



MASTER THESIS

**THE INFLUENCE OF NEIGHBORHOOD
CRIME AND INCOME ON ALTRUISM**

The Lost Letter Technique as a Measurement of the
Influence of Neighborhood Crime and Income on
Altruistic Behavior

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Preface

The master thesis at hand is the result of several months of work and with its completion I will finish my master's degree for public administration specialization in public safety at the University of Twente, the Netherlands.

During my study I always had the support of several special people in my life. Therefore I first want to thank my family, especially my parents, for their loving and of course financial support. Without them my whole study would have been impossible. Furthermore I would like to thank my friends for motivating and distracting me when needed. Special thanks are going out to the great people who helped me dropping the Lost Letters. Patrick, you had the best letter "throwing technique", Raphaela, your endurance was fabulous, Corns, thanks for nagging after 5 minutes of dropping letters, also thank you Stephie, Kamila and Niki. Here I would also like to thank Katharina Schulte for her kind support and feedback. If I am talking about feedback I am coming to my supervisors of the University of Twente. Thanks to Marianne Junger and Elmer Lastdrager for their critical reviews and feedback.

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Abstract

Purpose

This study aims to investigate the relationship between neighborhood crime, income and altruism. Furthermore the relation between structural neighborhood characteristics, descriptive neighborhood characteristics and altruism was examined.

Method

We performed a Lost Letter Study among 32 neighborhoods in the city of Hengelo, the Netherlands. The neighborhoods were different with respect to their level of crime, mean personal and household income, as well as the structural and descriptive characteristics. Overall we dropped 352 letters within the months June and July, 2013.

Results

In total 77.1% of the dropped letters were returned which is according to the existing literature an expected result. There were no significant results found between neighborhood crime and altruism. Also the personal income and the household income do not show any significant relationship with the level of altruism. Furthermore structural and descriptive neighborhood characteristics do not significantly influence the level of altruism. A whole model with all study variables also did not show an indication of a relationship between our independent variables and the outcome variable altruism.

Conclusion

We conclude that none of the tested neighborhood characteristics does have a significant influence on the level of altruism of dwellers. Neither income, neighborhood crime nor structural or descriptive neighborhood characteristics affect the pro-social behavior of residents. Therefore we conclude that the altruism of small town dwellers in the Netherlands does not depend on the neighborhood characteristics that were focused on. The level of pro-social behavior of these residents is irrespective of the external circumstances they are living in.

According to the existing literature and the present research we carefully conclude that cultural differences and the city size play a potential role in registering a difference in the level of altruism of dwellers.

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1 Introduction

This study investigates whether altruism is associated with neighborhood crime and income. Structural and descriptive neighborhood characteristics were also taken into account. The Lost Letter Technique [LLT] was used in different neighborhoods to investigate a possible association between these factors.

Selflessness is finished egoism

(Oscar Wilde, 1854-1900)

We can observe many kinds of helping behavior in society, such as helping a family member or a stranger, saving somebody's life or the small act of dropping an apparently lost letter into the next mailbox. What all of these behaviors have in common is the selflessness of the giving or acting person. The quote of Oscar Wilde "selflessness is finished egoism" can be translated into that altruism is always caused by an egoistic desire. Philosophers, such as Aristotle, occupied themselves with this phenomenon since centuries. Is mankind able to perform truly altruistic acts? And which circumstances reinforce or reduce altruistic behavior? It seems logical that circumstances of our education are influencing whether and how strong we behave pro-socially. But social circumstances such as the area we are living in can influence our pro-social behavior as well. Therefore, researchers are interested in the influence of social dynamics of neighborhoods on the pro-social behavior of dwellers. Are small town dwellers more helpful than big town dwellers? Do neighborhood characteristics shape the behavior of inhabitants? Which neighborhood-characteristics increase or decrease altruistic behavior? Lots of studies have shown that specific neighborhood characteristics are actually influencing the pro-social behavior of dwellers whereas the same amount of studies shows contradictory results. Therefore the aim of the present study is to shed more light on the possible relationship of neighborhood characteristics and the altruistic behavior of residents in a small town in the Netherlands. Because of the broad spectrum of possible neighborhood characteristics we are limiting this research to several factors, particularly to neighborhood crime rate and average income. There is little to no research about these factors in the Netherlands. Nonetheless, researchers are arguing that there is a negative correlation between the average income of a neighborhood and altruism (Holland, Silva, Mace, 2012).

To the best of our knowledge the present research is the first study of its kind. We will investigate how far characteristics of neighborhoods are influencing the altruistic behavior of its residents. We will present a case study of a small town in the Netherlands. This will be done by a Lost Letter Experiment inspired by the experiment of Holland et al. (2012). There are several lost letter studies performed in the Netherlands but none of them examined the relationships between income, crime and altruism.

The remainder of this section is structured as follows. First we will discuss the construct of altruism and its connection with income as well as with crime. After this, the Lost Letter Technique will be explained and we will discuss whether it is a reliable tool to measure the level of altruism of a community. Furthermore, some hypotheses will be posited to characterize the expected causal relationship of the various independent variables and the dependent variable altruism. Finally we will define several research questions.

1.1 Altruism

Altruism means behaving in a manner that does not benefit the actor directly, but mainly the receiver. Altruism is discussed in various disciplines, such as biology, philosophy and economy.

On the basis of Darwin's observations on evolution, or in other words the survival of the fittest, it is also questioned why altruistic behavior occurs when it is not promoting the fitness of the actor.

Altruism differs from other social behavior on the basis of the consequences for the giver as well as the receiver. Altruism is defined as a behavior in form of a helpful act to another person without any kind of counterclaim (Johnson et al., 1989). Therefore altruism is a non-reciprocal behavior without any benefit for the giver. West, Gardner and Griffin (2006) as well as Johnson et al. (1989) explain altruism in a biological way as a social behavior which reduces the fitness of the actor and thereby enlarge the fitness of the receiver. *Fitness* implicates the reproductive success of an actor or in other words to beget offspring (Sigmund and Hauert, 2002). This means that person A acts in a certain way that is beneficial in reproductive terms for person B but brings no reproductive benefit for person A. But how can altruism exist when Darwin's law states that only the fittest of a population survive? So why do individuals act in a manner that increases the fitness of others and decreases its own if it is not supporting one's own evolution? If we answer this question purely on the basis of Darwin's law, altruism

“should not be evolutionarily stable” (West et al., 2006, p.1). However Hamilton’s kin selection theory (1964) argues that altruism between relatives can be explained through that by helping relatives to propagate themselves one’s own genes are passed on through the relatives. Thus, one clear reason for altruism of mankind and between animals is kinship (Sigmund and Hauert, 2002). This implies that the predominant part causing an altruistic act is the indirect benefit for the giver thus “the reproduction of non-descendent relatives” (West et al., 2006, p.1). Nevertheless, the approach of kin selection promoting altruistic behavior is hardly matching with the common definition of altruism which implies that the altruistic act results in no beneficial gain for the giver (Sigmund and Hauert, 2002).

According to Penner, Dovidio, Piliavin and Schroeder (2005) the evolutionary explanation of altruism is quite important to understand pro-social behavior at the micro level or in other words how and why does pro-social behavior occur among the mankind.

Another approach derived from natural selection theory is called *group selection* (Wilson, 1997) and describes altruism at the macro level. The macro level explains altruism between and within groups. According to Penner et al. (2005), cooperative behavior at the macro level or pro-social behavior within a group can increase the fitness of the group and therefore creates a benefit compared to other groups. Furthermore, Dovidio et al. (1997) found that an induced *common group identity* can increase the helping behavior towards persons who were perceived as out-group members before. Hence feeling bonded within a group and having a kind of *we-feeling* increases the altruistic behavior of group members. Consequently, not only increasing one’s own fitness but also increasing the fitness of one’s own group can explain altruism. This behavior is already detectable when we are looking at the history of mankind where hunter-gatherers cooperated much more than any other type of creatures (Bingham, 1999; Boehm 1999).

But in reality we do not only observe altruism between relatives or within related groups. It can be found everywhere, between friends, within the family or even between unknown persons, thus there should be another component which plays an important role to describe the development of altruism between humans. This is where psychology comes into play. According to Penner et al. (2005) this is the meso level of pro-social behavior. The meso level of altruism studies the behavior of actors and recipients in specific altruistic situations from a psychological point of view. Consequently it

discusses the question in which cases people do help each other or not. For answering this question it is crucial to define when behavior counts as altruistic. Saving somebody's life by bringing yourself in danger is quite different from carrying a lost letter to the next mailbox which implicates just the minor consequence of a small loss of time. A psychologist would consider both cases as altruistic whereas a socio-biologist just considers the first case as altruistic (Johnson et al., 1989). In contrast to socio-biologists, psychologists are sure about behavior that is of little or no importance to the actor and concentrates on the helping behavior (Penner et al., 2005). What motivates humans to behave altruistic or help each other are feelings such as "love, kindness, good will" (Konstan, 2000, p.4), pity (Sober and Wilson 1998) as well as sympathy and compassion (Batson, 1991) thus feelings which focus on the welfare of others.

Obviously, there are great differences in altruistic behavior; the previously discussed example of rescuing a stranger's life can be associated with risks of pain or even death whereas the act of dropping a found letter into the next mailbox is a mere small and simple errand to run. But according to Pilivian et al. (1981, cited by Penner et al., 2005) humans make a cost-reward analysis in both situations. As in economic affairs, it is desirable to minimize one's costs and to maximize one's benefit. This sounds contradictory to the theories discussed earlier and implies that humans weigh the rewards of alternative behaviors, even in altruistic situations.

The economic model strongly depends on the definition of costs and benefits of the altruistic act. If we define the benefits of helping according to Perlow and Weeks (2002) as an opportunity of personal development and the costs of not helping according to Dovidio et al. (1997) as feeling guilty and ashamed, this changes the impact of the expected benefits.

According to Batson (1991) altruism between humans can still occur under specific circumstances. This happens if the costs of not helping are greater than the rewards of alternative courses of action. In summary helping acts of humans can have two different motivations either helping one's own and be egoistic or behave altruistic and increasing the well-being of another.

1.2 Altruism and Income

According to Holland et al. (2012), the average income of a neighborhood influences the pro-social behavior of its residents. They report that lost letters dropped in poorer neighborhoods have 91% lower odds to be returned than letters dropped in wealthier neighborhoods. Therefore, the socio-economic characteristics of an area are shown to

have a significant effect on the pro-social behavior that residents are showing with respect to a foreigner. Similarly, Nettle, Colléony and Cockerill (2011) report that deprived neighborhoods do have lower return rates of lost letters in contrast to more affluent neighborhoods in the same city. However they could not find any differences between these neighborhoods for other altruistic behaviors such as “helping a person who dropped an object, needed directions to a hospital, or needed to make change for a coin”. According to them there are differences in the level of altruistic behavior between neighborhoods but these depend on the topic of the altruistic act.

In contrast to these findings, Amato (1983) could not find any evidence that the social class of an individual’s environment is a predictor for helping behavior. Different results to the previously described study have been found by Piff, Stancato, Cote, Mendoza-Dente and Keltner (2012). According to Piff et al. (2012) individuals of upper-classes behave less ethical than individuals of lower classes. Their research includes seven studies showing that individuals belonging to upper-classes rather break the law concerning driving, do have stronger tendencies for unethical decision-making, take valued goods from others sooner, do lie more often in negotiations, cheat rather to enlarge the chance of winning a prize and advocate unethical behavior at work (Piff et al., 2012). In other words, people living in wealthier neighborhoods show more unethical tendencies (Piff et al., 2012).

The finder has to take the ethical choice whether picking up the lost letter or not. In the western culture it is apparently unethical to ignore the letter and walk by accepting that the receiver will doubtlessly not get his or her letter, and thereby shifting the responsibility to the next person walking by. Relying on this and the other findings of Piff et al. (2012), it should be more likely that the lost letters of the present research will be dropped in greater numbers in the more deprived neighborhoods and that inhabitants of the more affluent neighborhoods are more likely to ignore a lost letter. Nevertheless there are still the findings of Holland et al. (2012) and Nettle et al. (2011) who in contrast to Piff et al. (2012) and Amato (1983), discovered the complete opposite within their studies. It can be summarized that the literature about the relationship of income and pro-social behavior is quite ambivalent. With respect to the importance of the kind of act, in our case the dropping of a lost letter, the resulting pro-social or anti-social behavior and the fact that Piff et al. (2012) do not take neighborhood effects into account, our first hypotheses is:

1. Hypothesis: people living in neighborhoods with a low median income behave less altruistically than people living in neighborhoods with a high median income.

1.3 Neighborhood Crime

In this study we are interested whether the crime rate of a neighborhood influences the altruistic behavior of dwellers. Obviously, we therefore have to understand how neighborhood crime arises and which factors influence the crime level and especially in which way the crime level influences the inhabitants of neighborhoods. Several theories are trying to explain how criminal behavior develops. In this section we are interested in theories which rely on neighborhood characteristics, such as the social circumstances and the environment of areas.

For a crime to occur several circumstances have to be fulfilled as Clarke and Eck (2003) illustrated this by their crime triangle which is shown in figure 1. Firstly there has to be an offender who is a person willing to commit a criminal act. Secondly there needs to be a possible victim in the form of a person or a target. At last, a crime mostly needs an unsupervised place to happen. These three components describe the inner triangle and are responsible for a crime to happen. Whereas the outer triangle, or rather the actors listed on the outside of the triangle, are trying to prevent criminal situations. The handler tries to have control over (possible) offenders and to observe them, you can think of parents or the police. The guardian tries to protect (possible) victims, this can be the person self or security guards, neighbors etc. Managers are responsible for the safety and supervision of places. The lack or the weaknesses of the outer triangle creates opportunities for crime to happen. According to the triangle a lot of factors influence whether a crime occurs in a neighborhood or not. In this section we are thus focusing on the spatial characteristics of neighborhoods, the possible victims and the possible offenders.

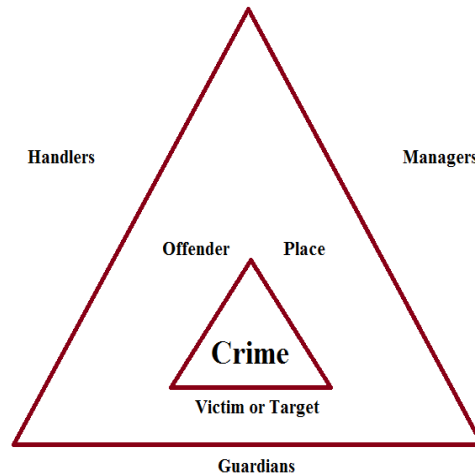


Figure 1. Crime triangle by Clarke and Eck (2003)

Several theories that try to explain how criminal behavior develops are based on the just described crime triangle. One of them is the Routine Activities theory which also relies on several social developments (Cohen and Felson, 1979). The cornerstone of this theory is that the routine activities of a society which are changing over time and space can lead to more opportunities to commit crime. You can think of the growing wealth of the western society during the last decades and for example the appearance of TV's or smartphones. These objects, or rather the price of these objects, affect the behavior of people. The inequality of income can lead to the impulse to steal such goods, which are quite common in western society. The opportunity to steal something can have an impact on the behavior of people. Are goods such as smartphones protected or is it easy to just take it? As the common saying "the opportunity makes the thief" explains, specific situations such as unsecured houses can lead to specific behavior. The increased mobility of western society also leads to more opportunities to commit crime. More leisure time leads to more possible victims staying outside their houses and leaving it without supervision. Possible offenders also have more leisure time to hang out and stay outside. Thus the chance that offenders and victims are confronted with each other has increased over the last decades because of the rise of leisure time. The Routine Activities theory is taken up by the Crime Pattern Theory which combines these principles with urban design. The Crime Pattern Theory (Brantingham and Brantingham, 1982) states that for our daily routines, such as going to work we are using paths in the urban structure. On these paths victims and offenders can come across each other. Therefore it is very likely that offenders commit crime nearby their daily

routines and paths. Due to this theory, the urban structure like the formation of houses and streets is quite important whether and which crimes are committed in certain areas. Another theory which mentions urban structure as a cause for crime is the social disorganization theory of Shaw and McKay (1942). This theory discusses the influence of structural characteristics of neighborhoods on the level of crime. For example the levels of crime and delinquency can increase if residents move to more attractive areas and therefore change the social composition of that neighborhood. According to Shaw and McKay (1942) the crime level depends on social characteristic and not the other way around.

This one-sided relationship is denied by Hipp (2010), who argues that the amount of crime can also change the structural characteristics of neighborhoods. This happens for example if families are moving from an area because of the high-crime levels in their own neighborhood. They are moving because of the level of crime and thereby they influence the residential stability of the abandoned neighborhood. If this family for instance has a different ethnical origin this is also influencing the ethnic composition of the neighborhood. Hipp's (2010) arguments are thus contradicting the social disorganization model, which states a one-directional relationship between crime and structural characteristics of neighborhoods. Hipp supposes a reciprocal relationship of these two factors.

Another important factor causing more neighborhood crime is the before mentioned ethnic heterogeneity of dwellers (Sampson and Groves, 1989). The higher this heterogeneity, the lower the formal and informal social control of people living in that area. Formal and informal control of a society can prevent people from carrying out delinquent behavior and hence are repressing the crime rate. Therefore, the weakness of these two controlling factors in a neighborhood can lead to higher levels of crime because possible delinquents are not held off from committing crime through the social control of their society. Hence the level of crime can increase when the social cohesion of residents is too low to have control over potential criminals (Hipp, 2010).

Past studies thus have already shown that structural characteristics, such as social cohesion and ethnic heterogeneity of neighborhoods, can cause more crime and that the place where a person lives matters in predicting whether this person participates in illegal actions or not (Shaw, McKay, 1942). But we also know that this relationship is two-sided and structural characteristics also influence the levels of crime (Hipp, 2010).

To understand the social behavior within neighborhoods we also have to bear in mind the Broken Windows Theory (Wilson and Kelling, 1982). This theory argues that places that are reflecting bad maintenance and disordered conditions inviting people to even provoke conditions such as littering (Cialdini, Reno and Kallgren, 1990) or destroying public good with impunity. According to Wilson and Kelling (1982), indications of disorder can even lead to more serious crimes and increase the fear of becoming a victim within its residents. In turn, the fear of becoming a victim of crime can negatively influence the pro-social behavior in potentially dangerous situations (O'Brien and Kaufmann, 2013).

According to O'Brien and Kaufmann (2013) how pro-social adolescents behave varies due to the physical disorder of neighborhoods. Even though they found a significant positive relationship between disorderly neighborhood conditions and pro-social behavior of adolescents, they are not arguing for a "cause and consequence" relationship. They rather argue that this connection results out of social processes happening in the neighborhood. According to the authors disordered conditions and lower occurrence of adolescents' pro-social behavior emerge from a low collective efficacy. The collective efficacy of a neighborhood is defined by the willingness of dwellers to work together towards a common goal such as crime control and is "linked to reduced violence" (Sampson and Raudenbusch, Earls, 1997, p.1).

The last important fact when talking about neighborhood crime is the objective and subjective safety people are exposed to. The objective safety can be expressed in official data and statistics, whereas the subjective safety reflects how safe people think they are. Subjective safety consists of three components namely the affective component, the cognitive component and the behavioral component. The affective component, or the fear of crime, is expressed by the emotional reaction toward physical harm (Garafalo, 1973). This component is influenced by the perception of crime in one's own neighborhood and is divided by the actual fear of crime and anticipated fear of crime. Whereas the actual fear of crime is the fear a person is feeling in the real crime situation and anticipated fear can be felt through the imagination of being in a fearful situation. Both kinds of fear differ for various crimes and can be affected by one's own victimization or the victimization of others. The cognitive component of subjective safety is the knowledge of unsafe situations and the subsequent risk assessment. The risk assessment depends on one's own prevalence, the likelihood of becoming a victim and one's own vulnerability of the sort of crime committed. This risk assessment leads

to the third component of subjective safety, the behavioral component. There are several behavioral consequences resulting from the cognitive component. First, people can decide to just avoid any behavior which could bring them into a dangerous situation. They can also improve their protection and insurance for themselves or their goods. At last, people can decide to communicate more about crime and for example get better informed and share these information or their emotions with each other. The last behavior is called participation and describes that people interact with each other, with a specific or crime in general as basis.

It is logical that the behavioral component is greatly influenced by the affective and cognitive component. Nevertheless the behavior of people is not always logical which can result in the so called 'fear of crime paradox'. This paradox implies that the fear of crime follows an irrational way; people who are the most unsafe, such as young men, feel the safest and people who have the lowest risk to become a victim have most fear, such as elderly women (de Vries, 2005).

1.4 Crime and Altruism

In the second section of this chapter we shortly discussed the cost-reward analysis of helping. This analysis is quite important to understand how crime, or the above mentioned fear of crime, can influence the altruistic behavior of persons. According to this theory, helpers or givers are weighing the probable costs and rewards of the possible options of action. The result of this analysis is the best "personal outcome" (Penner et al., 2005, p.3) and the person will most likely take this course of action. The results of the cost reward analysis differ per person and are influenced by many circumstances. To behave altruistically or not is a personal decision and depends on the experiences of the helper or giver. The fear of crime and being suspicious because of specific experiences would logically lead to a non altruistic behavior. The costs of not helping, like feeling ashamed or guilty (Penner et al., 2005), might feel different for these people; namely reducing one's own risk of becoming a victim when behaving not altruistically. For fearful persons altruistic acts probably look like a threat to their own safety. In contrast to non-fearful persons or non-victims they carry out another cost reward analysis. Moreover the personal risk assessment discussed in the previous section plays a major role in the question of helping a person or not. The risk assessment, like the cost reward analysis, can lead to actions that avoid every harmful consequence. The person who is assessing his or her risks of action, fears physical harm and will decide to not behave altruistically.

Another approach on the influence of crime on altruism comes from Staub and Vollhardt (2008), who are discussing the positive influence of victimization on altruistic behavior. Contradictory to Penner et al. (2005), they are stating that being victimized can lead to an increased caring for others and therefore for an increase in altruistic actions. But not every victimization directly results in higher altruism and not every victim becomes more caring for others. For an increasing altruism after victimization, several pre-conditions have to be fulfilled. The victimized person “has to see other human beings in a positive light” and feel empowered and strong enough to act for other people (Staub and Vollhardt 2008, p. 274). It is therefore important what happens after the victimization. A reprocessing of the event seems crucial to empower the person and give him or her the confidence to (again) trust in other persons. If both conditions are fulfilled it can increase the empathy and the “pro-social value orientation” (allocation of resources) of the victim and therefore the foundations of altruism (Staub and Vollhardt, 2008).

Homant (2010) assumes that the routine activities of altruistic people brings them into potential dangerous situations. Homant (2010) discovered a positive correlation between altruism and victimization, thus the higher the altruistic behavior of people the higher the chance that they have been victimized in the past. According to him, altruistic people are often situated in areas where other people need help like in high crime areas. It is therefore possible that they are more often vulnerable for street crimes. Altruistic persons thus bring themselves into dangerous situations because they are trying to help people in need and thereby carry out their routine activities in high crime areas. Homant (2010) separated altruism into two categories. The first category is safe altruism which states that the helping person does not lead himself into dangerous situations. The second category risky altruism states that the helping person also acts in situations which could physically harm himself. Homant’s findings suggest that risky altruism is a predictor of victimization whereas safe altruism is not. Nevertheless, to the best of our knowledge this study is the only of its kind, since we have found no other research indicating the same relationship between altruism and victimization. Moreover, Homant only found a relationship between risky altruism and victimization, which is not researched by this study. According to Homant a harmless altruistic act like dropping a lost letter is not influenced by earlier victimization.

The literature about the relationship of crime and altruism is quite limited and the few studies we have found are ambivalent. According to Homant (2010) the crime level of a

neighborhood has no influence on the safe altruistic behavior of its residents. But on the basis of his research and the study of Staub and Vollhardt (2008) we can hypothesize that the higher the level of crime in an area, the higher the altruistic behavior. Nevertheless, Penner et al. (2005) are showing that many factors are influencing whether a person performs the altruistic act or not. With respect to their findings and the conditions which have to be fulfilled before a victim becomes more altruistic and trusts humans we could also suggest that the higher the crime in an area the less altruistic it's residents will be. Nevertheless, the altruistic act people have to fulfill in this experiment is definitive a safe act, the units of observation do not put themselves in danger. We therefore base our second hypothesis on Homant's (2010) findings.

H2: A safe altruistic act stays the same no matter to the crime level of a neighborhood

1.5 The Lost Letter Technique

A lost letter study is a nonreactive field experiment (Farrington and Knight, 1980) originally invented by Merritt and Fowler in 1948. Merritt and Fowler developed a technique to study the general honesty of the public. The actual idea is to allocate letters which appear to have been lost by the sender and to register how many of these letter come back to the stated address, in other words how many of the letters are picked up and dropped into a mailbox. If a letter is picked up and dropped in a post box this is seen as evidence of an altruistic act. It is not required to observe each letter for a lost letter study it can simply be measured how many of the distributed letters arrive at the address stated on the letter. This procedure saves a lot of time and can provide information about the general altruistic behavior of a community. It further enables the researcher to distribute a great amount of letters in a relatively short amount time. Merritt and Fowler (1948) compared the return rates of two different types of letters. Both types were "stamped, self-addressed and sealed letters" (p.90). Letter A contained a mundane message whereas the content of letter B made the impression to be a 50cent coin. Overall 85% of content A (control type) and 54% of content B letters were returned to the author's address (see table 1 for an overview). The researchers made a second control with postcards of which 72% were returned. They concluded that 80%-90% of the American public has a "generally altruistic attitude" (p.93) but that the honesty is reduced by the possibility of financial gain. Another LLT investigated how victim characteristics influence stealing the content from a lost letter (Farrington & Knight, 1980). They enlarged the research design of Merritt and Fowler by observing

the letters after they dropped them. The content of the envelope was £1 and a handwritten letter, either for a male or female. The results show that the money was stolen more often when the addressee was male. Apparently people have gender preferences when helping another person. We therefore have to pay attention to the addressee of our lost letters. A gender neutral name (Holland et al., 2012) solves this problem. Another problem is that this method is presently quite expensive to send €1 per mail. Moreover the smallest Euro bank note is €5 which can sum up to a considerable amount due to the large quantity of letters. But luckily even without the integration of money the return rates of lost letters can be a good measure of altruism (Fessler, 2009).

Nevertheless, the first LLT in the Netherlands examined whether people would steal a €5 note out of a lost letter (Keizer, Lindberg and Steg, 2008). The independent variable in the study of Keizer et al. (2008) was the appearance of the neighborhood (graffiti and litter on the ground around the mailbox). They found out that letters with graffiti on the mailbox have been stolen 14% more than letters in the clean condition with no graffiti and no litter on the ground. As discussed earlier, disorderly conditions of a neighborhood do have influence on petty crime behavior, such as stealing from a lost letter, and should be taken into account when conducting an LLT.

In 1965 the LLT was made famous by Milgram, Mann and Harter who developed a LLT for assessing community orientations towards political groups and other institutions. They dropped 400 stamped and addressed letters assigned to four different institutions; two different political parties; a medical research association; and a single private person. Letters were dropped in ten districts of New Haven, a city in Connecticut USA, and different placements, on the street pavements, shops, telephone booths, and under windshield wipers. The overall return rate was 48%, but just 25% for each of the political related letters and more than 70% of the personal letter and the medical research association. Milgram et al. (1965) proved that the LLT can be a good method to measure community orientations. A similar study made use of an LLT to investigate attitudes about social sensitive issues with regard to gender related differences (Liggett, Blair and Kennison, 2010). It made use of men and women restrooms to distribute the letters to make gender related conclusions. In fact the researchers distributed letters addressed to a pro and anti-gun association. Women sent back more letters addressed to the anti-gun association whereas men preferred to drop the letters addressed to the pro-gun association. Therefore the researchers concluded

that the LLT was a good tool to measure gender differences towards social related issues.

In 2012 Holland, Silva and Mace studied the altruistic behavior towards unrelated individuals in London, with the main hypothesis that individuals in more affluent neighborhoods would behave in a more altruistic manner than individuals in less affluent neighborhoods. Holland et al. (2012) dropped 300 letters in 20 neighborhoods of London during June 2010 (15 letters per area). The neighborhoods were chosen by a wide range of their level of income deprivation. The *lost letters* were addressed by hand and with a neutral name, “J. Holland”, which could be a male or a female receiver. They were dropped on the pavement on rain free weekdays with the address face up. For people walking by these letters it looked as if the letter was *lost* by someone. The goal of the research by Holland et al. (2012) was to examine whether people behave altruistically and throw the letter in the next mailbox, or whether the letter was ignored. Thus, the dependent (i.e. outcome) variable was binary and stated whether a lost letter was returned or not. Furthermore Holland et al. (2012) wanted to investigate whether the income deprivation, the population density, the ethnic diversity, the number of mailboxes, the social cohesion, or wealth influences the level of altruistic behavior in a neighborhood. Overall 61% of the letters were returned and 39% were not. The researchers discovered that the best predictor of returning a letter or not is the income deprivation of the neighborhood. In the richest areas on average 87% of the lost letters were returned, compared to a return rate of 37% in the poorest neighborhoods. The results of Holland et al (2012) show that individuals living in poor neighborhoods are less altruistic than individuals living in wealthier areas.

Table 1

Return Rates of Lost Letters by Research Condition

	Research Condition	Return Rate (%)	<i>p</i>
Merritt and Fowler (1948)	a) Mundane message	85	unknown
	b) Letter with impression of 50cent coin	54	
	c) Postcards	72	
Milgram et al. (1965)	Overall	48	unknown
	a) Political related address	25	
	b) Personal related address	70	
	c) Medical research association address	70	

Keizer et al. (2008)	a) Clean condition mailbox b) Disorderly condition mailbox	13 (stolen) 27 (stolen)	p<0.05
Holland et al. (2012)	Overall a) Rich neighborhoods (quartiles 1-2) b) Poor neighborhoods (quartiles 2-4)	61 87 37	Significant results between quartile the 2 top quartiles and the 2 bottom quartiles. Results are unpublished.

1.5.1 Advantages and Disadvantages of the Lost Letter Technique

In their research Milgram et al. (1965) mention the biggest limitation of the LLT. According to them these are the factors that mediate the process of returning the letters. Here you can think of the circumstances which drive a person to pick up a letter and drop it into a mailbox to complete the postal way. It is for example possible that a person took the letter home with the intention to post it but at home the letter was forgotten or simply discarded. But the more research is done with the LLT and the more we know about which factors are influencing the return rate the better we can design the research conditions and interpret the results. Nevertheless, the LLT has a lot of advantages. Participants do not know that they are part of an experiment (Milgram et al., 1965). According to Penner et al. (2005) this a great advantage because people knowing they are research participants or placed under research conditions behave more altruistically. In research conditions, people are aware of the norms of pro-sociality (Fessler, 2009) and it is possible that they are only acting pro-socially because of the observation. Therefore the Lost Letter Technique is a good method to measure altruistic behavior. Through changing the research conditions (for example the addressee) it can also be a good method to measure community orientations towards various individuals, political parties etc. The second advantage of a LLT is that the basis of the measurement is an ordinary action. At last it is quite easy and safe to determine the results of a LLT (Milgram et al., 1965) through counting the returned letters.

There is one limitation that is not mentioned in the literature, but does concern our research. Because we are comparing neighborhoods, it is important that the letters are picked up by people living in the specific neighborhood. If this is not the case, it is

possible to get an ecological fallacy where we assume individuals to live in neighborhoods where they are actually not live.

1.6 The Present Research

As mentioned at the beginning of this chapter, the findings referring to the neighborhood characteristics and altruism are conflicting. Furthermore, till now there are no studies examining the relationship of neighborhood crime and altruism and the average neighborhood income and altruism in the Netherlands.

Holland et al. (2012) are stating a correlation between income deprivation and altruistic behavior but did not examine whether the crime rate, which is often related to the average income, influences altruistic behavior as well. The goal of this research is to find out whether the correlation between income, crime and altruism exists, or not. To reach this goal, the Lost Letter study of Holland et al. (2012) is adapted in the Netherlands. Thereby, we can also compare the influence of the average income on altruism between the two countries Great Britain and the Netherlands, and compare a metropolis such as London with a small town such as Hengelo.

To the best of our knowledge there is no study which is stating the correlation between the crime rate of neighborhoods and the altruistic behavior of their citizens. Thus one enlargement of the present study is the variable crime. Therefore we developed the following research question:

Do neighborhood crime and the median income of neighborhoods influence the altruism of dwellers?

To be able to answer this question, we will first answer the following sub-questions.

Is there a difference in the level of altruistic behavior between neighborhoods with:

- 1. A different median income?*
- 2. Different numbers of neighborhood crime*
- 3. Different structural neighborhood characteristics*
- 4. Different descriptive neighborhood characteristics*

The first sub-question should clarify whether the median income of a neighborhood influences the altruistic behavior of its dwellers. Because the present research has two main independent variables, the second sub-question is similar to the second. This question should clarify whether neighborhood crime influences the altruistic behavior of its citizens. We have also seen that neighborhood characteristics can influence the

altruism of dwellers. The third research questions should give an answer if this is the case for the safe altruistic act of dropping a lost letter. The last sub-question should clarify whether descriptive neighborhood characteristics influence the altruistic behavior of the inhabitants.

Furthermore we are interested whether a specific constellation of the study variables influences the altruistic behavior of dwellers. We therefore developed the fifth sub-question:

5. *Does a specific constellation of crime, median income, neighborhood characteristics and descriptive characteristics of a neighborhood influence the altruistic behavior of dwellers?*

Summarized, the present study investigates whether the mentioned study variables have a causal relationship with the altruism of dwellers. To do this we will test each study variable separately and in relation with each other in a multivariate model.

2 Pilot-Study

Milgram et al. (1965) characterize on big limitation of the LLT which is “a lack of control over the precise processes that mediate the return of the letters” (p.438). Due to this problem a little pilot-study was conducted in May 2013 by which the researchers got a little insight into the process when a letter is found by a person. In total 12 letters were distributed in Enschede, the Netherlands, a neighbour city of Hengelo. Using this pilot-study the best distance between the dropping place of a lost letter and the nearest mailbox of the main-study was determined. Furthermore the most appropriate and realistic content for the lost letters of the main-study was developed.

2.1 Appearance of the Letters

The letters were commercial white standard envelopes DIN-B6, without a window. The addressee was handwritten on the front of the letter. For simplicity the address was the researcher’s home address in Enschede. To exclude any gender related issues only the first initial of the receiver’s first name was used. Every letter was sufficiently stamped to ensure that an altruistic act does not fail because of an absent stamp and the quite bigger altruistic act that the finder has to buy a stamp to ensure that a stranger gets his letter or that the letters do not arrive because they are not stamped. Eight of the twelve

letters were dropped open. This was done due to the possible curiosity of people. If a finder is curious what the content of the letter is it is simple to read the letter and afterwards drop it sealed or open. It seems less likely that a finder drops the letter after he/she ripped it open. Four of the twelve letters were dropped sealed to test the just described concerns.

2.2 Content of the Letters

An important step before the implementation of the pilot-study as well as the main study was to find out if the content of the letter has an influence on whether people are dropping the letter into a mailbox or not. Earlier research (Milgram et.al, 1965; Farrington and Knight, 1980; Merritt and Fowler, 1948) used short and not excessively important notes, which sounded urgent enough so that the finder got the impression that it would be important that the addressee would actually get the letter. Due to the technical improvements of the last decades it became unusual to send letters as Milgram et al. (1965) did via mail. Most of the written conversations nowadays are held via electronic channels. We developed three contents which seemed realistic and urgent enough.

The first content indicated that the letter was a research project of the University of Twente. This content replicated the study of Holland et al. (2012) whose content stated that the letter was part of a Masters course at the UCL London.

Content two was an invitation to a class reunion of a secondary school (further reunion). A class reunion is a note that can surely be sent by post and it is urgent enough that the invited person receives the letter and does not miss the event.

Content three was a children's-birthday invitation (further birthday invitation). Also this note is realistic enough to be sent by post and urgent enough so that the invited child does not miss the birthday party.

2.3 Distance to Mailbox

A last important step was to find the best distance between the dropping place and the next mailbox. Unfortunately none of the considered literature indicated this experimental variable. For the main study we were interested in the optimal distance between dropping place to the next mailbox. Thus we chose to drop the letters within different distances to discover what the influence of the distance to the mailbox on the altruistic act of dropping a letter is. We therefore placed each type of letter once one meter, 15 meters, 50 meters, and 100 meters away from a mailbox.

2.4 Dropping Procedure

It is desirable to drop all letters without the attention of onlookers. The researcher pretended to lace her shoes and during this act of subterfuge dropped the letter front side up on the pavement. To secretly drop the letter was successful eleven times. Just one time the procedure did not work out and the researcher was noticed by a pedestrian who run after her to bring her the just *lost* letter. However, the person did not seem to comprehend that he became part of a research project. Even if you could determine the action of the pedestrian as an altruistic act the same letter was dropped again after half an hour.

2.5 Observation

After dropping, all of the twelve letters have been observed as discreet as possible. It was chosen to observe the letters from a car, because it is not an unusual scene to see people waiting in a car. The car was parked close enough to have the letter in view, but far enough away so that the finder would not immediately see the observer. The optimal distance between observer and letter was estimated to be about 50 meters.

2.6 Results Pilot-Study

Overall 7 of the dropped letters arrived two days later at the researcher's home (see table 2 for an overview). The content of these letters was three times of University letters, two reunion letters and two birthday invitations. Two of these letters have falsely been dropped at neighbor houses. The neighbors also showed an altruistic act and brought the letters to the right address. Both neighbors opened the letters, which could happen accidentally when not looking at the addressee. One neighbor certainly had read the content of the letter because he wished the researcher a nice reunion party.

Thus there were five letters which did not return at the researcher's home. Two letters (reunion and birthday invitation) were picked up by male persons who inserted them in their bags. Both letters were not returned. Consequently both persons did not drop the letter after inserting them. One birthday invitation was picked up and read by a male person afterwards he turned the letter into a ball and threw it on the sideway. A university letter was picked up by three teenage girls who laughed about it and threw it away. One reunion letter was disregarded by all passengers it was not picked up after eight hours and collected by the researcher when it started to rain. Without consideration of this letter the average time until someone picked up a lost letter was 20.5 minutes.

None of the letters dropped a distance of 100 meters away from a mailbox was returned. Obviously a distance of this size or even more is too far to expect an altruistic act, or people do not have the mailbox in their view and the act of dropping the letter is associated with too much effort. In contrast all letters 1 meter away from a mailbox have been returned. Hereupon it is concluded that this condition is probably too easy and the altruistic act too little to be of use. Consequently it was chosen to drop the letters in a distance between 15 and 50 meters, thus approximately 30 meters with the mailbox in sight. With this distance the dropping of a letter is not too easy but also not too laborious to fulfil a small altruistic act.

Table 2

Results of the Pilot-study conducted in may 2013

Content letter	Distance to mailbox (in meters)	Returned
University	1	yes
University	15	yes
University	50	yes
University	100	no
Reunion	1	yes
Reunion	15	no
Reunion	50	yes
Reunion	100	no
Birthday invitation	1	yes
Birthday invitation	15	no
Birthday invitation	50	yes
Birthday invitation	100	no

3 Method

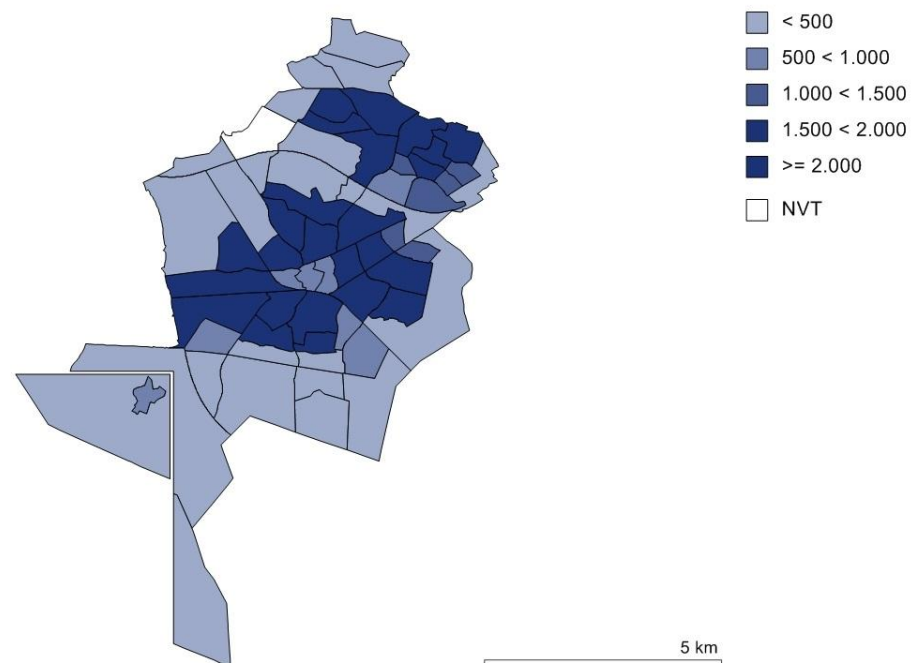
This chapter describes the applied methodology of the present study. First we will discuss the data collection method as well as the sample size. After this we will describe the appearance, the content and the dropping procedure of the lost letters. This is

followed by a description of the used variables and finally the procedure of the data analysis.

3.1 Neighborhood Sample

This study is based on the data of a lost letter study conducted in June and July 2013 in the Netherlands. 352 letters were distributed in Hengelo a small town in the east of the country. The number of letters is comparable to Holland et al. (2012) who dropped 300 letters and Wilson et al. (2009) who dropped 216 letters. Overall Hengelo has 62 neighborhoods from which 30 are excluded from this sample. First we excluded all areas with an extremely small population (from 0 to 467 inhabitants, see Figure 2). For these areas the chance that a person possibly finds more than one letter is higher than for the included areas. The excluded areas are industrial areas, business areas, the city centre, a neighbourhood without a mailbox (Vikkerhoek) and areas with scattered houses. The final sample size was 32 neighborhoods (see appendix A for an overview). The sample size is comparable to Holland et al. (2012) who distributed their lost letters over 20 neighborhoods. Within those 32 different areas there are 63 mailboxes, thus on average 1.97 mailboxes in each neighborhood.

In each neighborhood 11 letters were distributed. This has two reasons. First we dropped the letters in the surroundings of mailboxes of which mostly all neighborhoods included to our sample have one to two regardless to their size and population. Second all study variables are standardized to compare the neighborhoods irrespective of their population density.



Source Community of Hengelo (GBA) adaption BGI

Figure 2. Total population of Hengelo per neighborhood in 2013.

3.2 Appearance of the Letters

A white standard envelope (DIN-B6) without a window was used (see Figure 3). The letters were stamped, unsealed and addressed to the home address of the study's author with a gender-neutral name L.Kranenberg. It is noteworthy that even though the origin of the author is German, the last name is common in the Netherlands as well and consequently no eventual biases have to be taken into account.

It is chosen just to state the first character of the first name to exclude any gender related causes whether the letter is posted or not. The letters were sufficiently stamped to guarantee that an altruistic act does not fail because of the absence of a stamp. Moreover the act of buying a stamp for a stranger and afterwards post the letter is a more expensive (man-hours and time) altruistic act than normally studied by a Lost Letter experiment. Because of the possible curiosity of people the letters were not sealed when dropped. Thereby the finder was able to read the letter without to rip it open.



Figure 3. JPEG image of a lost letter

3.3 Content of the Letters

Since the first LLT was carried out in 1948 by Merritt and Fowler the communication media has changed a lot. Back in time it was one of the only ways and quite common to communicate private as well as for business by post. Because of the appearance of the internet and mobile phones or smartphones we nowadays mostly communicate via other ways. It is not as usual as 65 years ago to send an urgent letter by post (Merritt and Fowler, 1948; Farrington and Knight, 1980). We therefore had to ensure that the content of the letter was as realistic as possible to prevent people from being suspicious while reading it. Moreover the content had to be believable in a printed version because of the too big workload of writing all letters by hand. Furthermore the content had to be important enough to make the finder accomplish a small altruistic act. On the basis of the findings of the pilot-study the content of the letters (see appendix B) was determined to be an invitation to a class reunion of a secondary school. This ensures that the content is realistic, believable in print version and pose an altruistic act if put into a mailbox.

The identification of returned letters was crucial to state when and where the letter has been dropped. We therefore used the sender as identification for the dropping place of the letter. Each letter was signed by a male as well as a female person (this was done to exclude gender related issues), the female name was changed for every neighborhood. We therefore knew for example that a letter signed by Willemijn was dropped in the neighborhood Bovenhoek. Hereby it was easy to identify *where* the returned letters have been dropped. To identify the date of dropping we changed the heading date of the letter

into the date of dropping. This gave us also information about the time-slot the letter was dropped because per day we just dropped one letter in each area.

3.4 Letter Dropping Procedure

Letters were just dropped on rain-free days to ensure the readability and to avoid that people do not pick up the letters because of the dirt and wetness and that the letters “do not lose their appearance of value” (Merritt, and Fowler, 1948, p.91). Because we want to measure altruistic behavior on neighborhood level we wanted a realistic picture of people living in each area. Therefore letters were dropped on various dates and times (Merritt and Fowler, 1948). The letters were dropped during weekdays and the weekend in three different timeslots, in the morning (7.00h-11.00h), in the noon (12.00h-17.00h) and in the evening (18.00-21.00h). A Python randomization was used to randomly combine time-slots and weekdays (see appendix C).

The researcher pretended to tie their shoe lace at the same time the letter was dropped face up on the sidewalk. In more unattended areas the letters were dropped out of the front passenger’s door by the co-driver. The co-driver opened the door, both researchers checked whether they would not be seen by anybody and then he/she unobtrusively dropped the letter on the sidewalk. The researcher observed one letter in each neighborhood to gain insight in what happened to the letters after they were dropped.

3.5 Letter Identification

Each letter was signed by a male and female name. The identification was done by changing the female name for every neighborhood. To identify the date of dropping we changed the heading date of the letter into the date of dropping. Since only one letter was dropped per day this provided information about the time-slot the letter was dropped in.

3.6 Independent Variables

3.6.1 Income

Two different kinds of measures of income were collected. First we used data of the standardized *median household income* (hereafter *household income*) of each neighborhood adjusted of the years 2007 till 2010. We used the most recent data published by the Dutch Centraal Bureau voor de Statistiek (Dutch for: Central Statistical Office; CBS). The CBS has defined the standardized household income as:

“The disposable income adjusted for differences in size and composition of the household.” The variable is measured in Euro on a ratio level from 0 to infinity, the higher the score the higher the median income of the households.

Second we used the *average personal income* of dwellers (hereafter *individual income*). This data is not adjusted for differences in households; it is purely the average personal net income of neighborhoods. This data is gathered by the CBS in 2011 and measured in Euro on a ratio level from 0 to infinity, the higher the score the higher the average personal net income.

3.6.2 Neighborhood Crime

Neighborhood crime is the number of crime incidents registered in each neighborhood. We therefore used data of types of crimes occurring in public space of neighbourhoods. The data is obtained from the CBS and to this date the most recent.

First we included crimes in relation to safety. These are *home-theft*, *street-theft* and *physical integrity*. Second we included crimes in relation to the quality of life, which are *vandalism* and *offenses against public order*.

All subscales are measured as a continuous variable, the higher the score the higher the number of crime incidents registered by the police. All data is based on incidents per 1000 inhabitants. Hereby we can compare the various neighborhoods regardless to their population size. All data gathered is from 2010 and measured on a continuous scale from 0 to infinity.

Additional to the several crime incidents we compiled an overall *crime index* for each neighborhood. This variable is aggregated through adding the individual crime incidents per 1000 inhabitants. To check the reliability of this scale Cronbach’s alpha was determined and proved to have a good reliability for all scales. Thus the combined variable crime index was intern consistent and could be used to indicate the overall crime rate of a neighborhood per 1000 inhabitants

3.6.3 Structural Neighborhood Characteristics

This variable is combined by four structural characteristics of neighborhoods and is coded by the researcher’s impression of the neighborhood and the surrounding of the dropping place.

In first instance we gathered data on the petty crime behavior *littering*. We therefore noticed each time when dropping a letter if there was litter on the ground (yes/no).

Because letters were dropped at several places and times in each neighborhood we thereby get an impression of the cleanness of a large part of each neighborhood and the data was not measured at just on time. Nevertheless the definition of littering is quite subjective and therefore can be a possible bias. To reduce the chance of a bias, littering was in advance defined as an accumulation of waste, a single can of cola for example was not assessed as litter. Moreover litter was just determined if both researchers acknowledged it, if the researchers disagreed over the situation it was not coded as litter. More or less the same method was used to detect the second subjective variable loitering *teenager*. This variable states whether there were groups of teenagers hanging around in the neighborhoods (yes/no). We defined these groups to be at least two teenagers hanging around with (possible) nuisance behavior. Also this variable can lead to a bias because it is quite subjective to assess the (possible) nuisance behavior. We therefore again just stated that there are teenagers hanging around if both researchers agreed.

The third variable describing the neighborhood characteristics is the most *typical kind of houses* (individual houses/terraced houses/high-rise buildings) occurring in the neighborhood. In the Netherlands it is common that the most houses in a neighborhood are similar to each other it is thus not often the case that there are very different houses in one area, like a high-rise building next to a single small family-house. The fourth variable is the overall *condition of houses* (very well/acceptable-good/poorly). Again measuring this variable can lead to a bias in the study because the assessment is based on the subjective opinion of the researchers. We tried to reduce this bias and based the data on the average opinion of all researchers who were busy in the dropping procedure of this study.

All data assessed for this variable was recorded during the dropping procedure of the letters in June and July 2013.

3.6.4 Descriptive Characteristics

First the *number of households* and the *population size* are assessed as two continuous variables, the higher the score the more households and the higher the population size. This is done to investigate whether the neighborhoods differentiate in these characteristics and to have a basis for the comparison of crime incidents per inhabitants. The ethnic diversity of the neighborhood is measured by the total number of *ethnic Dutch* living in a neighborhood. This data is gathered from the CBS and was published

in 2013. The variable is measured as a continuous variable the higher the score the more inhabitants are born in the Netherlands. To examine whether the average age of inhabitants influences the altruism we included the average *age* of inhabitants. Also *age* is measured as a continuous variable, the higher the score the higher the mean age of inhabitants in a neighborhood. This data also comes from the CBS and was published in 2010.

3.7 Data Analysis

All data is analyzed by using the Statistical Package for the Social Sciences (SPSS; version 21.0). As a first step we checked the data for errors and missing values through a frequency analyses. The data was complete and no missing values or errors were found. Our sample size of dropped letters is 352. The outcome variable is whether a dropped letter has returned to the author's address or not (0=yes and 1=no) and is regressed against our predictor variables by binary logistic regression.

The continuous predictor variables (*crime index*, *median household income*, *individual income*) were changed into fourfold (double split-half) categorical variable. For this purpose we used the mean as a splitting point to generate two halves and split these halves again the same way. Thereby we got four categories indicating how much *crime* per 1000 inhabitants occurring in a neighborhood and four categories indicating the *household income* and *individual income* of dwellers. For all three variables category 1 indicates the lowest number and category 4 the highest. The categorization is done to point out where the neighborhoods are situated with respect to income deprivation and crime. Trough cutting the categories beneath and above the mean we can point out where a neighborhood is situated with respect to the *average income* and the *crime level*. Hereby we want to achieve a better comparison between deprived neighborhoods and more privileged neighborhoods, as well as "low" crime areas and "high" crime areas.

Because of the categorical character of our outcome variable we chose to test our data with logistic regression. Logistic regression allows us to regress the binary dependent returning of letters against both categorical and continuous independent variables. By assessing the goodness of fit it gives us an indication of how adequate our set of predictors is and an indication about the importance of each predictor and also their interaction. When working with logistic regression several assumptions have to be fulfilled. First we checked the nature of our sample and ran descriptive statistics on our predictive variables. No variable and categories of variables has been found to have

limited numbers. We therefore assumed to have suitable sample for running this analysis. The second assumption is the absence of high intercorrelations among our predictor variables. There is not just one way to check this assumptions thus we performed a VIF-statistics to determine eventual multicollinearity of our predictor variables. No indication of multicollinearity was found; all values are beneath 10 (except for both income variables). The third assumption for a successful logistic regression is the absence of outliers. We therefore checked the residuals by using Cook's distance. None of the cases had a score of 1 or higher, thus no outliers were found.

To test our hypotheses we run several logistic regression models with constellations of variables based on the literature. We first run a binary logistic regression for every independent variable and our outcome variable return of lost letters. Hereby we tested every possible relationship between our study variables and the altruistic behavior of neighborhood dwellers. We started with a logistic regression containing the *household income* of neighborhoods and another with the *individual income*. Hereby we checked whether the average income of neighborhoods has influence on the level of altruism performed in the neighborhood.

Hereafter we made a model with the categorized *crime index* to investigate whether the overall number of crime influences the return rate of lost letters. Hereafter we made a model with the various single neighborhood crimes, thereby we checked if a single type of crime influences the return of the lost letters.

According to the literature discussed in the introduction section structural neighborhood characteristics probably have an influence on the altruistic behavior of dwellers. We therefore made a model with the independent variables describing the neighborhood characteristics (*litter, teenagers, most typical kind of houses* and the *overall condition of houses*).

It is also tested whether the descriptive characteristics of a neighborhood influence the return of lost letters. Hereby we included the independent variables amount of *ethnic Dutch* and *age*.

As a last step we performed two multivariate models. We had to run two multivariate models because of the correlation of *individual income* and *household income*. The first multivariate model includes all variables except the *individual income*. The second multivariate model includes all variables except the *household income*. For both models we used the forced entry method provided by SPSS. This method tests all predictor

variables in one block to evaluate their predictive ability. Thereby it also controls for the effects of other predictors in the model. We decided to perform the multivariate models by using the forced entry method because of the criticism on the forward and backwards stepwise procedures. Both stepwise methods can be influenced by random variation and the chance of include or exclude a variable on the basis of statistical grounds is high. By performing a binary logistic regression for every independent study variable and the return of letters and two multivariate models including all study variables we checked for every possible intercorrelation.

We used an alpha level of .05 for all tests.

4 Results

4.1 Status Letters

The numbers of returned letters are displayed in table 3. In total 352 letters were dropped from which 268 (77.1%) were returned and 84 (23.9%) were not. The mean of returned letters per neighborhood is 8.38 with a standard deviation of 1.7.

Table 3

Return rate of Lost Letters

	N	%	Mean (SD)
Returned	268	76.1	8.38 (1.7)
Not returned	84	23.9	2.63 (1.3)
Total	352	100	

4.2 Description Sample

The sample consisted of 32 neighborhoods of Hengelo. The average population sizes of those neighborhoods in 2013 was 2134.47 (SD = 940.91). Figure 4 indicates how the population sizes vary across the whole sample.

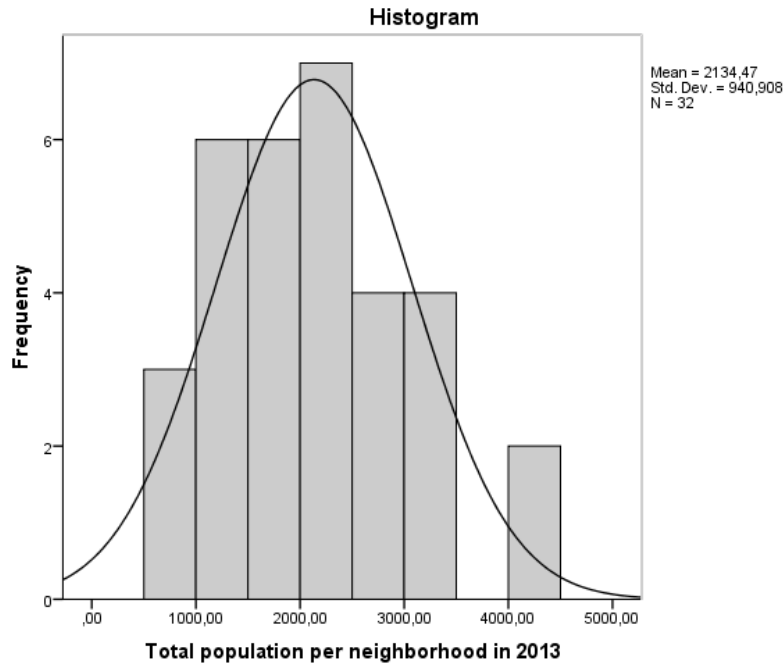


Figure 4. Histogram of the total population per neighborhood in 2013

The people living in the included neighborhoods in 2010 are on average 39.66 years old and 77.7% of them were ethnic Dutch (see table 4). Ethnic Dutch means that a person is born in the Netherlands. Therefore we get the number of foreign national residents living in the included neighborhoods which considerably varies across the sample. The highest percentage of ethnic Dutch living in a neighborhood is 91.07% whereas the lowest percentage is 45%.

Table 4

Sample characteristics and odds ratio with not returned letters

(N=352)

	<i>M</i>	<i>SD</i>	<i>OR</i>	<i>p</i>
Population size ¹	2134.47	927.41	1.00	.86
Age ²	39.66	4.46	.98	.57
Ethnic Dutch (%) ¹	77.74	9.15	.99	.34
Personal Income ³	20.58	2.95	.97	.41
Household Income ²	22.58	3.31	.99	.90
Home-theft ²	5.74	3.33	1.00	.97
Street-theft ²	8.19	5.19	.99	.70

Physical integrity ²	4.47	3.49	.99	.96
Vandalism ²	6.32	4.98	.98	.50
Offenses against public order ²	0.93	.79	.87	.39
Total crime (index) ²	25.66	13.70	.99	.66

Note. OR=odds ratio. The data is gathered in ¹2013; ²2010; ³2011.
 p<0.05.

As stated in the method section we categorized the total *crime index* into 4 categories (1 to 4). The higher the *crime index* equates to the more crime incidents were registered in the neighborhood. Thus *crime index* category 1 indicates the lowest number of crime per thousand inhabitants with a range of 0 incidents up to 12.83 registered incidents. Neighborhoods of the *crime index* category 2 have a registered number of 12.84 up to 25.66 incidents per thousand inhabitants. Category 3 included neighborhoods with 25.66 thru 38.49 incidents per thousand inhabitants. Category 4 includes the neighborhoods with the highest crime index with more than 38.49 registered incidents per 1000 inhabitants.

As pictured in figure 5 21.9% of the neighborhoods of our sample belong to category 1. The same percentage of neighborhoods belongs to category 4 indicating the highest amount of crime. The other two categories are stating whether the *crime index* lies direct under the mean (category 2, 31.9%) and direct above the mean (category 3, 25%).

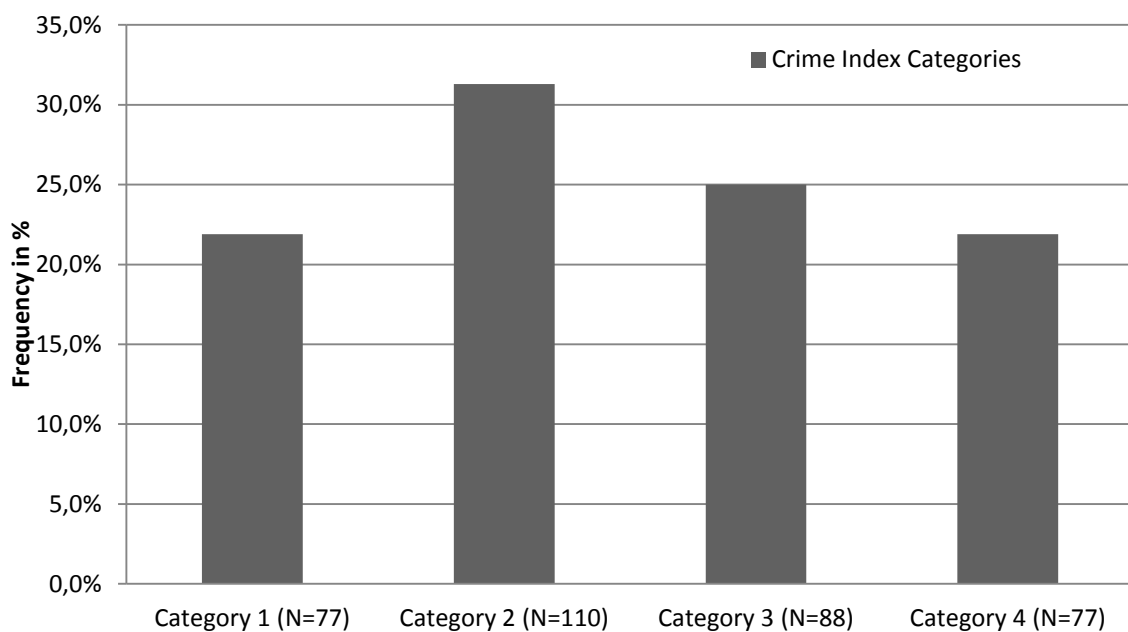


Figure 5. Sample distribution across the within the four *crime index* categories

We described in the methods section that the *crime index* is composed of several neighborhood crimes, all measured per thousand inhabitants. In 2010 there are on average 25.66 crime incidents registered per 1000 inhabitants. The neighborhood with the lowest number of registered crime incidents in 2010 counts 7.14 crimes per 1000 inhabitants, the area with the highest number of crime counts 50.83 incidents per 1000 inhabitants. On detail there are on average 5.6 *home-theft* incidents, 8.2 *street-theft* incidents, 4.7 incidents with *physical integrity*, 6.3 incidents with *vandalism and destruction of public space* and 0.9 *offenses against public order* (see table 4).

The distribution over the four *Crime Index* categories is comparable; every category includes about equal numbers of neighborhoods. When looking at the four *household income* categories (figure 6) we see a different picture which is not that comparable. Here the category indicating the lowest *household income* is labeled as 1 and includes neighborhoods with an income of €0 thru €19.210. Category 2 includes neighborhoods with a *household income* of €19.210 thru €22.570. The third category includes neighborhoods with a *household income* of €22.570 thru €25.930. The last category 4 includes the neighborhoods with the highest amount of *household income* of €25.930 and more.

The smallest percentage (12.5%) of cases is found for the highest *household income* category. Also the lowest category 1 just includes 15.6% of the sample. The biggest amount of neighborhoods is scattered around the mean in the category 2 (37.5%) and category 3 (37.5). The average *household income* in 2010 of the whole sample is 22.580€ ($N= 32$, $SD= 3360$) with the lowest income of 16.700€ and the highest income of 32.300€. The half of our sample has a *household income* per year (2010) which is below the overall median ($\tilde{x}= 22.45$) and the mean.

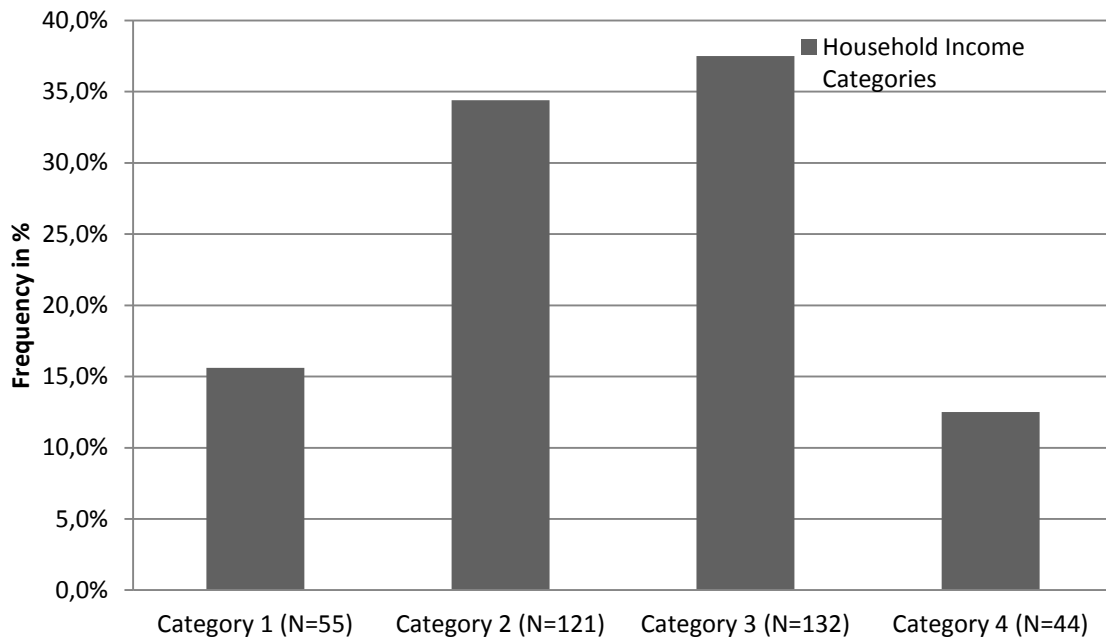


Figure 6. Sample distribution across the four household income categories

We see another income distribution when looking at the descriptives of the *individual income* categories. Again category 1 includes the neighborhoods with the lowest *individual income* from €0 thru €17.990. Category 2 includes the neighborhoods with a mean *individual income* of €17.990 thru €20.580. Category 3 includes all neighborhoods with a mean *individual income* of €20.580 thru €24.390, and category 4 the neighborhoods with the highest mean personal income of €24.390 and higher. *Individual income* Category 1 with the most deprived neighborhoods included 25% of the sampled neighborhoods, this is almost 10% more than for the adjusted *household income*. Category 2 includes less neighborhoods namely 15,6%. Like for *household income* the third *individual income* category included the most areas (53,1%) and the fourth with the most privileged category the least (6,3%). In table 4 it is visible that the average *individual income* of the whole sample (20.580€) is lower than the average *household income* of our sample (22.5800€).

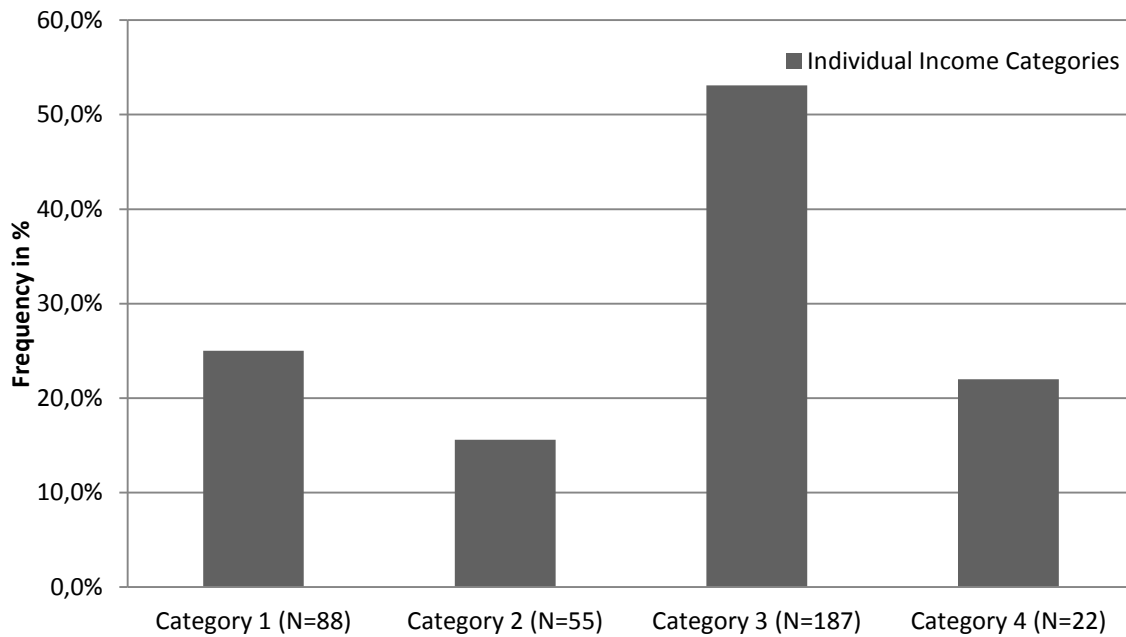


Figure 7. Sample distribution across the four individual income categories

For our analysis we also collected data which is based on the subjective impression of the researchers. Those data concern the overall condition of the neighborhoods as well as the subjective safety. Because of the findings of Keizer et al. (2008) we were first interested in whether there was *litter* lying on the ground. We identified littering in 15.6% of the cases (table 5).

The impression of a neighborhood also depends on the kind of houses and their state. In our sample we saw in over the half of the areas (56.3%) terraced houses, in 25% of the areas individual houses and in 18.8% high-rise buildings (see table 5). In our view the overall condition of houses was pretty good. We did not find any neighborhood with houses in a poor condition. In 71.9% of the cases the houses were in a very good condition and in 28.1% of the cases in a slightly worse condition but still defined by the researchers as acceptable/good. As an indicator of subjective safety we registered whether there were teenagers hanging around, this was the case in 28.1% of the cases (table 5).

Table 5

Sample characteristics and odds ratio with not returned letters

		N	%	OR	p
Litter ¹	yes	55	15.6	1.01	.96
	no	297	84.4		
Type of houses ¹	individual houses	88	25	1.35	.33
	serial houses	198	56.3		

	high-rise buildings	66	18.8	1.14	.73
Condition of houses ¹	very well	253	71.9		
	acceptable/good	99	28.1	1.19	.51
	Poorly	0	0		
Teenagers ¹	yes	99	28.1		
	no	253	71.9	.97	.92

Note. N=352. OR=odds ratio. The data is gathered in ¹2013.

*p<0.05.

So far we made a descriptive analysis of our sample characteristics. In the next paragraphs we are going to describe the results of the statistical tests we performed to test our models presented in the data analysis section.

4.3 Model 1: Household Income and Return Rates of Lost Letters

We performed a direct logistic regression to test the relationship of the dependent variable and the independent variable *household income* (see table 6). The model contained one independent variable (*household income*). The full model was not statistically significant ($\chi^2(3, N = 352) = .803, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .3% (Cox and Snell R square) and .4% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. As shown in table 4 none of the categories made a statistically significant contribution to the model. Because we have a categorical independent variable the income categories 2, 3 and 4 are compared to the first and lowest income category which is used as a reference group. All odds ratios are less than 1 indicating that compared to the lowest income category lost letters dropped in richer neighborhoods are .7 times (category 2), .75 times (category 3) and .72 times (category 4) more likely to be returned. But we have to treat these results as effectively zero and their odds ratio as 1, because of the absence of statistical significance.

Table 6

Logistic Regression Predicting Likelihood of Return of Lost Letters

	B	S.E	Wald	df	p	OR	95% CI for OR	
							Lower	Upper
Household Income Cat. 1 ¹			1.02	3	.79			
Household Income Cat. 2 ¹	-.36	.37	.94	1	.33	.70	.34	1.44

Household Income Cat. 3 ¹	-.29	.36	.65	1	.42	.75	.37	1.52
Household Income Cat. 4 ¹	-.33	.46	.51	1	.48	.71	.29	1.8
Constant	-.89	.29	9.00	1	.003	.41		

Note. N=352.CI=confidence interval. Or=odds ratio. ¹The data is gathered in 2010.
*p<0.05.

4.4 Model 2: Individual Income and Return Rates of Lost Letters

We performed a direct logistic regression to test the relationship of the dependent variable return of lost letters and the independent variable *individual income* (see table 7). The model contained one independent variable (*individual income*). The full model was not statistically significant ($\chi^2 (3, N = 352) = 1.102, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .003% (Cox and Snell R square) and .005% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. As shown in table 5 none of the categories made a statistically significant contribution to the model. The first individual income category is used as a reference group. All odds ratios are less than 1 indicating that compared to the lowest income category lost letters dropped in richer neighborhoods are .7 times (category 2), .82 times (category 3) and .59 times (category 4) more likely to be returned. But again we have to treat these results as effectively zero and their odds ratio as 1, because of the absence of statistical significance.

Table 7

Logistic Regression Predicting Likelihood of Return of Lost Letters

	B	S.E	Wald	df	p	OR	95% CI for OR	
							Lower	Upper
Individual Income Cat.1 ¹			1.09	3	.78			
Individual Income Cat.2 ¹	-.29	.41	.53	1	.47	.74	.34	1.65
Individual Income Cat.3 ¹	-.19	.29	.45	1	.50	.82	.46	1.46
Individual Income Cat.4 ¹	-.52	.60	.75	1	.39	.59	.18	1.93
Constant	-.98	.24	16.79	1	.00	.38		

Note. N=352.CI=confidence interval. Or=odds ratio. ¹The data is gathered in 2011.
*p<0.05.

4.5 Model 3: Crime Index and Return Rates of Lost Letters

We again performed a logistic regression to assess the impact of the different *crime index* categories and the number of returned letters. The model contains one

independent categorical variable (*crime index*). The full model was not statistically significant ($\chi^2(3, N = 352) = 2.25, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .007% (Cox and Snell R square) and .01% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. Table 8 shows that none of the *crime index* categories made a statistically significant contribution to the model. The strongest predictor of not returning a letter is the *crime index* category 3, recording an odds ratio of 1.21. This indicates that lost letters dropped in a neighborhood belonging to the *crime index* category 3 are 1.21 times less likely to be returned. Lost letters dropped in neighborhoods with a *crime index* belonging to category 2 are .95 times more likely to be returned and .68 times more likely when belonging to the *crime index* category 4. Nevertheless again we have to treat these results as effectively zero and their odds ratio as 1, because of the absence of statistical significance.

Table 8

Logistic Regression Predicting Likelihood of Return of Lost Letters

	<i>B</i>	<i>S.E</i>	Wald	df	<i>p</i>	<i>OR</i>	95% CI for <i>OR</i>	
							Lower	Upper
Crime index ¹			2.38	3	.49			
Crime index 2 ¹	-.06	.35	.02	1	.87	.95	.48	1.86
Crime index 3 ¹	.19	.36	.29	1	.59	1.21	.61	2.43
Crime index 4 ¹	-.39	.39	.96	1	.33	.68	.31	1.48
Constant	-1.11	.26	17.83	1	.33	.33		

Note. N=352.CI=confidence interval. OR=odds ratio. ¹The data is gathered in 2010.

*p<0.05.

4.6 Model 4: Types of Neighborhood Crime and Return Rates of Lost Letters

Next we run a logistic regression for the several kinds of *neighborhood crime* (see table 9). The model contained five independent variables (*home-theft, street-theft, public-integrity, vandalism* and *public-order*). Also this full model was not statistically significant ($\chi^2(5, N = 352) = 1.38, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .004% (Cox and Snell R square) and .006% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. None of the neighborhood crimes makes a statistically significant contribution to the model. We therefore have to treat the

odds ratio as 1 implying that there is not relationship of neighborhood crimes and the return of letters.

Table 9

Logistic Regression Predicting Likelihood of Return of Lost Letters

	<i>B</i>	<i>S.E</i>	Wald	df	<i>p</i>	<i>OR</i>	95% CI for <i>OR</i>	
							Lower	Upper
Home-theft ¹	-.01	.07	.04	1	.85	.99	.86	1.13
Street-theft ¹	.01	.04	.02	1	.89	1.00	.93	1.08
Public integrity ¹	.01	.07	.04	1	.84	1.01	.89	1.16
Vandalism ¹	-.03	.04	.44	1	.51	.98	.90	1.05
Public order ¹	-.152	.17	.83	1	.36	.86	.62	1.19
Constant	-.89	.35	6.32	1	.01	.41		

Note. N=352.CI=confidence interval. OR=odds ratio. ¹The data is gathered in 2010.
*p<0.05.

4.7 Model 5: Structural Neighborhood Characteristics and Return Rates of Lost Letters

We performed the fifth model to identify the possible relationship between the return of letters and structural neighborhood characteristics (see table 10). It therefore includes four independent variables (*litter*, *teenager*, *kind of houses* and *condition of houses*). The full model containing all predictors was not statistically significant ($X^2(5, N = 352) = 1.492, p > .05$). This indicates that the model was not able to distinguish between returned and not returned letters. The model as a whole explained between .004% (Cox and Snell R square) and .006% (Nagelkerke R Square) of the variance in not returned letters, and correctly classified 76.1 of the cases. As shown in table 8 no of the four variables make a statistically significant contribution to the model.

Table 10

Logistic Regression Predicting Likelihood of Return of Lost Letters

	<i>B</i>	<i>S.E</i>	Wald	df	<i>p</i>	<i>OR</i>	95% CI for <i>OR</i>	
							Lower	Upper
Litter ¹	.141	.426	.110	1	.74	1.15	.500	2.652
Teenager ¹	-.023	.324	.005	1	.71	.977	.518	1.18
Individual houses ¹			.941	2	.63			
Terraced houses ¹	.288	.32	.81	1	.37	1.33	.71	2.50

High-rise buildings ¹	.100	.42	.06	1	.81	1.07	.49	2.52
Poor condition houses ¹	.197	.29	.45	1	.50	1.29	.68	2.17
Constant	-1.505	.472	10.1	1	.001	.22		

Note. N=352.CI=confidence interval. Or=odds ratio. ¹The data is gathered in 2010. *p<0.05.

4.8 Model 6: Descriptive Neighborhood Characteristics and Return Rates of Lost Letters

The next direct logistic regression was performed to assess the impact of descriptive neighborhood characteristics on the likelihood on dropped letters to be not returned. The model includes two independent variables (*ethnic Dutch* and *average age*). The full model containing all predictors was statistically not significant ($\chi^2(2, N = 352) = 1.08, p > .05$). This indicates that the model was not able to distinguish between returned and not returned letters. The model as a whole explained between .003% (Cox and Snell R square) and .004% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of the cases. As shown in table 11 no of the four variables make a statistically significant contribution to the model and both odds ratio are close to 1.

Table 11

Logistic Regression Predicting Likelihood of Return of Lost Letters

	B	S.E	Wald	df	p	OR	95% CI for OR	
							Lower	Upper
Average age ¹	-.01	.03	.11	1	.74	.99	.94	1.05
Ethnic Dutch ²	-.01	.01	.70	1	.40	.98	.96	1.02
Constant	.12	1.36	.01	1	.93	1.13		

Note. N=352.CI=confidence interval. OR=odds ratio. The data is gathered ¹in 2010; ²2013. *p<0.05.

4.9 Model 7: Multivariate Model (Household Income)

We performed a multivariate direct logistic regression to assess the overall impact of descriptive characteristics, neighborhood characteristics, crime and the household income on the likelihood that a lost letter was returned (see table 12). The model contained 13 independent variables (*household income, home-theft, street-theft, public integrity, vandalism and public order, ethnic Dutch, age, litter, houses, condition of houses and teenager*). The full model containing all predictors was statistically not

significant ($\chi^2 (15, N = 352) = 5.71, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .016% (Cox and Snell R square) and .024% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. As shown in table 12 none of the independent variables made a unique statistically significant contribution to the model.

Table 12

Logistic Regression Predicting Likelihood of Return of Lost Letters

	<i>B</i>	<i>S.E</i>	Wald	df	<i>p</i>	<i>OR</i>	95% CI for <i>OR</i>	
							Lower	Upper
Household Income Cat. 1 ¹			1.20	3	.75			
Household Income Cat. 2 ¹	-.78	.76	1.05	1	.31	.46	.10	2.03
Household Income Cat. 3 ¹	-.73	.95	.59	1	.44	.48	.08	3.09
Household Income Cat. 4 ¹	-.75	1.1	.45	1	.50	.47	.05	4.20
Home theft ¹	-.04	.08	.27	1	.60	.96	.82	1.22
Street theft ¹	-.01	.06	.02	1	.88	.99	.89	1.11
Public integrity ¹	.03	.08	.10	1	.75	1.03	.88	1.19
Vandalism ¹	-.03	.05	.44	1	.51	.97	.88	1.07
Public order ¹	-.23	.21	1.16	1	.28	.79	.52	1.21
Ethnic Dutch ²	-.00	.04	.00	1	.98	.99	.92	1.08
Age ¹	-.00	.04	.01	1	.92	1.00	.94	1.08
Litter ²	.10	.53	.04	1	.85	1.10	.39	3.11
Individual houses ²			2.27	2	.32			
Terraced houses ²	.36	.36	.82	1	.36	1.38	.68	2.79
High-rise buildings ²	-.24	.49	.24	1	.63	.79	.29	2.08
Condition houses ²	-.07	.52	.02	1	.89	.94	.34	2.58
Teenager ²	-.24	.38	.40	1	.53	.78	.37	1.66
Constant	-.01	3.3	.00	1	.99	.988		

Note. N=352. CI=confidence interval. OR=odds ratio. The data is gathered in ¹2010; ²2013.
*p<0.05.

4.10 Model 8: Multivariate Model (Individual Income)

We performed a last direct logistic regression to assess the overall impact of descriptive characteristics, neighborhood characteristics, crime and the individual income on the likelihood that a lost letter was returned (see table 13). The model contained 13

independent variables (*household income, home-theft, street-theft, public integrity, vandalism and public order, ethnic Dutch, age, litter, houses, condition of houses and teenager*). The full model containing all predictors was statistically not significant ($\chi^2(15, N = 352) = 5.26, p > .05$), indicating that the model was not able to distinguish between returned and not returned letters. The model explains between .015% (Cox and Snell R square) and .022% (Nagelkerke R Square) of the variance in returned letters, and correctly classified 76.1 of cases. As shown in table 12 none of the independent variables made a unique statistically significant contribution to the model. In contrast to the previous model the odds ratio did not change considerably.

Table 13

Logistic Regression Predicting Likelihood of Return of Lost Letters

	<i>B</i>	<i>S.E</i>	Wal d	df	<i>p</i>	<i>OR</i>	95% CI for <i>OR</i>	
							Lower	Upper
Individual Income Cat. 1 ¹			.76	3	.86			
Individual Income Cat. 2 ¹	-.56	.99	.31	1	.57	.57	.81	4.01
Individual Income Cat. 3 ¹	-.24	1.00	.05	1	.81	.79	.11	5.68
Individual Income Cat. 4 ¹	-.59	1.24	.23	1	.63	.55	.05	6.29
Home theft ²	-.06	.08	.47	1	.49	.94	.80	1.11
Street theft ²	.01	.05	.03	1	.87	1.00	.91	1.11
Public integrity ²	.03	.08	.00	1	.97	1.00	.87	1.16
Vandalism ²	-.03	.05	.47	1	.49	.97	.88	1.07
Public order ²	-.12	.23	.27	1	.61	.89	.57	1.40
Ethnic Dutch ²	-.03	.04	.39	1	.53	.98	.91	1.05
Age ²	.02	.04	.05	1	.83	1.00	.93	1.08
Litter ³	-.00	.50	.00	1	.99	.99	.37	2.67
Individual houses ³			2.11	2	.35			
Terraced houses ³	.38	.37	1.05	1	.30	1.46	.71	3.01
High-rise buildings ³	-.11	.49	.05	1	.83	.89	.34	2.37
Condition houses ³	-.24	.66	.13	1	.72	.78	.22	2.88
Teenager ³	-.09	.42	.05	1	.83	.92	.40	2.07
Constant	1.09	3.50	.09	1	.75	2.99		

Note. N=352.CI=confidence interval. OR=odds ratio. The data is gathered in ¹2011; ²2010; ³2013.

*p<0.05.

5 Discussion

In this chapter we will successively answer our research questions on the basis of the results we obtained by the executed lost letter experiment. We will also relate our results to the relevant literature. Hereafter we will discuss the limitations of the present study and provide food for thought for future work. Finally we will give an overall conclusion of the present research and discuss possible policy implications.

5.1 Main Findings

To our knowledge the present study was the first attempt to investigate the relationship between neighborhood crime, income and altruism in the Netherlands. Moreover it examined the relation between altruism, structural neighborhood characteristics, and descriptive neighborhood characteristics. The data was gathered by the LLT.

No significant relationships were found between the study variables and the altruistic behavior of residents. The return rates of the various neighborhoods did not vary a lot and we could not find any meaningful tendencies. None of the tested models was able to distinguish between returned and not returned letters. Also the odds ratio did not indicate a significant relationship between the independent variables and the level of altruism.

On the basis of our findings we can say that we did not find any evidence for an association between neighborhood crime, structural neighborhood characteristics, descriptive neighborhood characteristics and the pro-social behavior of people. Furthermore the level of altruism does not depend on the average household income or the average individual income of dwellers. In our sample it did not matter in which neighborhood an individual lived or what the economic background looks like, they all show more or less the same level of pro-social behavior. It seems that the findings of Holland et al. (2012) are not applicable to a small town in the Netherlands. In the next paragraphs we are going to discuss the results of the various tested models and relate them to the relevant literature.

5.1.1 Main Findings Altruism and Income

Our hypothesis states that the higher the average income of a neighborhood the higher the level of altruistic behavior of dwellers. Although the odds ratios suggest that the higher the average income of a neighborhood the higher the altruism of residents none

of the results has shown a statistically significant relationship and we have to be careful when interpreting these findings.

According to our findings and on the basis of the absence of statistical significant relationships we reject our first hypothesis. There was no significant evidence found that the higher the average income of a neighborhood the higher the altruistic level.

Our results are contrary to the findings of Holland et al. (2012) who also conducted a lost letter experiment and found that the odds of return rates for richer neighborhoods were higher than for poorer neighborhoods. Also Nettle et al. (2011) stated a lower return rate in deprived neighborhoods in contrast to richer neighborhoods in the same city. We also found no evidence for the findings of Piff et al. (2012) who concluded that people belonging to upper-classes behave less ethical or in our case less altruistic than individuals belonging to lower classes.

Nevertheless our findings are in line with the results of Amato (1983) who also did not find any relationship of the belonging to a social class and the level of helping behavior. It is notable that the various literatures dealing with this topic differ a lot from each other. There is no clear proof for the relationship between income and altruism. Therefore it is impossible to draw a general conclusion about the impact of the level of income on the pro-social behavior.

On the basis of the findings of the present study we can say that for a small Dutch town there is no causal relationship between the level of income and the level of altruism. With respect to the pro-social behavior of people it does not matter whether they have an income below or above the average. According to our findings and those of Amato (1983) we can carefully conclude that there is no causal relationship of belonging to a social class and the level of altruism.

5.1.2 Main Findings Altruism and Neighborhood Crime

According to the literature it is inconclusive whether crime influences the pro-social behavior of people. We therefore hypothesized that the crime level of a neighborhood does not influence the altruism of dwellers.

In the present study there was no evidence found for a relationship between neighborhood crime and the level of altruism. None of our results showed a statistically significant evidence for this relationship. Also the odds ratio did not show a linear relationship between the *crime index* categories and altruism. The present study thus was not able to identify a significant relationship between the *crime index* of a

neighborhood and the altruism of dwellers. This result supports our earlier stated hypothesis. In addition, our findings are in line with Homant (2010), who could not find any causal relationship between crime and safe altruistic behavior. According to his research a safe altruistic act is not influenced by earlier victimization of the helper which supports our findings. According to him just risky altruism (dangerous situations) is influenced by earlier victimization and can lead to a higher pro-social behavior.

There was also no relationship found between the various types of neighborhood crime and altruism. The odds ratio of each type of crime are almost 1 and therefore do not show any direction of the influence of neighborhood crime on the altruism of dwellers. Rather these results show that in our sample there is no relationship between *home-theft, street-theft, public integrity, vandalism and public order* incidents, and the altruism of inhabitants. Also these findings support our hypothesis.

In the present research we assumed that the *crime index* of a neighborhood is related to the number of crime victims living in that neighborhood. We stated that the higher the number of neighborhood crime the higher the number of neighborhood crime victims.

According to Penner et al. (2005) crime victims in contrast to non victims carry out a different cost reward analysis before fulfilling an altruistic act or not. Persons who have been a victim of crime want to avoid any harmful consequences to their behavior and therefore decide to not act in an altruistic way. Thus according to the findings of Penner et al. (2005) dropped letters within high crime areas must have had a lower return rate than low crime areas. But we did not discover this relationship. There are no differences regarding altruism in neighborhoods with low levels of crime (and therefore low levels of victims) and high levels of crime. According to our results we cannot support that an earlier victimization under special circumstances can lead to an increase in altruistic behavior (Staub and Vollhardt, 2008).

5.1.3 Main Findings Altruism and Structural Neighborhood Characteristics

It is also tested whether various structural neighborhood characteristics show a relationship with the altruism of dwellers. To our knowledge there are no comparable studies, therefore we cannot relate our findings to other research.

We tested four study variables which were all measured on the basis of the subjective opinion of the researcher which is justified in the methods. These variables are *litter, teenagers, the most typical type of houses* and the overall *condition of houses*.

Overall structural neighborhood characteristics do not show a significant relationship with altruism. The whole model included all variables and was not able to differentiate between returned and not returned letters.

Consequently the researched neighborhood characteristics do not influence the altruistic behavior of residents. In our sample it made no difference to the number of returned letters whether there was litter on the ground or whether there were teenagers hanging around. It was also unimportant if the most typical type of houses were individual houses, terraced houses or high rise buildings and whether the houses were in a good or poor condition.

5.1.4 Main Findings Altruism and Descriptive Neighborhood Characteristics

Furthermore the present study tested whether various descriptive neighborhood characteristics do influence the altruism of dwellers. Again to our knowledge there are no comparable studies, we therefore cannot relate our results to other research.

Our study variables concerning the descriptive characteristics of neighborhoods are the percentage *ethnic Dutch* and the average *age* of inhabitants. Overall the descriptive neighborhood characteristics do not show a statistically significant relationship with altruism. Further both study variables did not show a difference in the odds of the return of lost letters. In our sample there is thus no relationship between the amount of *ethnic Dutch* people living in a neighborhood, the average *age* of a neighborhood and the altruism of dwellers. Therefore, it does not matter for the level of altruism how the ethnic composition of the neighborhood looks like. The group selection theory (Wilson, 1997) which states that pro-social behavior within a group increases the fitness of this group (Penner, 2005) is thus in our case not dependent on the ethnic homogeneity of dwellers.

It is also unimportant how old the inhabitants on average are the altruistic level is more or less the same.

5.2 Limitations and Future Research

The present study has several limitations that need to be taken into account when considering our results.

Several of these limitations are related to the research design of a lost letter study. First regarding time and personnel it was not possible to observe every letter after dropping. Therefore there is a lack of control over the processes that mediate the return of the

letters (Milgram et al. 1965). We thus do not know what exactly happened after dropping the letters. To reduce these limitations we just dropped letters under special circumstances detailed in the methods section. For future research it is advisable to observe letters after dropping and observe what is happening to a letter after it was dropped like Farrington and Knight did (1980). For this approach it is advisable to plan in for more time and/or work-hours. But still there is always the chance that letters have been found by people not living in the neighborhood. In the present research this chance is reduced to a minimum by the research design. Nevertheless, we are not able to ascertain that every letter returned letter was found and returned by a resident of the neighborhood where it was dropped. This could lead to an ecological fallacy because we want to study the influence of various neighborhood characteristics on the altruism of dwellers and not of people who are not living in the specific neighborhood. When conducting a lost letter study concerning different places this problem can hardly be solved. It is thinkable to survey people who did find a lost letter, but this can lead to other problems such as attracting attention to the research, or interrupt the actual process of returning a letter.

Another limitation could be due to choice of the city. Hengelo is relatively small, compared to other cities such as London where lost letter studies have been carried out. It is thinkable that there are differences in altruism of small town dwellers and big town dwellers. Future research thus can compare lost letter studies of cities with different sizes.

Further it could be advisable to carry out this study in a city where the differences of crime and income indexes are more extensive to accomplish better results. It is thinkable that the differences within this sample were not large enough to get significant results like Holland et al. (2012).

The last limitations concerning the research design is the distance of dropped letters to the next mailbox. In past studies researchers have not mentioned if they have taken this variable into account. Consequently we cannot be sure if the chosen distance between letters and mail-boxes of the present study was optimal. Future research can extend the present research and investigate whether there are differences in returned letters when the distance between dropped letters and mail-boxes changes and if there is a recommendable distance.

Another limitation of this study is the possible unreliability of the postal services in the Netherlands. What we can say is that the reputation of the Dutch postal service is quite

good. During this research the postman dropped two letters accidentally in the neighbor's mail-boxes. Both were brought to the researcher's home by the neighbors but it is unclear if there were other letters which have been posted wrongly or got lost in the postal process. Future research can in advance test the reliability of the national postal services.

The present study is also limited in view of the fact that we have not taken into account possible confounding variables that might have affected the relation between crime, income, neighborhood characteristics and altruism. Possible confounding variables are education, unemployment or gender. Identify and control for these variables could be a task and enrichment for future research.

Furthermore it is likely that our findings can be just applicable to the Dutch society. The data collection took place in the Netherlands and therefore our sample includes only Dutch neighborhoods. The units of observations were individuals located in the Netherlands. With respect to the diverse literature it is imaginable that cultural differences play a role whether people behave altruistic. To our knowledge there are so far no studies investigating cultural differences between crime, income, neighborhood characteristics, descriptive neighborhood characteristics and altruism. Future research can investigate these possible cultural differences.

Moreover we have to treat the generalizability of our research with caution. Although we included nearly a whole Dutch city into our sample it is uncertain whether we can apply our findings to the complete Dutch society. Even in the Netherlands Hengelo is a small city and it is questionable if we can generalize our findings to larger cities of this country. Comparing larger cities to small cities could be an approach for future research.

Another limitation of the present study could be related to the independent study variables. We gathered the data from the CBS which is the only open source for this kind of data. The most recent data for some variables was already three years old the time this study was conducted. We thus cannot ascertain that the data for the independent variables we used describes the real picture of the sample at the time we carried out our lost letter experiment. Future research thus can use data which is gathered at the same moment as dropping the lost letters.

Finally the present study is also not able to determine whether there is a difference between safe and risky altruistic acts. We researched a relative safe altruistic act, dropping a letter and concluded that this act is not related to crime, income,

neighborhood characteristics and descriptive neighborhood characteristics. But we did not investigate whether a risky altruistic act is related to the study variables. Further research can enlarge the data gathering with another altruistic act which is not as safe or harmless as dropping a found letter.

5.3 Conclusion

On the basis of the findings of the present research we can now say that we have a better understanding of the influence of different neighborhood characteristics on the altruism of dwellers. Although none of the tested neighborhood characteristics show a significant relationship we gained more knowledge about the influence of neighborhood crime, the median household income, the average individual income, structural neighborhood characteristics and descriptive neighborhood characteristics on altruism. We now can carefully conclude that the mentioned variables do not have any influence on whether dwellers of neighborhoods of a small Dutch city become more or less altruistic.

We have already pointed out that the literature dealing with either the relationship of belonging to a social class and altruism, or the relationship of crime and altruism differs with respect to the results. For instance our results differ to the findings of Holland et al. (2012) who had almost the same research design. It should be mentioned that studies arguing about this topic were conducted in different countries. It is thus conceivable that cultural differences play a role in the development of altruism.

Exaggerated we can conclude that inhabitants of small towns in the Netherlands behave pro-socially no matter to their income, the neighborhood crime they are exposed to and the structural and descriptive characteristics of the neighborhoods they are living in. For other reasons which do not have influence on Dutch citizens people in Great Britain become less altruistic when living in a deprived neighborhood. However we cannot be sure what causes the different results of these studies. Future research can try to investigate whether there are differences in the level of altruism of small town and big town dwellers, and between countries. This would help to find out whether our findings are applicable to other cities in the Netherlands or to other countries as well. Furthermore future research can test for more possible confounding variables. Hereby it can be discovered step by step why there are so many different approaches explaining the causes of different levels of altruism.

Despite the absence of significant results our findings do have important implications for future research of different disciplines. Our findings will benefit researchers who are

dealing with pro-social behavior of individuals or communities. Our research contributes to a better understanding of the impact of social and economic characteristics on altruistic behavior.

The findings of the present study are also important for criminologists dealing with the consequences of crime. We now know that the exposure of neighborhood crime does not influence the pro-social behavior of small town dwellers in the Netherlands. By reason of this knowledge it is thinkable to develop approaches or initiatives for high crime areas based on the pro-social behavior of inhabitants.

Finally our results can be relevant to the city council of Hengelo. First the knowledge and the evidence that the investigated structural neighborhood characteristics of neighborhoods do not influence the pro-social behavior of inhabitants can lead to cost savings in the city maintenance. Second the city council knows that the researched descriptive neighborhood characteristics do not influence the altruism of inhabitants. This knowledge can be crucial for future neighborhood compositions.

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Appendix A: List of Included Neighborhoods

1. T'Wilbert
2. Anninks-Nijhofshoek
3. Bartelinkshoek
4. Berflo Es Noord
5. Berflo Es Zuid
6. Bovenhoek
7. Bruninkshoek
8. De Noork
9. Elsbeek
10. Groot Driene Noord
11. Groot Driene Zuid
12. Hengelose Es Noord
13. Klein Driene
14. Middelhoek
15. Molendijkhoek
16. Nijverheid
17. Roershoek
18. Schothorsthoek
19. Sogtoenhoek
20. Tichelwerk
21. Tijertshoek
22. Tuindorp t'Lansink
23. Tuindorp Zuid
24. Veldwijk Noord
25. Veldwijk Zuid
26. Vossenbelt Noord
27. Vossenbelt Zuid
28. Weidorp
29. Weijinkshoek
30. Woolde
31. Woolder Es
32. Zwavertshoek

Appendix B: Content of the “Lost Letters”

Uitnodiging Reünie

Hengelo, XX juni 2013 (*date of dropping*)

Beste allemaal,

Hierbij willen wij jullie uitnodigen voor de eerste officiële reünie van onze klas. Voor deze bijeenkomst hebben we alle oud-klasgenoten uitgenodigd en we zouden het op prijs stellen als jij ook aanwezig kunt zijn. De reünie zal gelegenheid bieden om elkaar weer te zien en te spreken.

Het feest vindt plaats op 29 juni 2013 en begint om 19.00 uur.

Als je tijd en zin hebt stuur dan zo spoedig mogelijk een mailtje naar: s.w.groeneveld@hotmail.com

Het feest zal plaatsvinden in Hengelo, maar de exacte locatie is helaas nog niet bekend, wij wachten nog op een bevestiging. Zodra de exacte locatie bekend is, sturen wij een e-mail met meer gegevens.

We kijken er al naar uit om jullie allemaal een keer terug te zien.

Tot snel,

Sander Groeneveld

Females Name (*code for neighborhood/mailbox*)

s.w.groeneveld@hotmail.com

Appendix C: Python for Random Distribution of the Letters

This Python was written by E.E.H. Lastdrager

```
#!/usr/bin/env python

# (c) 2013 Elmer Lastdrager <elmer@lastdrager.com>
import random, math
# Aantal brieven per buurt
brievenPerBuurt = 11
# Buurten met een lijst van postbussen per buurt
buurten = { "Tuindorp Zuid" : ["Bremarsweg", "Badhuisstraat"],
            "Nijverheid"   : ["Wilderinkstraat", "Krabbenbosplein", "Gezinastraat",
            "Rijstraat"],
            "Berflo Es Zuid" : ["Bremarsweg", "Berfloplein"],
            "Veldwijk Noord" : ["Pruisische Veldweg"],
            "Veldwijk Zuid"  : ["Vuurdoornplein"],
            "Berflo Es Noord" : ["Langelermaatweg", "Waarbekenweg", "Parallelweg"],
            "Tuindorp 't Lansink" : ["Industriestraat", "CT Storkstraat"],
            "Woolde"         : ["Rozenstraat", "Geerdinksweg"],
            "Woolder Es"     : ["Deldenerstraat", "Pasteurstraat"],
            "Weidorp"        : ["Balistraat", "Deldenerstraat", "Telgen", "Hampshire"],
            "Tichelwerk"     : ["Oldenzaalsestraat 15", "Beukweg", "Ir M Schefferlaan"],
            "T Wilbert"      : ["PJ Troelstraat", "Achterhoekse Molenweg", "Sloetsweg"],
            "Hengelose Es Noord" : ["Uitslagweg", "Huneborg", "H Lefmanstraat"],
            "Vossenbelt Zuid" : ["Oslostraat"],
            "Vossenbelt Noord" : ["Toulousestraat", "Harzstraat", "Straasburg"],
            "Roershoek"      : ["Salamanderstraat", "Torenlaan", "Levantstraat"],
            "Schothorshoek"  : ["Klaas de Rookstraat"],
            "Tijertshoek"    : ["August Vordingstraat"],
            "Middelhoek"     : ["Louis Bouwmeesterstraat"],
            "Sogtoenhoek"    : ["Willem van Otterloostraat", "Carl Muckstraat"],
            "Bartelinkshoek" : ["Dinant Dijkhuisstraat"],
            "Bruninkshoek"   : ["Aaltje Noordewierstraat"],
            "Weijinkshoek"   : ["Willem Royaardstraat"],
            "Bovenhoek"      : ["Cuys Voorberghstraat"],
            "Molendijkhoek"  : ["Noordelijke Esweg 91", "Noordelijke Esweg 202"],
            "Klein Driene"   : ["Mozartlaan", "Schubertstraat", "Josef Haydnlaan"],
            "Anninks-Nijhofshoek" : ["Grundellaan", "Woltersweg"],
            "Groot Driene Zuid" : ["Reviusstraat", "Brederostraat"],
            "Groot Driene Noord" : ["Willem de Merodestraat", "HC Pootstraat",
            "Jacques Perkstraat"],
            "Zwavertshoek"   : ["Spiegelstraat"],
            "De Noork"       : ["Josef Haydnlaan"],
            "Elsbeek"       : ["Oude Modelweg", "Professor Lorentzstraat"]
            # "Vikkerhoek" : [ "geen (grens gezinastraat)"
        }

dagen = ["Werkdag"] * 5 + ["Weekend"]
timeslots = ["Ochtend", "Middag", "Avond"]
brievenTotaal = len(buurten) * brievenPerBuurt
#####
```

```

# Methoden
#####

def randomPickAndDelete(lst):
    r = random.randint(0,len(lst)-1)
    res = lst[r]
    del lst[r]
    return res
#####
# Runtime
#####
print "BrievenVerdeler 1.0 - Elmer Lastdrager"
print "-----"
# Verdeel alles random
for buurt, bussen in sorted(buurten.iteritems()):
    print "Voor buurt:", buurt
    t = [] # Tijd
    while (len(t) < brievenPerBuurt):
        t.append(timeslots[random.randint(0,len(timeslots)-1)])
    d = [] # Dag
    while (len(d) < brievenPerBuurt):
        d.append(dagen[random.randint(0,len(dagen)-1)])
    # First include all boxes evenly, then fill randomly
    b = bussen*(brievenPerBuurt / len(bussen)) # postBus
    tmpbussen = bussen[:] # deepcopy of list
    while (len(b) < brievenPerBuurt):
        b.append(randomPickAndDelete(tmpbussen))
    n = brievenPerBuurt
    # Zolang we meer brieven hebben voor deze buurt
    while (n > 0):
        # Kies een willekeurige postbus
        r = random.randint(0,len(b)-1)
        pb = randomPickAndDelete(b)
        pt = randomPickAndDelete(t)
        pd = randomPickAndDelete(d)
        print "\t",pb,pd,pt
        n = n - 1
    print ""

```

Appendix D: Pictures of Some Returned Letters



