5, with the exception of the upper bound of the index of leisure outside of the neighborhood, which includes 0. Still, this procedure assumes monotonicity and, therefore, may be too conservative. All in all, taking together both approaches (which assume different sources of attrition), our reading of these results is that the potential effects of selective attrition do not affect the our estimates in any significant way.

It is worth mentioning that, within the time frame analyzed (four to five months after the intervention), it is possible that more long-term responses would not be detected. Responses that are related to costly behaviors of households may require some confirmation that the changes brought about by the intervention are permanent, or may be partly dependent on coordination across neighbors, and these may take time to develop. These may help explain the relatively small or absent responses observed for many dimensions of social capital and investments in home improvement. It is also possible that, if we were considering a longer time frame and if park use and crime changed permanently, quality of life would have responded. So we do not want to over-interpret some of the non-significant results from the previous tables.

The robust results for park use, neighborhood ownership and use, leisure outside the neighborhood, and crime in the park and in the neighborhood, suggest that anonymity and direct interaction among neighbors is not the only relevant – and possibly not the main – mechanism in the "Broken Windows" crime phenomenon. The physical conditions of a location – in terms of lighting, deterioration, and number of people circulating – may be enough to generate important responses of crime, even in a setting of low social interactions and unchanged anonymity (in the sense meant by Zimbardo, 2008). The results suggest that urban infrastructure by itself may be a direct determinant of the local incidence of crime. We come back to these and other points in more detail in the next sub-section on mechanisms.

3.3 Mechanisms

This section examines the potential existence of heterogeneous treatment effects associated with the intervention. The goal is to shed light on mechanisms that can help explain the effects on different dimensions documented before. We consider three set of variables: (i) individual characteristics (education, number of children, and distance from the house to the park); (ii) characteristics of the area around the park (whether there is good public lighting, a public transportation stop nearby, and businesses related to risky behaviors, such as liquor stores and night clubs); and (iii) the park-level average of all outcome variables at baseline. As discussed in previous section, we use the machine learning procedure proposed

by Chernozhukov et al. (2018). Table 6 presents a summary of the main results (and the different panels of Appendix Table 6 present a more detailed version of the same results). First, we find no evidence of heterogeneous treatment effects associated with individual-level characteristics. We do not report these results in Table 6 to save space, but they are available in Appendix Table 6.

Table 6 presents the results of the heterogeneity exercises, considering characteristics of the area around the park and baseline averages at the park level, for all outcomes that appeared as significant in previous sections. A "+" ("−") sign implies that the treatment effect is stronger for neighborhoods with a higher (lower) level of the characteristic considered in the respective column. We only consider results that are statistically significant at the 10% level.

Public lighting in the park is important to explain the effects on trust and security (in the park and in the neighborhood), suggesting that there is complementarity between the recovery of the park and this dimension of public infrastructure. The existence of a public transportation stop close to the park, in turn, has different effects on different dimensions. On the one hand, the effect on use of the park and the neighborhood are stronger, similarly to the effect on security. On the other hand, the effect on trust and participation in community organizations is smaller in areas with public transportation stops. One way of interpreting this pattern is that areas with public transportation are naturally busier, so recovery of the park increases its use by people coming through the neighborhood, reducing crime. But at the same time, since these areas are busier, individuals have fewer personal connections and it is more difficult to build general trust and social capital.

Next, we also find heterogeneous treatment effects when there are "bad" businesses around the park: effects on participation in community organizations are significantly smaller. At the same time, we find that the effects on security in the park are stronger in these areas but that the effects on security in the neighborhood decrease. This suggests the existence of a substitution effect, where crime and violence may move to other places.

Now we move on to analyze how the baseline characteristics at the park level interact with outcomes. First, we find that there are convergence effects (i.e. the lower the baseline value of the variable at the park level, the stronger the treatment effect) for four variables: use of the park, maintenance of the park, security in the park, and security in the neighborhood. In all of these cases, the lower the baseline value, the stronger the treatment effect. In turn, we find reinforcement effects (i.e. the higher the baseline value of the variable at the park level, the stronger the treatment effect) for one variable: participation in community organizations. For all the other variables, we do not find statistically discernible heterogeneous treatment effects by baseline characteristics.

Second, baseline levels of security in the park and in the neighborhood are the variables that generate the most interesting heterogeneity: lower baseline levels are correlated with stronger treatment effects for use of the park, maintenance of the park, use and ownership of the neighborhood, security in the park, and security in the neighborhood. These results suggest that increases in security in the area are probably among the main mechanisms explaining the results. In contrast, it is interesting to notice that the effects on participation in community organizations are actually stronger in areas with initially higher levels of security. In addition, there are no heterogeneous effects for social capital and trust. Together with the other results reported in this section, this suggests that the mechanisms explaining the effects on security

outcomes are different from the ones explaining the results along these other dimensions. This seems to be at odds with theories emphasizing the role of participation and social capital as determinants of crime patterns observed in these settings.

Third, higher baseline levels of participation and trust imply larger treatment effects along several dimensions: use of the park, use and ownership over the neighborhood, and security in the park and in the neighborhood. The only exception is the case of baseline levels of trust, where a lower level implies a larger treatment effect on participation in community organizations. The overall picture derived from these results is that baseline levels of participation and trust seem to be complementary to the treatment. This is opposite to the results obtained for baseline levels of security in the neighborhood. Finally, higher baseline levels of leisure outside of the neighborhood are associated with larger treatment effects on park use and participation. This suggests that people increased the time spent in the neighborhood and that this increased both park use and engagement in neighborhood organizations.

Wrapping up, results in this section suggest that, while parks with low baseline levels of security have larger treatment effects, baseline levels of trust and community participation seem to be complements to the treatment. This supports our previous discussion of the main effects, in which we argued that the broader pattern documented in our experiment are not consistent with the view that the main, and maybe only, mechanism behind the so-called "Broken Windows" effect is an increase in local social capital.

4 Concluding Remarks

The role that local spaces and infrastructure play in explaining several behaviors and social outcomes is a topic of interest for both research and public policy. Assessing this role has become even more pressing with the expansion of cities and the segregation of urban populations in developing countries along socioeconomic lines.

Our paper examines the local impacts of recovering public spaces in fragile areas of a developing country. We designed and implemented a randomized experiment to analyze the local impact of recovering deteriorated public parks in Santiago, Chile. We find that the treatment improves not only park use and maintenance but positively affects dimensions related to security, participation in community organizations, confidence in neighbors, and use and ownership over the neighborhood. We also find a decline in leisure outside of the neighborhood.

The impacts we document are heterogeneous along various local characteristics. We find that for most variables, the impacts are stronger in parks with higher baseline levels of insecurity in the park and in the neighborhood. This suggests that a key mechanism for several of the effects we find is related to improvements in security. In contrast, we find that areas with higher baseline levels of confidence and participation in community organizations tend to have larger treatment effects. Taken together, these two main findings indicate that recovering public spaces benefits many areas with low baseline levels of security, but also requires the existence of complementary factors in the form of confidence among neighbors and participation in community organizations for the benefits of the intervention to be fully capitalized. Finally, we also find that there are some physical features around the parks that affect the

magnitude of treatment effects. In particular, the existence of public lighting tends to be complementary to treatment along several dimensions. Other features such as the presence of a public transportation stop and of "bad" businesses around the park also affect the size of treatment effects. These results suggest that contextual features should mediate our understanding of the impacts of the recovery of public infrastructure.

To conclude, we believe that the findings in this study contribute to our understanding of the role of public spaces and local infrastructure on several relevant dimensions of local community life. We also hope that they shed some light on the mechanisms connecting these two.

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Table 1: Summary Statistics

	Sample	No attrition
	(1)	(2)
Household Head Gender	0.44	0.44
	(0.50)	(0.50)
Time living in household	21.52	22.04
	(15.60)	(15.56)
Number of household members	3.42	3.51
	(1.64)	(1.65)
Household head worked last week	0.82	0.82
	(0.38)	(0.38)
Owner lives in household	0.81	0.84
	(0.39)	(0.37)
Years of education	10.35	10.30
	(2.98)	(3.00)
Income	367.26	367.69
	(222.13)	(222.07)
Distance to park	0.08	0.08
	(0.05)	(0.05)

Notes: This table presents averages for the complete sample and for the sample without attritors. Robust standard errors are reported in parentheses.

Table 2: Balance Tests

	Control	Treatment	Impact	MHT p-value	Control (No attrition)	Treatment (No attrition)	Impact	MHT p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household Head Gender	0.44	0.44	-0.00	0.97	0.45	0.42	-0.02	1.00
	(0.50)	(0.50)	(0.02)		(0.50)	(0.49)	(0.03)	
Time living in household	24.01	18.97	-4.91***	0.01**	24.59	19.56	-4.92**	0.01**
	(16.53)	(14.15)	(1.79)		(16.41)	(14.27)	(1.88)	
Number of household members	3.35	3.50	0.15	0.89	3.48	3.54	0.07	1.00
	(1.65)	(1.63)	(0.09)		(1.66)	(1.64)	(0.11)	
Household head worked last week	0.81	0.84	0.02	0.97	0.82	0.83	0.00	1.00
	(0.39)	(0.37)	(0.02)		(0.38)	(0.38)	(0.02)	
Owner lives in household	0.80	0.82	0.03	0.97	0.83	0.85	0.02	1.00
	(0.40)	(0.38)	(0.02)		(0.37)	(0.36)	(0.02)	
Years of education	10.23	10.46	0.23	0.95	10.19	10.39	0.16	1.00
	(3.16)	(2.80)	(0.16)		(3.18)	(2.81)	(0.17)	
Income	362.78	372.03	14.38	0.97	367.61	367.77	2.20	1.00
	(220.15)	(224.29)	(13.55)		(221.46)	(222.89)	(14.78)	
Distance to park	0.08	0.08	-0.00	0.97	0.08	0.08	-0.00	1.00
	(0.05)	(0.04)	(0.00)		(0.05)	(0.04)	(0.00)	
Use of Park	-0.05	-0.08	-0.04	0.97	-0.03	-0.08	-0.04	1.00
	(0.70)	(0.70)	(0.06)		(0.71)	(0.70)	(0.06)	
Park maintenance	-0.00	-0.03	-0.02	0.97	-0.00	-0.04	-0.03	1.00
	(0.79)	(0.80)	(0.06)		(0.80)	(0.80)	(0.06)	
Confidence and relations with neighbors	0.00	0.01	0.01	0.97	-0.01	0.01	0.02	1.00
	(0.51)	(0.52)	(0.03)		(0.51)	(0.53)	(0.03)	
Ownership over and use of neighborhood	0.00	-0.03	-0.03	0.90	-0.01	-0.03	-0.02	1.00
	(0.38)	(0.39)	(0.02)		(0.38)	(0.40)	(0.03)	
Participation in community associations	0.01	-0.05	-0.06*	0.96	0.02	-0.02	-0.04	1.00
	(0.85)	(0.85)	(0.03)		(0.88)	(0.87)	(0.04)	
Perception of security in neighborhood	0.00	0.03	0.02	0.97	-0.00	0.03	0.03	0.99
	(0.44)	(0.40)	(0.03)		(0.43)	(0.39)	(0.04)	
Perception of security in the park	0.01	-0.02	-0.03	0.97	-0.00	-0.04	-0.04	1.00
	(0.72)	(0.68)	(0.06)		(0.72)	(0.68)	(0.07)	
Home investments	-0.00	-0.02	-0.02	0.97	0.02	-0.01	-0.04	0.99
	(0.50)	(0.52)	(0.03)		(0.50)	(0.53)	(0.03)	
Leisure outside neighborhood	0.00	-0.03	-0.03	0.97	0.00	-0.03	-0.04	0.94
	(0.41)	(0.45)	(0.02)		(0.41)	(0.45)	(0.02)	
Quality of life	-0.00	-0.03	-0.03	0.97	-0.01	-0.03	-0.03	0.99
	(0.43)	(0.42)	(0.02)		(0.43)	(0.42)	(0.02)	

Notes: This table presents averages for the treatment and control group. All regressions include controls for fixed effects. Robust standard errors are reported in parentheses. Robust p-values to multiple hypothesis testing following Romano and Wolf (2005a, 2005b, 2016) are presented in columns (4) and (8), this tests for the probability of rejecting one or more true null hypothesis in the context of multiple hypothesis being tested.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 3: Impact on Park Use and Maintenance

	Mean (Control) (1)	Difference (2)	Observations (3)
Park Use	0.00	0.46***	1221
		(0.05)	
		[0.00***]	
Park Maintenance	0.00	0.31***	1218
		(0.04)	
		[0.00***]	

Notes: This table presents treatment effects for Park Use and Maintenance. All regressions include controls for fixed effects. Robust standard errors are reported in parentheses. Robust p-values for multiple hypothesis following Romano and Wolf (2005a, 2005b, 2016) in square brackets.
***Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table 4: Medium-Term Impact on Park Attributes

	Mean (Control)	Difference	Observations
	(1)	(2)	(3)
Park looks in good state	0.02	0.28	105
		(0.24)	
		[0.26]	
Park has vegetation	0.03	0.60**	105
		(0.25)	
		[0.07*]	
Park has seats	-0.04	0.36**	105
		(0.15)	
		[0.00***]	
Park has hard ground	-0.02	0.21	105
		(0.24)	
		[0.87]	
Park has exercise machines	-0.01	0.05	105
		(0.24)	
		[0.89]	
Park has traditional games for infants	0.06	0.40*	105
		(0.20)	
		[0.04**]	
Park has garbage disposal	-0.03	0.45**	105
		(0.20)	
		[0.01***]	
Park looks like a safe environment	0.08	0.10	105
		(0.18)	
		[0.89]	
Park invites neighbors to socialize	-0.01	0.36**	105
		(0.18)	
		[0.07*]	
Park contributes to neighborhood welfare	0.06	0.48***	105
		(0.15)	
		[0.00***]	

Notes: This table presents medium-term treatment effects for park attributes. All regressions include controls for fixed effects. Robust standard errors are reported in parentheses. Robust p-values for multiple hypothesis following Romano and Wolf (2005a, 2005b, 2016) in square brackets.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 5: Impact on Main Outcomes

	Mean (1)	Impact (2)	Observations (3)
Ownership over and use of neighborhood	0.00	0.11***	1222
		(0.03)	
		[0.00***]	
Confidence with neighbors	-0.04	0.08***	1521
		(0.03)	
		[0.06*]	
Participation in community associations	-0.00	0.12**	1215
		(0.06)	
		[0.07*]	
Perception of security in the park	-0.00	0.12***	1215
		(0.04)	
		[0.02**]	
Perception of security in neighborhood	0.00	0.06**	1221
		(0.02)	
		[0.06*]	
Home investments	-0.00	0.01	1221
		(0.03)	
		[0.68]	
Quality of life	-0.00	0.03	1221
		(0.02)	
		[0.34]	
Leisure outside neighborhood	-0.00	-0.07**	1221
		(0.03)	
		[0.07*]	

Notes: This table presents treatment effects for the main outcomes discussed in this work. All regressions include controls for fixed effects. Robust standard errors are reported in parentheses. Robust p-values for multiple hypothesis following Romano and Wolf (2005a, 2005b, 2016) in square brackets.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net Summary

	Public Lightning	Bus Stop	Bad Business	Initial Use of Park	Initial Park Maintenance	Initial Own and Use	Initial Trust	Initial Participation	Initial Security in Park	Initial Security in Neigh	Initial Leisure Outside
Use of Park		+		-	-			+	-	-	+
Park Maintenance					-	-		+	-	-	
Ownership and Use		+		-	-		+	+	-	-	
Trust	+	-		+							
Participation		-	-			-	-	+	+	+	+
Crime in Park	+	+			-	-		+	-	-	
Security in Neigh	+	+	+	-	-	+	+		-	-	
Security Outside			-								

Notes:

Appendix Table 1: Summary Indices

Questions	Range of Answers
Panel A: Park Use	
Use park adult	(0/1)
Use park children under 12	(0/1)
Use park children over 12	(0/1)
Freq use park adult	(1-5)
Freq use park children under 12	(1-5)
Freq use park children over 12	(1-5)
Freq children play in park	(1-4)
Freq families walk in park	(1-4)
Panel B: Park Maintenance	
Freq new scratches - park	(1-5)
Freq new garbage - park	(1-5)
Neighbors should be co-responsible of park maintenance	(0/1)
Panel C: Confidence and relations with neighbors	
General confidence	(1-10)
Confidence in known people	(1-4)
Confidence in people known for first time	(1-4)
Confidence in the family	(1-4)
Confidence in the neighbors	(1-4)
My neighbors deserve trust	(0/1)
My neighbors do not get on well	(0/1)
My neighbors are very solidarian	(0/1)
N neighbors you know the name	(0,...)
Frequency conversating with neighbors	(1-4)
People I can ask a favour in the neighborhood	(1-4)
N people I can ask a favour	(0,...)
People I can ask a favour in/out neighborhood	(0,...)

Note:

Appendix Table 1: Summary Indices

Questions	Range of Answers
Panel D: Ownership over and use of neighborhood	
Good neighborhood to live	(1-5)
Proud of my neighborhood	(1-5)
Want to change neighborhood	(0/1)
Freq new scratches - neighborhood	(1-5)
Freq new garbage - neighborhood	(1-5)
Family visits from other neighborhoods	(1-5)
Walk in neighborhood Adult	(1-5)
Walk in neighborhood Children under 12	(1-5)
Walk in neighborhood Children over 12	(1-5)
Children playing in neighborhood	(1-4)
Families walking in neighborhod	(1-4)
Walk with family in neighborhood	(1-4)
Panel E: Participation in Organizations	
Participate in the neighborhood council	(1-3)
Participate in community organization	(1-3)
Panel F: Perception of security in the park	
Frequency of Young people wandering	(1-4)
Frequency of Thefts and muggings	(1-4)
Frequency of Vandalism	(1-4)
Frequency of Drug dealing	(1-4)
Frequency of Shootings and fights	(1-4)
Frequency of Alcohol and drug consumption	(1-4)
Frequency of Drug consumption	(1-4)
Frequency of Drug dealing	(1-4)
Perception of Security, Early morning still dark, weekday	(1-7)
Perception of Security, Early morning still dark, weekend	(1-7)
Perception of Security, Morning, weekday	(1-7)
Perception of Security, Morning, weekend	(1-7)
Perception of Security, Afternoon, weekday	(1-7)
Perception of Security, Afternoon, weekend	(1-7)
Perception of Security, Night, weekday	(1-7)
Perception of Security, Night, weekend	(1-7)
Perception of Security, Night after 00:00, weekday	(1-7)
Perception of Security, Night after 00:00, weekend	(1-7)

Note:

Appendix Table 1: Summary Indices

Questions	Range of Answers
Panel G: Perception of security in the neighborhood	
Frequency of Young people wandering	(1-4)
Frequency of Thefts and muggings	(1-4)
Frequency of Vandalism	(1-4)
Frequency of Drug dealing	(1-4)
Frequency of Shootings and fights	(1-4)
Frequency of Alcohol and drug consumption	(1-4)
N of thefts without violence	(0,...)
N of muggings	(0,...)
N of house burglaries without violence	(0,...)
N of house burglaries with violence	(0,...)
Growth rate of crime	(1-3)
New fences in the house	(0/1)
Perception of Security of House	(1-7)
Perception of Security of Neighborhood	(1-7)
Perception of Security of my street	(1-7)
Perception of Presence of Wastelands	(1-7)
Perception of Security neighborhood in the night	(1-7)
Probability of suffering a theft	(1-5)
Probability of suffering a mugging	(1-5)
Probability of suffering a burglary	(1-5)
Probability of suffering a violent burglary	(1-5)
Panel H: Home Investments and Value	
Ln Price of the house (CLP)	(0,...)
Ln House rent (CLP)	(0,...)
Painting/repairing external walls	(0/1)
Painting of gate	(0/1)
Putting flowers outside the entrance	(0/1)
Repairing external floor	(0/1)
Repairing or putting grilles	(0/1)
Painting/repairing internal walls	(0/1)
House extension	(0/1)
Repairing roof	(0/1)
Repairing of Windows	(0/1)
Repairing toilets	(0/1)

Note:

Appendix Table 1: Summary Indices

Questions	Range of Answers
Panel I: Quality of Life	
Healthy lifestyle	(1-5)
Freq practice physical activity	(1-5)
Perception of health	(1-7)
Sad	(1-4)
Irritable	(1-4)
Angry	(1-4)
Relaxed	(1-4)
Happy	(1-4)
Worried	(1-4)
Tired	(1-4)
Satisfaction with life	(1-10)
I am happy with my family	(1-5)
I value the quality of my family	(1-5)
We have good time in my family	(1-5)
We respect each other in my family	(1-5)
I feel beloved by my sons	(1-5)
Panel J: Leisure outside Neighborhood	
Freq watch TV Homemaker	(1-7)
Watch TV Children under 12	(1-7)
Watch TV Children over 12 (1-7)	(1-7)
Use computer Homemaker (1-7)	(1-7)
Computer Children under 12 (1-7)	(1-7)
Computer Children over 12 (1-7)	(1-7)
Freq visit a mall Homemaker (1-5)	(1-7)
Mall Children under 12 (1-5)	(1-7)
Mall Children over 12 (1-5)	(1-7)
Time at home wkd Homemaker 1-7)	(1-7)
Home wkd Children under 12 (1-7	(1-7)
Home wkd Children over 12 (1-7)	(1-7)
Visiting family to other neighborhoods	(1-5)

Note:

Appendix Table 2: Attrition Analysis

	(1)	(2)	(3)
Treatment	-0.04***		-0.05
	(0.01)		(0.01)
Household Head Gender		0.02	0.02
		(0.02)	(0.02)
Time living in household		-0.00**	-0.00***
		(0.00)	(0.00)
Number of household members		-0.02**	-0.02**
		(0.01)	(0.01)
Years of education		0.00	0.00
		(0.00)	(0.00)
Log of Income		-0.00	-0.00
		(0.02)	(0.02)
Distance to Park		0.40	0.37
		(0.28)	(0.28)
Use of Park		-0.01	-0.02
		(0.02)	(0.02)
Park Maintenance		-0.01	-0.01
		(0.01)	(0.01)
Ownership Over and Use of neighborhood		0.03	0.02
		(0.03)	(0.03)
Participation in Community Associations		-0.01	-0.01
		(0.01)	(0.01)
Perception of Security in Park		0.06**	0.06**
		(0.02)	(0.02)
Perception of Security in Neighborhood		-0.03	-0.03
		(0.04)	(0.04)
Home Investments and Value		-0.05*	-0.05*
		(0.02)	(0.02)
Leisure Outside Neighborhood		0.00	-0.00
		(0.02)	(0.02)
Quality of Life		0.01	0.01
		(0.03)	(0.03)

Notes: This table presents the treatment effect on attrition. All regressions include controls for fixed effects. Robust standard errors are reported in parentheses.

Appendix Table 3A: Impact on Each Component of the Index

Variable	Impact	Standard Error	MHT p-value
Panel A: Park Use			
Use park adult	0.49***	(0.07)	0.00***
Use park children under 12	0.55***	(0.07)	
Use park children over 12	0.43***	(0.10)	
Freq use park adult	0.33***	(0.06)	0.00***
Freq use children under 12	0.51***	(0.08)	0.00***
Freq use children over 12	0.42***	(0.08)	0.00***
Freq children play in park	0.53***	(0.07)	0.00***
Freq families walk in park	0.52***	(0.06)	0.00***
Panel B: Park Maintenance			
Freq new scratches - park	0.57***	(0.08)	0.00***
Freq new garbage - park	0.26***	(0.07)	0.00***
Neighbors should be co-responsible of park maintenance	0.13***	(0.05)	0.01***
Panel C: Ownership Over and Use of Neighborhood			
Good neighborhood	0.07	(0.06)	0.61
Proud to my neighborhood	-0.01	(0.06)	0.99
Want to change my neighborhood	0.06	(0.05)	0.65
Freq new scratches - neighborhood	0.23***	(0.08)	0.03**
Freq new garbage - neighborhood	0.12*	(0.07)	0.28
Family visits from other neighborhoods	0.03	(0.06)	0.99
Walk in neighborhood Adult	0.14**	(0.07)	0.23
Walk in neighborhood Children under 12	0.17**	(0.08)	0.29
Walk in neighborhood Children over 12	0.04	(0.09)	0.99
Children playing in neighborhood Adut	0.22***	(0.06)	0.03**
Families walking in neighborhood	0.24***	(0.05)	0.01**
Walk with family in neighborhood	0.10*	(0.05)	0.61
Panel D: Confidence and relationship with neighbors			
General confidence	0.06	(0.07)	0.92
Confidence in known people	0.19***	(0.05)	0.04**
Confidence in people known for the first time	0.01	(0.08)	1.00
Confidence in the family	0.07*	(0.04)	0.91
Confidence in neighbors	0.03	(0.06)	0.99
My neighbors deserve trust	0.01	(0.05)	1.00
My neighbors do not get on well	0.04	(0.07)	0.98
My neighbors are very solidarian	0.04	(0.06)	0.98
N neighbors know the name	0.07	(0.05)	0.80
Frequency conversating with neighbors	0.08*	(0.04)	0.77
People I can ask a favour in the neighborhood	0.03	(0.04)	0.99
N people I can ask a favour	0.01	(0.05)	1.00
People I can ask a favour in/out neighborhood	0.05	(0.05)	0.95

Notes: This table presents inverse probability weighting estimates to account for the potential effects of sample attrition. Control variables include the randomization strata fixed effects and the following baseline variables: the OHIP score, the Rosenberg score, employment status, years of education, and dummy for being the household head. Standard errors are reported in parentheses.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix Table 3B: Impact on Each Component of the Index

Variable	Impact	Standard Error	MHT p-value
Panel E: Participation in Community Associations			
Participate in the neighborhood council	0.11	(0.07)	0.11
Participate in community organization	0.14**	(0.06)	0.09*
Panel F: Security in Park			
Frequency of young people wandering	0.17***	(0.06)	0.29
Frequency of theft and muggings	0.18***	(0.07)	0.22
Frequency of vandalism	0.07	(0.05)	0.75
Frequency of drug dealing	0.08	(0.05)	0.71
Frequency of shootings and fights	0.13**	(0.06)	0.42
Frequecy of alcohol and drug consumption	0.13**	(0.05)	0.42
Frequency of drug consumption	0.11*	(0.06)	0.51
Frequency of drug dealing	0.09*	(0.05)	0.63
Perception of Security, Early morning still dark, weekday	0.06	(0.07)	0.76
Perception of Security, Early morning still dark, weekend	0.03	(0.06)	0.76
Perception of Security, Morning, weekday	0.07	(0.08)	0.76
Perception of Security, Morning, weekend	0.10	(0.06)	0.63
Perception of Security, Afternoon, weekday	0.16***	(0.06)	0.29
Perception of Security, Afternoon, weekend	0.15	(0.11)	0.42
Perception of Security, Night, weekday	0.16**	(0.08)	0.29
Perception of Security, Night, weekend	0.26***	(0.09)	0.07*
Perception of Security, Night after 00:00, weekday	0.06	(0.10)	0.76
Perception of Security, Night after 00:00, weekend	0.20	(0.13)	0.29
Panel G: Security in Neighborhood			
Frequency of young people wandering	0.06	(0.05)	0.95
Frequency of thefts and muggings	0.03	(0.05)	0.98
Frequency of vandalism	0.05	(0.05)	0.97
Frequency of drug dealing	0.11	(0.08)	0.82
Frequency of shootings and fights	0.06	(0.05)	0.95
Frequecy of alcohol and drug consumption	0.07	(0.06)	0.92
N of thefts without violence	0.09	(0.06)	0.82
N of muggings	0.11**	(0.05)	0.78
N of house burglaries without violence	-0.12**	(0.06)	0.69
N of house burglaries with violence	0.01	(0.08)	0.99
Growth rate of crime	0.06	(0.05)	0.97
New fences in the house	0.03	(0.06)	0.99
Perception of Security in House	0.03	(0.10)	0.99
Perception of Security in Neighborhood	0.11	(0.08)	0.68
Perception of Security of my street	0.08	(0.08)	0.86
Perception of Security of Wastelands	0.17***	(0.04)	0.16
Perception of Security neighborhood in the night	0.14***	(0.04)	0.23
Probability of suffering a theft	0.07	(0.06)	0.95
Probability of suffering a mugging	0.05	(0.04)	0.98
Probability of suffering a burglary	0.11**	(0.06)	0.80
Probability of suffering a violent burglary	0.01	(0.05)	

Notes: This table presents inverse probability weighting estimates to account for the potential effects of sample attrition. Control variables include the randomization strata fixed effects and the following baseline variables: the OHIP score, the Rosenberg score, employment status, years of education, and dummy for being the household head. Standard errors are reported in parentheses.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix Table 3C: Impact on Each Component of the Index

Variable	Impact	Standard Error	MHT p-value
Panel H: Home Investment and Value			
Ln Price of the House	0.01	(0.05)	1.00
Ln House rent	0.12**	(0.05)	0.47
Painting/repairing external walls	-0.05	(0.06)	0.99
Painting of gate	0.04	(0.05)	0.99
Putting flowers outside the entrance	0.02	(0.05)	1.00
Repairing external floor	-0.03	(0.05)	1.00
Repairing or putting grilles	0.12**	(0.05)	0.47
Painting/repairing internal walls	-0.02	(0.05)	1.00
House extension	0.02	(0.05)	1.00
Repairing roof	0.04	(0.05)	1.00
Repairing of Windows	-0.19	(0.13)	0.47
Repairing toilets	-0.03	(0.10)	1.00
Panel I: Quality of Life			
Healthy lifestyle	0.12**	(0.05)	0.32
Freq practice physical activity	0.04	(0.08)	0.99
Perception of health	0.04	(0.08)	1.00
Sad	0.02	(0.07)	1.00
Irritable	0.02	(0.07)	1.00
Angry	0.03	(0.06)	1.00
Relaxed	0.04	(0.04)	0.99
Happy	0.11**	(0.05)	0.39
Worried	0.05	(0.04)	0.98
Tired	0.05	(0.04)	0.99
Satisfaction with Life	0.02	(0.04)	1.00
I am happy with life	0.03	(0.06)	1.00
I value the quality of my family	0.04	(0.04)	0.99
We have a good time in my family	0.02	(0.05)	1.00
We respect each other in my family	-0.02	(0.06)	1.00
I feel beloved by my sons	-0.08*	(0.04)	0.72
Panel J: Leisure Outside Neighborhood			
Freq watch TV Homemaker	-0.19**	(0.08)	0.04**
Watch TV Children Under 12	-0.08	(0.10)	0.96
Watch TV Children Over 12	-0.01	(0.10)	1.00
Use computed Homewaker	-0.02	(0.05)	1.00
Computed Children Under 12	-0.10	(0.07)	0.86
Computed Children Over 12	-0.09	(0.10)	0.96
Freq visit a mall Homemaker	-0.11*	(0.05)	0.30
Mall Children Under 12	-0.07	(0.07)	0.96
Mall Children Over 12	0.03	(0.10)	1.00
Time at home weekend Homemaker	-0.01	(0.06)	1.00
Home weekend Children Under 12	-0.04	(0.08)	1.00
Home weekend Children Over 12	-0.09	(0.08)	0.96
Visiting family to other neighborhoods	0.06	(0.04)	0.88

Notes: This table presents inverse probability weighting estimates to account for the potential effects of sample attrition. Control variables include the randomization strata fixed effects and the following baseline variables: the OHIP score, the Rosenberg score, employment status, years of education, and dummy for being the household head. Standard errors are reported in parentheses.

***Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix Table 4: Inverse Probability Weighting Estimates

Use of park	0.45***
	(0.05)
Park maintenance	0.31***
	(0.04)
Confidence with neighbors	0.05**
	(0.02)
Ownership over and use of neighborhood	0.11***
	(0.03)
Participation in community associations	0.15**
	(0.06)
Perception of security in the park	0.12***
	(0.04)
Perception of security in neighborhood	0.05**
	(0.02)
Home investments	0.02
	(0.03)
Quality of life	0.03
	(0.03)
Leisure outside neighborhood	-0.06**
	(0.03)

Notes: This table presents inverse probability weighting estimates to account for the potential effects of sample attrition. Control variables include the following baselines: Household head gender, Time living in household, Number of household members, Years of education, Log of income, Distance to park. Standard errors are reported in parentheses.
***Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Appendix Table 5: Lee Bounds

	Lower and Upper Bounds	Observations
Use of park	0.39;0.50	1530
	[0.33, 0.56]	
Park maintenance	0.31;0.39	1530
	[0.25, 0.45]	
Confidence with neighbors	0.05; 0.06	1530
	[0.00, 0.11]	
Ownership over and use of neighborhood	0.07;0.16	1530
	[0.03, 0.20]	
Participation in community associations	0.10;0.16	1530
	[0.01, 0.23]	
Perception of security in the park	0.07;0.20	1530
	[0.01, 0.26]	
Perception of security in neighborhood	0.07;0.10	1530
	[0.00, 0.14]	
Home investments	-0.07;0.04	1530
	[-0.12, 0.08]	
Quality of life	-0.01;0.08	1530
	[-0.05, 0.12]	
Leisure outside neighborhood	-0.13;-0.02	1530
	[-0.17, 0.02]	

Notes: This table presents robustness checks considering potential effects of attrition.
***Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Use of Park	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.704	3.493	0.232
	(3.511,3.902)	(3.296,3.680)	(-0.042,0.502)
	-	-	[0.201]
Bus Stop	3.625	3.072	0.559
	(3.360,3.883)	(2.808,3.335)	(0.191,0.933)
	-	-	[0.007]
Bad Business	1.734	1.551	0.207
	(1.489,1.975)	(1.311,1.795)	(-0.132,0.538)
	-	-	[0.486]
Use of Park Baseline	-0.143	0.144	-0.300
	(-0.197,-0.092)	(0.092,0.195)	(-0.375,-0.224)
	-	-	[0.000]
Park Maintenance Baseline	-0.119	0.102	-0.220
	(-0.167,-0.069)	(0.053,0.149)	(-0.286,-0.152)
	-	-	[0.000]
Trust Baseline	0.008	0.031	-0.023
	(-0.027,0.040)	(-0.002,0.064)	(-0.070,0.023)
	-	-	[0.657]
Ownership and Use Baseline	-0.012	-0.019	0.004
	(-0.039,0.014)	(-0.045,0.007)	(-0.033,0.040)
	-	-	[1.000]
Participation Baseline	0.100	-0.053	0.156
	(0.065,0.136)	(-0.093,-0.017)	(0.105,0.207)
	-	-	[0.000]
Security in Park Baseline	-0.082	0.084	-0.164
	(-0.143,-0.019)	(0.020,0.143)	(-0.251,-0.077)
	-	-	[0.001]
Security in Neighborhood Baseline	-0.041	0.047	-0.091
	(-0.075,-0.008)	(0.015,0.080)	(-0.138,-0.044)
	-	-	[0.000]
Home Investment and Value Baseline	0.013	-0.056	0.071
	(-0.019,0.044)	(-0.088,-0.025)	(0.026,0.114)
	-	-	[0.004]
Leisure Outside Baseline	-0.009	-0.007	-0.002
	(-0.033,0.015)	(-0.031,0.018)	(-0.036,0.031)
	-	-	[1.000]
Quality of Life Baseline	-0.004	-0.041	0.033
	(-0.021,0.013)	(-0.058,-0.023)	(0.008,0.057)
	-	-	[0.017]
Distance to Park Baseline	-1.484	-2.482	0.951
	(-2.275,-0.728)	(-3.279,-1.680)	(-0.131,2.017)
	-	-	[0.167]
Years of Education Baseline	9.889	10.020	-0.076
	(9.217,10.560)	(9.357,10.670)	(-1.001,0.819)
	-	-	[1.000]
Children	0.361	0.416	-0.053
	(0.281,0.441)	(0.340,0.498)	(-0.166,0.062)
	-	-	[0.706]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Park Maintenance	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.777	3.634	0.137
	(3.584,3.974)	(3.430,3.827)	(-0.144,0.414)
	-	-	[0.681]
Bus Stop	3.462	3.254	0.246
	(3.193,3.734)	(2.987,3.520)	(-0.142,0.632)
	-	-	[0.397]
Bad Business	1.640	1.663	-0.005
	(1.402,1.882)	(1.429,1.887)	(-0.339,0.309)
	-	-	[1.000]
Use of Park Baseline	-0.059	-0.016	-0.043
	(-0.120,0.003)	(-0.077,0.045)	(-0.129,0.043)
	-	-	[0.662]
Park Maintenance Baseline	-0.114	0.086	-0.208
	(-0.167,-0.062)	(0.033,0.144)	(-0.281,-0.133)
	-	-	[0.000]
Trust Baseline	0.027	-0.011	0.042
	(-0.006,0.059)	(-0.045,0.023)	(-0.004,0.088)
	-	-	[0.147]
Ownership and Use Baseline	-0.015	-0.027	0.007
	(-0.042,0.013)	(-0.055,0.002)	(-0.031,0.045)
	-	-	[1.000]
Participation Baseline	0.059	-0.051	0.114
	(0.020,0.098)	(-0.090,-0.013)	(0.059,0.167)
	-	-	[0.000]
Security in Park Baseline	-0.067	0.127	-0.181
	(-0.133,0.002)	(0.058,0.196)	(-0.281,-0.087)
	-	-	[0.000]
Security in Neighborhood Baseline	-0.033	0.073	-0.104
	(-0.068,0.002)	(0.039,0.109)	(-0.154,-0.052)
	-	-	[0.000]
Home Investment and Value Baseline	-0.028	-0.016	-0.010
	(-0.060,0.005)	(-0.049,0.014)	(-0.055,0.036)
	-	-	[1.000]
Leisure Outside Baseline	-0.013	-0.028	0.013
	(-0.039,0.014)	(-0.053,-0.002)	(-0.022,0.047)
	-	-	[0.916]
Quality of Life Baseline	-0.009	-0.027	0.019
	(-0.025,0.009)	(-0.043,-0.010)	(-0.004,0.042)
	-	-	[0.206]
Distance to Park Baseline	-1.580	-2.486	0.967
	(-2.374,-0.819)	(-3.317,-1.662)	(-0.139,2.051)
	-	-	[0.173]
Years of Education Baseline	9.764	10.130	-0.306
	(9.079,10.450)	(9.423,10.820)	(-1.314,0.679)
	-	-	[1.000]
Children	0.361	0.376	-0.021
	(0.287,0.438)	(0.298,0.455)	(-0.134,0.090)
	-	-	[1.000]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Confidence and relations with neigbhbors	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.852	3.415	0.422
	(3.683,4.017)	(3.255,3.581)	(0.185,0.659)
	-	-	[0.001]
Bus Stop	3.128	3.798	-0.677
	(2.884,3.366)	(3.557,4.038)	(-1.021,-0.336)
	-	-	[0.000]
Bad Business	1.636	1.675	-0.055
	(1.423,1.852)	(1.465,1.889)	(-0.352,0.238)
	-	-	[1.000]
Use of Park Baseline	-0.013	-0.097	0.085
	(-0.066,0.042)	(-0.150,-0.043)	(0.012,0.157)
	-	-	[0.048]
Park Maintenance Baseline	0.011	0.040	-0.027
	(-0.039,0.059)	(-0.009,0.087)	(-0.098,0.043)
	-	-	[0.886]
Trust Baseline	-0.012	0.001	-0.014
	(-0.042,0.017)	(-0.027,0.030)	(-0.055,0.028)
	-	-	[1.000]
Ownership and Use Baseline	-0.040	-0.007	-0.030
	(-0.065,-0.015)	(-0.032,0.018)	(-0.067,0.006)
	-	-	[0.209]
Participation Baseline	0.016	-0.033	0.048
	(-0.020,0.051)	(-0.071,0.002)	(-0.001,0.097)
	-	-	[0.113]
Security in Park Baseline	0.029	0.017	0.022
	(-0.028,0.088)	(-0.038,0.074)	(-0.063,0.104)
	-	-	[1.000]
Security in Neighborhood Baseline	0.037	0.021	0.013
	(0.008,0.067)	(-0.008,0.050)	(-0.026,0.055)
	-	-	[1.000]
Home Investment and Value Baseline	0.010	-0.002	0.012
	(-0.020,0.041)	(-0.031,0.029)	(-0.031,0.054)
	-	-	[1.000]
Leisure Outside Baseline	0.003	-0.046	0.049
	(-0.016,0.022)	(-0.065,-0.027)	(0.023,0.077)
	-	-	[0.001]
Quality of Life Baseline	-0.014	-0.021	0.011
	(-0.029,0.001)	(-0.037,-0.005)	(-0.012,0.032)
	-	-	[0.678]
Distance to Park Baseline	-2.115	-1.211	-0.802
	(-2.765,-1.454)	(-1.881,-0.560)	(-1.760,0.102)
	-	-	[0.164]
Years of Education Baseline	9.742	10.140	-0.381
	(9.074,10.380)	(9.504,10.780)	(-1.342,0.505)
	-	-	[0.826]
Children	0.397	0.362	0.039
	(0.321,0.472)	(0.283,0.436)	(-0.068,0.144)
	-	-	[0.945]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Ownership and Use of neighborhood	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.676	3.540	0.149
	(3.486,3.868)	(3.345,3.733)	(-0.125,0.425)
	-	-	[0.562]
Bus Stop	3.727	2.874	0.852
	(3.467,3.989)	(2.606,3.137)	(0.471,1.222)
	-	-	[0.000]
Bad Business	1.761	1.483	0.266
	(1.532,1.989)	(1.270,1.703)	(-0.055,0.572)
	-	-	[0.210]
Use of Park Baseline	-0.100	0.042	-0.142
	(-0.154,-0.043)	(-0.013,0.098)	(-0.220,-0.061)
	-	-	[0.001]
Park Maintenance Baseline	-0.125	0.120	-0.239
	(-0.175,-0.074)	(0.068,0.171)	(-0.311,-0.164)
	-	-	[0.000]
Trust Baseline	0.044	-0.015	0.066
	(0.013,0.076)	(-0.046,0.016)	(0.020,0.112)
	-	-	[0.009]
Ownership and Use Baseline	-0.007	-0.023	0.013
	(-0.034,0.021)	(-0.050,0.004)	(-0.027,0.051)
	-	-	[1.000]
Participation Baseline	0.064	-0.037	0.103
	(0.024,0.104)	(-0.075,0.002)	(0.047,0.160)
	-	-	[0.001]
Security in Park Baseline	-0.110	0.128	-0.239
	(-0.174,-0.042)	(0.061,0.195)	(-0.332,-0.142)
	-	-	[0.000]
Security in Neighborhood Baseline	-0.045	0.066	-0.111
	(-0.083,-0.009)	(0.031,0.101)	(-0.162,-0.060)
	-	-	[0.000]
Home Investment and Value Baseline	0.001	-0.060	0.060
	(-0.032,0.032)	(-0.091,-0.027)	(0.014,0.104)
	-	-	[0.020]
Leisure Outside Baseline	-0.032	-0.009	-0.022
	(-0.056,-0.006)	(-0.034,0.016)	(-0.058,0.012)
	-	-	[0.398]
Quality of Life Baseline	-0.033	-0.022	-0.011
	(-0.051,-0.015)	(-0.039,-0.004)	(-0.037,0.014)
	-	-	[0.780]
Distance to Park Baseline	-1.801	-2.204	0.481
	(-2.595,-1.020)	(-2.991,-1.407)	(-0.651,1.580)
	-	-	[0.809]
Years of Education Baseline	9.894	9.928	0.002
	(9.263,10.530)	(9.262,10.590)	(-0.912,0.951)
	-	-	[1.000]
Children	0.353	0.377	-0.032
	(0.276,0.429)	(0.301,0.452)	(-0.135,0.081)
	-	-	[1.000]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Participation in community associations	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.522	3.654	-0.134
	(3.339,3.704)	(3.463,3.843)	(-0.403,0.124)
	-	-	[0.636]
Bus Stop	2.931	3.667	-0.782
	(2.675,3.181)	(3.410,3.927)	(-1.149,-0.420)
	-	-	[0.000]
Bad Business	1.228	1.893	-0.675
	(1.010,1.439)	(1.669,2.091)	(-0.977,-0.359)
	-	-	[0.000]
Use of Park Baseline	-0.008	-0.054	0.038
	(-0.066,0.048)	(-0.113,0.003)	(-0.042,0.116)
	-	-	[0.693]
Park Maintenance Baseline	-0.007	0.022	-0.028
	(-0.064,0.052)	(-0.038,0.078)	(-0.111,0.054)
	-	-	[1.000]
Trust Baseline	-0.070	0.074	-0.151
	(-0.101,-0.040)	(0.043,0.105)	(-0.193,-0.108)
	-	-	[0.000]
Ownership and Use Baseline	-0.092	0.041	-0.136
	(-0.116,-0.068)	(0.017,0.065)	(-0.170,-0.101)
	-	-	[0.000]
Participation Baseline	0.055	-0.061	0.120
	(0.014,0.094)	(-0.099,-0.021)	(0.061,0.177)
	-	-	[0.000]
Security in Park Baseline	0.136	-0.090	0.232
	(0.076,0.197)	(-0.149,-0.030)	(0.143,0.318)
	-	-	[0.000]
Security in Neighborhood Baseline	0.077	-0.018	0.096
	(0.046,0.105)	(-0.048,0.010)	(0.051,0.137)
	-	-	[0.000]
Home Investment and Value Baseline	0.042	-0.044	0.091
	(0.009,0.077)	(-0.077,-0.012)	(0.043,0.135)
	-	-	[0.001]
Leisure Outside Baseline	-0.012	-0.038	0.028
	(-0.036,0.011)	(-0.062,-0.015)	(-0.006,0.061)
	-	-	[0.210]
Quality of Life Baseline	-0.004	-0.032	0.026
	(-0.021,0.013)	(-0.049,-0.015)	(0.004,0.050)
	-	-	[0.045]
Distance to Park Baseline	-1.200	-1.948	0.868
	(-1.958,-0.467)	(-2.676,-1.209)	(-0.147,1.868)
	-	-	[0.185]
Years of Education Baseline	10.450	9.570	0.781
	(9.771,11.080)	(8.918,10.240)	(-0.101,1.699)
	-	-	[0.160]
Children	0.348	0.402	-0.054
	(0.268,0.432)	(0.323,0.483)	(-0.165,0.062)
	-	-	[0.750]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Crime in park	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.806	3.296	0.505
	(3.614,3.998)	(3.107,3.490)	(0.243,0.773)
	-	-	[0.000]
Bus Stop	3.696	3.082	0.652
	(3.419,3.967)	(2.814,3.359)	(0.274,1.031)
	-	-	[0.002]
Bad Business	1.712	1.654	0.029
	(1.466,1.951)	(1.413,1.894)	(-0.315,0.368)
	-	-	[1.000]
Use of Park Baseline	-0.074	-0.007	-0.058
	(-0.135,-0.016)	(-0.066,0.052)	(-0.140,0.027)
	-	-	[0.361]
Park Maintenance Baseline	-0.091	0.118	-0.210
	(-0.148,-0.034)	(0.061,0.175)	(-0.292,-0.129)
	-	-	[0.000]
Trust Baseline	0.040	0.018	0.021
	(0.006,0.073)	(-0.014,0.051)	(-0.026,0.069)
	-	-	[0.772]
Ownership and Use Baseline	-0.029	0.022	-0.050
	(-0.056,-0.001)	(-0.006,0.049)	(-0.089,-0.010)
	-	-	[0.027]
Participation Baseline	0.052	-0.039	0.088
	(0.011,0.093)	(-0.079,0.001)	(0.031,0.143)
	-	-	[0.005]
Security in Park Baseline	-0.070	0.078	-0.146
	(-0.144,0.003)	(0.006,0.149)	(-0.248,-0.043)
	-	-	[0.012]
Security in Neighborhood Baseline	-0.029	0.051	-0.082
	(-0.066,0.007)	(0.014,0.088)	(-0.133,-0.028)
	-	-	[0.006]
Home Investment and Value Baseline	0.006	-0.066	0.073
	(-0.027,0.039)	(-0.099,-0.033)	(0.027,0.119)
	-	-	[0.004]
Leisure Outside Baseline	-0.005	-0.039	0.032
	(-0.030,0.020)	(-0.064,-0.015)	(-0.003,0.068)
	-	-	[0.144]
Quality of Life Baseline	-0.005	-0.035	0.026
	(-0.023,0.012)	(-0.053,-0.017)	(0.001,0.052)
	-	-	[0.088]
Distance to Park Baseline	-2.057	-1.785	-0.202
	(-2.811,-1.269)	(-2.559,-1.015)	(-1.291,0.945)
	-	-	[1.000]
Years of Education Baseline	9.920	9.629	0.320
	(9.260,10.600)	(8.952,10.300)	(-0.664,1.278)
	-	-	[1.000]
Children	0.381	0.376	0.007
	(0.304,0.454)	(0.300,0.453)	(-0.101,0.114)
	-	-	[1.000]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Crime in neighborhood	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.862	3.300	0.575
	(3.677,4.051)	(3.114,3.486)	(0.293,0.844)
	-	-	[0.000]
Bus Stop	3.606	3.324	0.276
	(3.334,3.868)	(3.061,3.591)	(-0.095,0.658)
	-	-	[0.277]
Bad Business	2.070	1.377	0.695
	(1.828,2.304)	(1.129,1.618)	(0.345,1.047)
	-	-	[0.000]
Use of Park Baseline	-0.064	0.016	-0.086
	(-0.119,-0.008)	(-0.041,0.073)	(-0.165,-0.004)
	-	-	[0.081]
Park Maintenance Baseline	-0.114	0.082	-0.190
	(-0.167,-0.061)	(0.032,0.133)	(-0.267,-0.113)
	-	-	[0.000]
Trust Baseline	0.071	-0.017	0.089
	(0.038,0.104)	(-0.052,0.017)	(0.042,0.133)
	-	-	[0.001]
Ownership and Use Baseline	0.025	-0.051	0.072
	(-0.001,0.050)	(-0.076,-0.025)	(0.036,0.109)
	-	-	[0.000]
Participation Baseline	0.040	0.005	0.036
	(-0.004,0.083)	(-0.038,0.049)	(-0.028,0.100)
	-	-	[0.540]
Security in Park Baseline	-0.177	0.148	-0.337
	(-0.240,-0.115)	(0.088,0.212)	(-0.424,-0.250)
	-	-	[0.000]
Security in Neighborhood Baseline	-0.088	0.094	-0.184
	(-0.120,-0.057)	(0.062,0.123)	(-0.228,-0.141)
	-	-	[0.000]
Home Investment and Value Baseline	-0.022	-0.035	0.010
	(-0.056,0.010)	(-0.067,-0.002)	(-0.038,0.055)
	-	-	[1.000]
Leisure Outside Baseline	-0.004	-0.030	0.024
	(-0.026,0.018)	(-0.053,-0.007)	(-0.010,0.056)
	-	-	[0.319]
Quality of Life Baseline	-0.020	-0.024	0.004
	(-0.036,-0.003)	(-0.041,-0.007)	(-0.019,0.028)
	-	-	[1.000]
Distance to Park Baseline	-2.251	-1.480	-0.789
	(-3.006,-1.479)	(-2.247,-0.712)	(-1.907,0.319)
	-	-	[0.329]
Years of Education Baseline	9.924	10.000	-0.063
	(9.284,10.570)	(9.360,10.650)	(-0.979,0.832)
	-	-	[1.000]
Children	0.368	0.387	-0.022
	(0.288,0.446)	(0.304,0.466)	(-0.136,0.090)
	-	-	[1.000]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Home investments and value	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.907	3.444	0.433
	(3.716,4.096)	(3.251,3.638)	(0.157,0.703)
	-	-	[0.005]
Bus Stop	3.657	3.073	0.603
	(3.380,3.935)	(2.800,3.336)	(0.212,1.003)
	-	-	[0.005]
Bad Business	1.755	1.495	0.232
	(1.525,1.982)	(1.259,1.731)	(-0.102,0.553)
	-	-	[0.343]
Use of Park Baseline	-0.119	0.008	-0.125
	(-0.177,-0.061)	(-0.049,0.067)	(-0.205,-0.042)
	-	-	[0.006]
Park Maintenance Baseline	-0.041	0.035	-0.076
	(-0.093,0.013)	(-0.018,0.088)	(-0.149,-0.004)
	-	-	[0.079]
Trust Baseline	0.057	-0.030	0.086
	(0.026,0.089)	(-0.060,0.003)	(0.042,0.129)
	-	-	[0.000]
Ownership and Use Baseline	-0.005	-0.025	0.018
	(-0.034,0.024)	(-0.052,0.004)	(-0.022,0.059)
	-	-	[0.797]
Participation Baseline	-0.020	0.026	-0.046
	(-0.064,0.022)	(-0.015,0.069)	(-0.107,0.012)
	-	-	[0.238]
Security in Park Baseline	-0.063	0.047	-0.108
	(-0.124,-0.001)	(-0.020,0.112)	(-0.197,-0.017)
	-	-	[0.043]
Security in Neighborhood Baseline	-0.006	0.025	-0.030
	(-0.040,0.029)	(-0.009,0.060)	(-0.081,0.019)
	-	-	[0.476]
Home Investment and Value Baseline	-0.028	0.001	-0.033
	(-0.061,0.005)	(-0.030,0.033)	(-0.080,0.014)
	-	-	[0.325]
Leisure Outside Baseline	-0.029	0.001	-0.033
	(-0.052,-0.006)	(-0.023,0.024)	(-0.066,0.001)
	-	-	[0.114]
Quality of Life Baseline	-0.043	0.000	-0.043
	(-0.060,-0.027)	(-0.016,0.016)	(-0.066,-0.018)
	-	-	[0.001]
Distance to Park Baseline	-1.965	-1.858	-0.059
	(-2.762,-1.189)	(-2.622,-1.069)	(-1.141,1.029)
	-	-	[1.000]
Years of Education Baseline	9.856	9.990	-0.153
	(9.201,10.550)	(9.321,10.680)	(-1.100,0.804)
	-	-	[1.000]
Children	0.373	0.380	-0.009
	(0.295,0.449)	(0.300,0.459)	(-0.117,0.103)
	-	-	[1.000]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Quality of Life	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.376	3.785	-0.390
	(3.192,3.562)	(3.605,3.967)	(-0.649,-0.139)
	-	-	[0.005]
Bus Stop	3.278	3.337	-0.029
	(3.007,3.552)	(3.063,3.610)	(-0.416,0.348)
	-	-	[1.000]
Bad Business	1.820	1.361	0.483
	(1.600,2.043)	(1.134,1.579)	(0.168,0.785)
	-	-	[0.006]
Use of Park Baseline	-0.036	-0.036	-0.005
	(-0.093,0.023)	(-0.091,0.021)	(-0.083,0.075)
	-	-	[1.000]
Park Maintenance Baseline	-0.068	0.078	-0.147
	(-0.124,-0.012)	(0.022,0.132)	(-0.227,-0.068)
	-	-	[0.001]
Trust Baseline	0.072	-0.073	0.150
	(0.039,0.104)	(-0.106,-0.040)	(0.106,0.194)
	-	-	[0.000]
Ownership and Use Baseline	0.013	-0.062	0.076
	(-0.012,0.039)	(-0.086,-0.036)	(0.041,0.113)
	-	-	[0.000]
Participation Baseline	-0.007	-0.024	0.011
	(-0.042,0.029)	(-0.062,0.014)	(-0.044,0.070)
	-	-	[1.000]
Security in Park Baseline	-0.102	0.131	-0.236
	(-0.162,-0.043)	(0.070,0.189)	(-0.320,-0.155)
	-	-	[0.000]
Security in Neighborhood Baseline	-0.021	0.068	-0.090
	(-0.051,0.009)	(0.038,0.098)	(-0.133,-0.047)
	-	-	[0.000]
Home Investment and Value Baseline	-0.085	0.062	-0.146
	(-0.118,-0.053)	(0.028,0.095)	(-0.192,-0.101)
	-	-	[0.000]
Leisure Outside Baseline	-0.040	0.007	-0.048
	(-0.062,-0.018)	(-0.015,0.029)	(-0.080,-0.018)
	-	-	[0.004]
Quality of Life Baseline	-0.048	-0.013	-0.037
	(-0.066,-0.030)	(-0.030,0.004)	(-0.061,-0.011)
	-	-	[0.011]
Distance to Park Baseline	-1.539	-1.682	0.151
	(-2.256,-0.781)	(-2.396,-0.947)	(-0.856,1.219)
	-	-	[1.000]
Years of Education Baseline	10.020	10.250	-0.227
	(9.338,10.690)	(9.626,10.890)	(-1.128,0.690)
	-	-	[1.000]
Children	0.444	0.299	0.148
	(0.365,0.523)	(0.221,0.381)	(0.033,0.256)
	-	-	[0.024]

Appendix Table 6: Heterogeneity analysis using machine learning: Classification analysis (CLAN), Elastic Net

Leisure outside neighborhood	Most Affected (1)	Least Affected (2)	Difference (3)
Good Lightning	3.500	3.709	-0.236
	(3.307,3.691)	(3.515,3.900)	(-0.515,0.041)
	-	-	[0.190]
Bus Stop	3.507	3.418	0.073
	(3.244,3.763)	(3.154,3.687)	(-0.317,0.451)
	-	-	[1.000]
Bad Business	1.517	1.932	-0.473
	(1.268,1.760)	(1.686,2.186)	(-0.823,-0.119)
	-	-	[0.016]
Use of Park Baseline	-0.047	-0.024	-0.009
	(-0.102,0.010)	(-0.082,0.033)	(-0.090,0.071)
	-	-	[1.000]
Park Maintenance Baseline	-0.019	-0.014	-0.019
	(-0.073,0.037)	(-0.069,0.041)	(-0.095,0.059)
	-	-	[1.000]
Trust Baseline	0.000	0.020	-0.020
	(-0.033,0.032)	(-0.012,0.053)	(-0.066,0.026)
	-	-	[0.794]
Ownership and Use Baseline	-0.013	-0.032	0.023
	(-0.041,0.015)	(-0.059,-0.005)	(-0.018,0.060)
	-	-	[0.551]
Participation Baseline	0.022	-0.030	0.049
	(-0.017,0.060)	(-0.069,0.010)	(-0.007,0.105)
	-	-	[0.172]
Security in Park Baseline	0.018	-0.008	0.021
	(-0.049,0.082)	(-0.075,0.061)	(-0.071,0.115)
	-	-	[1.000]
Security in Neighborhood Baseline	0.016	0.036	-0.024
	(-0.017,0.046)	(0.004,0.068)	(-0.069,0.023)
	-	-	[0.643]
Home Investment and Value Baseline	0.000	-0.031	0.026
	(-0.036,0.035)	(-0.065,0.003)	(-0.026,0.073)
	-	-	[0.629]
Leisure Outside Baseline	-0.038	-0.023	-0.013
	(-0.061,-0.015)	(-0.045,0.000)	(-0.046,0.019)
	-	-	[0.890]
Quality of Life Baseline	-0.019	-0.021	0.003
	(-0.036,-0.001)	(-0.039,-0.003)	(-0.022,0.028)
	-	-	[1.000]
Distance to Park Baseline	-1.548	-1.612	0.101
	(-2.270,-0.821)	(-2.360,-0.905)	(-0.952,1.111)
	-	-	[1.000]
Years of Education Baseline	10.000	10.050	-0.078
	(9.340,10.680)	(9.342,10.720)	(-1.000,0.911)
	-	-	[1.000]
Children	0.376	0.362	0.005
	(0.299,0.452)	(0.282,0.442)	(-0.106,0.118)
	-	-	[1.000]