Effectiveness of Awareness Campaign on Rat-runners:
Application of Mobility Management Methodology to Through Traffic Problems

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Abstract: This study proposes a “soft” measure, “the Rat-runner MM (Mobility Management),” against through traffic problems that is implemented by residents, and analyzes its effectiveness. The authors conducted a social experiment along a residential street with heavy traffic. Communication tools developed with socio psychological knowledge were distributed to rat-runners. From the questionnaire survey, it was found that the communication tools distributed during the experiment made the rat-runners aware that through traffic causes nuisances to neighborhoods. A follow-up survey conducted one month after the experiment showed the rat-runners’ improved behavior. Meanwhile, traffic volume on the residential street decreased by about 10% after the experiment. An attitude survey conducted for residents found that the Rat-runner MM did not face any resistance unlike other hard measures that were proposed for implementation along the residential street.

Keywords: Traffic calming, Traffic safety, Public participation, Mobility management

1. INTRODUCTION

1.1 Background

Today in Asia we often find heavy through traffic along residential streets, even in cases when these are incredibly narrow. Car drivers prefer to detour to avoid congested arterial roads, resulting in the residential streets they use becoming dangerous to residents. In such circumstances, pedestrians and cyclists fear speeding cars, and the noise and vibration produced by heavy traffic bother people enough to stay in their houses. These problems seem to be increasing in frequency and seriousness as the use of car navigation systems and bypass maps on the internet become more popular. Thus, many residential areas need measures to address these problems.

In American cities, some local governments have developed a resident participation scheme, such as one named the “Neighborhood Speed Watching Program (NSWP)” to address such through traffic problems. For example, in Grand Junction, Colorado, the local municipality lends speed guns to the citizen groups who have suffered from the impacts of speeding cars in residential areas, and encourages them to record each car speed and the corresponding license plate numbers (Division of Transportation Engineering, Grand Junction, Colorado). When the residents submit speeding cars’ license plate numbers and recorded speeds to the municipal government, the municipal staffs send the speeding drivers a letter informing them that they were speeding and advising them to drive safely. In general, the NSWP have been reported to significantly decrease car speeds (Womble, 1990 and Mazzella, 1995). Ullman (1996) compared traffic calming measures used in American cities, including the NSWP, speed humps and chokers, and traffic signal control. A soft measure such as the
NSWP that uses participatory approach was found to be an effective measure comparable with other hard measures or traffic regulation change in America. However, in Japan and other Asian countries, there are no systematic activities which residents can implement to address problems and particularly externalities brought about by through traffic in neighborhoods.

1.2 Goals of Research

This study proposes and analyzes the effectiveness of a “soft” measure, “the Rat-runner MM (Mobility Management),” against through traffic problems that is implemented by residents affected by through traffic. This measure employs the “Mobility Management” methodology, which encourage drivers to voluntarily change their driving behavior to become socially desirable for the public using social psychological theories (MOMENTUM and MOSAIC, 1999; Fujii, 2003; JSCE, 2005).

A methodology to influence through traffic drivers or “rat-runners” to change their behavior was employed in this study. It is assumed that some of rat-runners do not have specific reasons to use residential roads as detours of arterial roads. That is, they may once find a bypass route then routinely use it unconsciously from then. The study tried to verify if “awareness of nuisance” enhanced by the Rat-runner MM can change the rat-runners’ driving behavior by analyzing a process and the results of a social experiment of Rat-runner MM conducted along a residential street with heavy through traffic in Japan.

1.3 Significance of Research

The primary objective of programs such as the NSWP is to reduce vehicle speeds along residential roads. These programs do not directly aim to reduce traffic volume. Moreover, programs such as the NSWP were developed to educate drivers against speeding car drivers and were not oriented as socio psychological programs despite them being implemented by residents. The Rat-runner MM presents a unique approach employing socio psychological programs with the twin objectives of reducing speeds and through traffic volumes along residential streets.

The Rat-runner MM experiment is analyzed from two points of view. The first is on the effectiveness of the experiment in reducing through traffic along the targeted residential street. The second is ease of residents’ participation in the activity. This is because if non-participating residents are anxious about bad side effects of the measure, residents who have active commitment cannot launch the activity easily, even if the method is effective to reduce traffic volume in residential roads. Controversial measures, on which residents’ viewpoints are split, would not be suited to activities for public participation because a certain amount of time would be needed in building public consensus.

2. SUBJECT AREA

2.1 Description of Subject Street

The Rat-runner MM social experiment was implemented along the Kokubunji Koko Higashi Dori Street running north-south in Kokubunji city, Tokyo, Japan (Figure 1). It is a 3.6-meter wide and 600-meter long one way street. A congested arterial road runs parallel to the subject street, and significant traffic pass through the street in the mornings and evenings on
weekdays to avoid congestion along the arterial. During peak hours, as many as 500 cars per hour use the street as an alternate route. Most of these cars run at speeds over the legal limit of 20 km per hour. Thus, pedestrians and cyclists using the street are exposed to the dangerous situation and the residents living along the street suffer from the noise and vibration brought about by through traffic.

Figure 1. Subject street

2.2 Activities for Traffic Safety around the Subject Street and Context of Implementation of Rat-Runner MM

In the vicinity of the subject street, residents-organized meetings have been held for the long-term improvement of traffic in the area. This triggered the city administration’s involvement into the activity and led to a TV program broadcast of the horrible condition along the residential road. The local government recognized the residents’ activity as “the Committee for Traffic Safety of Kokubunji Koko Higashi Dori Street” in a city bylaw that led to the setting up of a system of cooperation between the local government and the. The participants at the committee meetings include around ten residents, officers of the city government, a private consultant, and academic staffs including the authors of this paper.

In 2006, the committee decided to conduct social experiments of traffic safety measures with a subsidy from The Ministry of Land, Infrastructure and Transport. It was decided that the experiments involve the implementation of three safety measures: (1) Rat-runner MM, (2) speed humps, and (3) chokers (Yoshida et al. 2007). The following chapter explains details of the Rat-runner MM experiment.

3. APPLICATION OF MOBILITY MANAGEMENT METHODOLOGY

3.1 Application of Communication Methods Used in MM for Rat-Runner MM

A variety of communication measures are commonly used by MM programs mainly to encourage shifting from car use to public transportation. The study adopted three communication measures into the Rat-runner MM experiment. These are (1) information, (2) request, and (3) behavioral plan. Table 1 shows a comparative table for the original usage of
each communication measure in most MM programs and the ways to implement them in the Rat-runner MM.

### 3.1.1. Information

“Information” is a technique that provides drivers various types of information related to transportation so that they change their attitude and behavior in their trips. In most MM programs, administrators supply, for example, individualized time tables and route maps of public transportation to households in order to encourage public transportation usage instead of private cars; they aim to make people realize that it is not difficult to refrain from using private cars. The information technique in general MM programs includes enhancing drivers’ moral consciousness regarding the facts of social demerits caused by car use, like environmental problems and traffic congestion. The intention is for drivers to start to think: “we should reduce private car use”.

<table>
<thead>
<tr>
<th>Communication Method</th>
<th>General MM Programs</th>
<th>Applied Methods in the Experiment of Rat-Runner MM</th>
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<tbody>
<tr>
<td>information</td>
<td>To provide time schedule and route maps of public transportation intending to encourage modal shift</td>
<td>To tell rat-runners that pedestrians and cyclists suffer from them, and to appeal their moral consciousness</td>
</tr>
<tr>
<td></td>
<td>To claim moral consciousness regarding environmental issues by car use</td>
<td>To tell the travel time both by the target street and by arterial roads surrounding the target street</td>
</tr>
<tr>
<td>request</td>
<td>To request “smart car use”</td>
<td>To ask to quit using the target street</td>
</tr>
<tr>
<td>behavioral plan</td>
<td>To ask trip makers to develop a travel plan, “when, where, and how to change your behavior”, intending to make them form “Behavioral Intentions”</td>
<td>To ask to describe an alternative route to the target street and the departure time in case of passing through the alternative</td>
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</table>

In the Rat-runner MM experiment two kinds of factual information were provided: (1) nuisances to neighborhoods caused by through traffic and (2) travel time comparisons between routes using the subject residential street and using the arterial roads around the subject street. Drivers were given information on nuisances to the residents, including dangers and risks to people living along the street, pedestrians, and cyclists. A child’s message in his own writing and a resident’s comment were also provided so that drivers become aware of their moral consciousness. Meanwhile, the travel time comparison was provided so that drivers would recognize that their travel times when using the subject street are not significantly shorter than when using the arterial roads. It was expected that when the drivers recognize the marginal merit of passing through the residential street, they would return to using the arterial roads.

### Request

The “request” technique is defined as a supplement to the information technique. As its name suggests, the request technique conveys the intentions of MM administrators to drivers and requests them to change their behavior to meet these intentions. In most MM programs,
administrators ask drivers to try “smart car use,” such as stopping the use of cars when it is not essential. When the request technique is used, it is recommended that drivers receive a multidimensional message, in other words, a message including both the merits and demerits of private car use like the following statement: “the car is a very convenient tool, but car use produces a variety of problems in the society.” It is presumed that drivers would feel antipathy when they recognize only one-sided messages such as “to drive cars is not good”.

In the experiment, we requested the drivers “to stop using the Koko Higashi Dori Street as a bypass route,” in addition to the information provided in the “information” technique. The “request” was accompanied with statements recognizing the present traffic congestions along arterial roads in the area and travel time savings achieved by using the residential street as a detour, so that the drivers recognized multidimensional messages.

**Behavioral Plan**

The “behavioral plan” is a technique for influencing individuals to change their travel behavior. The way to apply this technique is to ask individuals questions about formulating a “behavioral plan,” that is the time, place, and modes they would change regarding their travel behavior. This procedure aims to develop concrete plans to change travel behavior by responding to these questions. In most MM programs, individuals are asked to envision a certain situation, for example, in case they change their commuting mode from private car to public transportation. Individuals then are able to plan concrete behavioral change by identifying specific train stations and/or bus stops they would use, and considering the departure time they have to leave in case they use those train stations and/or bus stops. The application of the behavioral plan in the Rat-runner MM is that rat-runners were asked to answer which arterial road route they would use and what time they would need to depart in case they give up running through the subject street.

**3.2 Difference between General MM and Rat-Runner MM**

In general, MM programs have been implemented by national and local governments to mainly promote a shift from private car use to public transportation. In those MM programs, administrators tell drivers social demerits by cars such as environmental problems and lost time caused by traffic congestion. These issues represent externalities that damage overall society including the drivers themselves. On the other hand, in the Rat-runner MM experiment, social demerits are conveyed to rat-runners by the residents, who suffer directly from the negative impacts of through traffic. The implementation structure is clearly different from general MM programs.

**4. IMPLEMENTATION OF RAT-RUNNER MM EXPERIMENT**

**4.1 Distribution of Communication Tools**

In the Rat-runner MM, two kinds of communication tools were distributed to the rat-runners who pass through the street. The first tool is the “awareness raising leaflet,” of which contents are the above mentioned factual information and request. The second is a questionnaire sheet that asks the drivers to develop their future behavioral plan. There were two ways to distribute the tools. One involved residents living around the street handing the tools to each driver on
the street when they stopped at a red light. The other involved questionnaires placed in every mailbox of an apartment block, residents of which could use the street as a bypass because of the location of the apartment. One month after the first distribution, a follow-up survey was conducted on respondents in the apartment block who offered cooperation to observe the behavioral change. Table 2 describes the summary of distributed communication tools and returned questionnaires.

<table>
<thead>
<tr>
<th>Table 2. Distribution and collection of communication tools</th>
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<tbody>
<tr>
<td><strong>Target</strong></td>
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<tr>
<td>drivers on the subject street</td>
</tr>
<tr>
<td></td>
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<tr>
<td>drivers living an apartment nearby</td>
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<td></td>
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4.2 Awareness Raising Leaflet

Actual Experiences from Several Points of View

This section introduces the contents and the process of drafting the awareness raising leaflet. The first content of the leaflet is factual information of experiences on the subject street of several persons: an elementary school boy who walks the street every day for the school, a woman who lives along the street, and a man who caused a car accident on the street. The intention was for the drivers to become aware of these experiences for them to appreciate the sense of morality by telling them about the dangerous situation along the street. The elementary school boy wrote about his horrible experience on the street where he witnessed his friend being involved in an accident there. The composition was shown on the awareness raising leaflet in his hand writing. The woman living near the street gave a message that she always feels danger there. The man who caused an accident on the street explained the situation at the time of the accident and appealed for the necessity of safe driving. A sentence was added to the compositions of dangerous experiences stating: “your careless driving could make pedestrians and cyclists fearful in some cases” so that the message drivers receive can have multiple aspects and not have the singular meaning of just “cars passing through the road are evil”.

Verification of Bypass Routes and Measurement of Travel Time

The second factual information are comparisons of travel time between bypass routes and arterial road routes. Drivers were shown that travel time of bypass routes is not dramatically shorter than that of arterial road routes (Figure 2). The following part explains how the travel time information was developed.

At first, the researchers identified where the rat-runners came from and to where they went via the subject street, to introduce appropriate alternative routes consisting of arterial roads. Plate numbers and running directions of passing cars were observed on 16 intersections in an area of about 4 square kilometers surrounding the subject street during 7:00 a.m. to 8:30 a.m. on a weekday, which is the peak hour. Cross-checking the plate numbers observed at each intersection, it became clear that the rat-runners passed through mainly two bypass routes: (1)
from north to south direction route and (2) from west to south direction route. According to the result, 2 corresponding alternative routes were developed.

### Comparisons of Travel Time

![Figure 2. Comparisons of travel time shown in the awareness raising leaflet](image)

Secondly, the travel time of the two rat-runners’ routes and the arterial road routes were measured by driving along these routes during the morning peak hour on a weekday. Two cars started at the same point where one car traveled through the rat-runners routes and the other passed along a corresponding arterial route. Both cars had the same destination point and each travel time was recorded upon reaching this destination. The process was conducted twice on each route set. Figure 2 shows the travel time comparisons. The figure shows that rat-runners’ route 2 did not save travel time at both cases. The second data from route set 2 was selected for information listed on the leaflet due to the smaller difference between travel times. The second data of route set 1 was also selected to conform with the recording time of the data of route set 2.

### 4.3 Questionnaire with Behavioral Plan Sheet

The second communication tool is a questionnaire that included a behavioral plan sheet. Its main question items are respondents’ use of bypass routes, impression on the awareness raising leaflet, and a behavioral plan for not passing the subject street. In developing behavioral plans, the respondents drew an alternative route along arterial roads on a map, and indicated the departure time when using the new route. It is aimed to encourage the behavioral change to not use the bypass routes. There is also a statement that asks respondents to refer to the information of travel time comparisons on the awareness raising leaflet before making their behavioral plans. A ballpoint pen and a stamped addressed envelope were included with the questionnaire sheet. The next chapter explains outcomes of the experiment.
5. CONVERSION OF RAT-RUNNERS TRAVEL BEHAVIOR AND ATTITUDE

5.1 Traffic Volume

Figure 3 explains the transition of traffic volume on the subject street taken before and after the Rat-runner MM experiment. The word “truck” means trucks including light trucks, and “car” means all cars except trucks. The graph shows traffic volume on a day 1 week before the experiment, on the experiment day, 1 week after the experiment, 4 weeks after the experiment, and 6 weeks after the experiment during 7:00 a.m. to 9:00 a.m. The volume observed 1 week before the experiment is 868, on the experiment day is 851, 1 week after the experiment is 763, and 4 weeks after the experiment is 775. This data indicates that the traffic volume after the experiment is about 10 percent lower compared to the previous volume. Results suggested that some of the rat-runners who received the communication tools quit using the subject street. In fact, a major beverage maker provided information that their commercial vehicles have stopped passing through the subject street after they heard about the experiment from one staff who received the communication tools.

![Traffic Volume counted during 7:00 a.m.~9:00 a.m.](image)

5.2 Conversion of Behavior and Attitude Observed from Questionnaire Survey

In the questionnaire survey, the researchers inquired about the purpose of the trip, the frequency of using the subject street, recognition of using the subject area, and so on, as well as future behavior plans. This section analyzes the effect of the experiment with describing these questionnaire results.

Attributes of the Rat-Runners

At first, attributes of the rat-runners who responded the questionnaire are described. From the viewpoint of the purpose of the trip, 66.4% of the respondents used the street for “commuting to office or school,” and this accounts for the highest proportion of trips as shown in Figure 4. The second largest number of trips is “business” with a share of 22.8%. Next, to the question about utilization of the subject street, 86.3% of the respondents replied “I have used the street for a long time” as shown in Figure 5. It suggests that most of the rat-runners used the street over a long duration. In contrast, people who replied “I used the street for the first time” only had a 2.7% share. To the question about frequency of using the street, 57.3% replied “almost every day,” as shown in Figure 6.
Awareness of Nuisance Caused by Rat-Running

In order to verify the effect of the awareness raising leaflet, drivers were asked about awareness of nuisances caused by their rat-running behavior after they read the awareness raising leaflet. To the question “what do you think after reading the leaflet?” 23.3% of respondents replied “I didn’t know that the passages of cars make nuisances”. 47.5% respondents replied “I knew the nuisances a little bit but this is more than.” This fact indicates that the leaflet made over 70 percent of the respondents aware the nuisances by rat-running. These results are shown in Figure 7.

Feasibility of Behavioral Plan

After the respondents made their future behavioral plan where they stated that they will not use the subject street, the respondents were asked about feasibility of the plan. People who
replied “it’s feasible” comprised 41.5 %. The share of people who replied “It’s not feasible because of business hour” is only 10.8%. These results are shown in Figure 8.

**Figure 7. Awareness of nuisance**

**Figure 8. Feasibility of future behavioral plan**

**Intention to Stop Using the Subject Street**

In addition to the feasibility of the behavioral plan, we asked about their intention regarding the subject street. Figure 9 shows replies to the question “what do you think you will do about passing the street?” The share of individuals who replied “I try to not use it as possible” is 25.1%, while the share of those who replied “I will use the street, but will slow down” is 57.5%. There are also 2.7% respondents who replied “I will never use it.”

**Figure 9. Intention to stop using the subject street**
Drivers’ Behavior Change One Month Later

One month after distribution of the communication tool, a second survey was conducted for the residents of an apartment block who answered “I use the subject street as a bypass” at the time of first survey. Table 3 shows relationship between answers about the intention of using the subject street at the time of the first and second surveys. The table shows that 10 out of 13 individuals who replied “I try to not use it as possible” in the first survey have actually given up or reduced their use of the subject street. Moreover, 10 out of 15 individuals who replied “I will slow down” have improved their driving behavior.

Table 3. Answer to the questionnaire and behavioral change a month later

<table>
<thead>
<tr>
<th>Intention of using the subject street at the time of the experiment</th>
<th>Actual behavior 1 month after the experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have totally given up using the street</td>
<td>I have given up using the street as far as possible</td>
</tr>
<tr>
<td>Never use</td>
<td>0</td>
</tr>
<tr>
<td>I try to not use it as possible</td>
<td>5</td>
</tr>
<tr>
<td>I will slow down</td>
<td>1</td>
</tr>
<tr>
<td>I won't change my behavior</td>
<td>0</td>
</tr>
</tbody>
</table>

5.3 Summary of Conversion of Rat-runners’ Behavior and Attitude

From the traffic count, it was found that traffic volume on the subject street decreased by about 10% during 7:00 a.m. to 9:00 a.m. after the Rat-runner MM experiment was conducted. From questionnaire surveys, it was found that over 70% of the rat-runners who received communication tools and replied to a questionnaire became aware that passing through the residential street instead of major roads make nuisances to the neighborhood. Over 40% of the respondents said that it is feasible for them to act along their future behavioral plans to not use the subject street. Meanwhile the respondents who said “I will never use the street,” which were only 2.7%, over 80% of the respondents said they will improve their behavior related to the subject street in some way. From the answers to a questionnaire conducted one month after the experiment, it was found that rat-runners who promised behavioral changes actually improved their behavior.

6. EASE OF PARTICIPATION FOR ACTIVE RESIDENTS

6.1 Measure Being Easy to Participate

In the previous chapters, the impacts of the Rat-runner MM on a residential street were analyzed and it was found that the Rat-runner MM brought about positive effect on the street. In this chapter, the ease of the Rat-runner MM for “residents who are active to participate in traffic calming” is considered. Even if a measure against through traffic provides positive effects, implementation of the measure would need consensus building process between
residents who agree with the measure and those who disagree. The consensus building process may be perceived as a burden to both the residents who agree and disagree, and such a measure would not be easy to conduct by active residents. In view of the issue, the ease implementing the Rat-runner MM was verified by analyzing the awareness of residents living along the subject street.

6.2 Resident Attitude Survey

An attitude survey was conducted to understand residents’ attitude and preference on measures against traffic problems in the subject street. The survey method uses a questionnaire, and the targets were heads of households in the area shown in Figure 10. This is an area in the community where residents were taking the initiative in conducting the social experiments including the Rat-runner MM experiment. The questionnaire was distributed by having it dropped into each mailbox by laboratory students, and it was collected by mail using a postage free envelope. After the time limit of the collection, a follow-up survey was conducted for the heads of households who did not reply. Table 4 shows the summary of distribution and collection of the questionnaire.

<table>
<thead>
<tr>
<th>Survey date</th>
<th>10/01/2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up survey date</td>
<td>10/10/2006</td>
</tr>
<tr>
<td>Number of distributed questionnaires</td>
<td>379</td>
</tr>
<tr>
<td>Number of collected questionnaires</td>
<td>229</td>
</tr>
<tr>
<td>Collection rate</td>
<td>60.4%</td>
</tr>
</tbody>
</table>

Table 4. Distribution and collection of resident attitude survey

As mentioned in Chapter 2, three measures were tested as social experiments; (1) Rat-Runner MM, (2) speed humps, (3) chokers. These three measures were implemented at
different times, and the questionnaire survey was conducted between the first day and the second day of the Rat-runner MM experiment - before implementation of speed humps and chokers.

6.3 Difference of Preference to the Rat-runner MM and Other Hard Measures between Participants and Non-participants in the Resident Committee

Difference Attitude to each measure between Participants and Non-participants in the Resident Committee

In the resident attitude survey, residents were asked what they thought about the Rat-runner MM, speed humps, and chokers. Replies to these questions were counted and classified into two categories: replies from residents who are members of the Committee for Traffic Safety of Kokubunji Koko Higashi Dori Street, where participants have discussed traffic safety measures, and replies from residents who are not members of the committee (Figure 11). If there are significantly different opinions between these two groups, these measures needed careful consensus building processes before permanent implementation.

On the Rat-runner MM, 22.2% of the committee members and 32.7% of the non-committee members said “I have great hope in it.” Individuals who said “I have some hope but it would be hard to continue” were 44.4% of the committee members and 40.6% of the non-committee members. Individuals who replied “I don’t think enhancing drivers’ moral consciousness is effective” comprise 27.8% of the committee members and 24.3% of the non-committee members. According to the results, there are no significant difference between the committee members and non-committee members on opinions about the Rat-runner MM at the 5% level.

![Figure 11. Residents’ opinions about the Rat-runner MM](image)

The opinions on speed humps are described on Figure 12. On the implementation of speed humps, 80.0% of the committee members said “I have great hope in it” while just 43.7% of non-committee members stated the same. This non-committee members’ proportion is significantly smaller than that of the committee members at the 5% level ($\chi^2=9.63$, p=0.002). On the other hand, individuals who replied “Car speed would slow but I’m worried about noise and vibration” are 20.0% among the committee members and 37.7% for non-committee members.
I have great hope in it
Car speed would slow but I'm worried about noise and vibration
It's not effective
others

Figure 12. Residents’ opinions about speed humps

On the implementation of chokers, 73.3% of the committee members replied “I have great hope in it” while 42.4% of the non-committee members replied the same as shown in Figure 13. The proportion of individuals who said “I have great hope in it” to the committee members was significantly greater than the proportion for non-committee members. This outcome is similar to that for the implementation of speed humps ($\chi^2=5.84$, p=0.016).

These results indicate that there are no significant differences about opinions on the Rat-runner MM between the committee members, who had participated in the implementation of the social experiments, and the non-committee members. On the other hand, in the implementation of speed humps or chokers, more committee members have great hope than the non-committee members, and a higher proportion of the non-committee members were concerned about the side-effects of these hard measures when compared with committee members.

Difference between Committee and Non-committee Members Viewed from Free Answers

In this section, responses to an open question about the 3 measures planned for the social experiments were analyzed. This is to verify if there were oppositions about the Rat-runners in detail because there was no alternative which mentioned side-effects in the question about the Rat-runner MM, unlike questions of speed humps and chokers. Concerns and oppositions could then be stated as replies to the open question, and then free answers about the Rat-runner MM, speed humps, and chokers could be examined.
Free answers about each measure were divided into 5 groups: (1) agreement with implementation, (2) proposal of additional measures, (3) idea that the proposed measure is meaningless, (4) proposal of different measures, and (5) opposition or worry. These were further classified into 2 categories: (1) opposition or worry and (2) others; Figure 14 shows classified data according to the groupings. On the Rat-runner MM, there is no opposition or worry stated in the free answers of both the committee members and the non-committee members. On the speed humps, there is a free answer of opposition or worry of the committee members and 5 ideas of opposition or worry in 16 free answers of the non-committee members. On chokers, there are 3 ideas of opposition or worry in 3 free answers of the committee members and 17 ideas of opposition or worry in 29 free answers of the non-committee members. From the analysis, it was found that there is no opposition or worry about the Rat-runner MM in free answers of both the committee members and non-committee members, unlike other hard measures like speed humps and chokers.

![Figure 14. Difference of the number of worry and opposition](image)

7. CONCLUSION

In this research, a soft measure against through traffic, the Rat-runner MM, was proposed and examined for its effectiveness. It was found that traffic volume on a subject residential street decreased by about 10% after an experiment employing the Rat-runner MM. From the questionnaire survey to the rat-runners, it was found that the communication tools distributed during the experiment made the rat-runners aware that through traffic causes nuisances to neighborhoods. A follow-up survey conducted one month after the experiment suggests that rat-runners who promised behavioral changes actually improved their behavior. Further, from a resident attitude survey, it was found that the Rat-runner MM did not face any resistance unlike the experience with other hard measures such as speed humps and chokers. These outcomes suggest that the Rat-runner MM is a comparably easy measure to implement when there are residents who are actively participate in the traffic calming process. Future challenges from this research will include the verification of the continuity or sustainability of the traffic reduction effect and the examination of the impact of individual communication methods which were used at that time of the experiments.
ACKNOWLEDGEMENTS

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REFERENCES


