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# Safe school ways by implementing school travel plans in primary schools in Vienna

Evaluation report of an intervention on the prevention  
of child pedestrian injuries in Austria



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## **Explanatory note**

This deliverable is one result of the grant agreement for an action, agreement number 2004119, work package no. 5 (WP5): Initiatives for interventions of the Public Health Sector to prevent accidents among vulnerable road users.

According to the contract WP5 has evaluated an implemented intervention on the prevention of child pedestrian injuries in Vienna, Austria (AT).

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# 1 Introduction

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The school surroundings are considered a particularly problematic area in terms of traffic safety. The conflicts between the various participants appear in numerous forms. It is mostly the traffic itself and the road as such that are the trouble makers, not so much the behaviour of children and teenagers. Of course, the children must undergo a schooling in order to be able to handle the current traffic situation but such a schooling doesn't release the municipalities from their responsibility when it comes to making the roads safe for all traffic participants.

The present report „Safe school ways by implementing school travel plans in primary schools in Vienna” aims to evaluate an intervention on the prevention of child pedestrian injuries in AT in order to show the effect of the initiative of school travel plans in primary schools in Vienna. This report is one of the deliverables of the work package „Initiatives for interventions by the public health sector to prevent accidents among vulnerable road users (VRU)”, which is part of the umbrella project “Strategies and best practices for the reduction of injuries (APOLLO)” led by the University of Athens. APOLLO is co-financed by the European Commission, DG SANCO within the Public Health Programme 2003-2008.

For years, attempts at district level – with rather varying degree of success – were made to enhance safety in the close vicinity of (primary) schools in Vienna even without a school travel plan but by implementing numerous measures (organization of traffic, structural measures concerning traffic engineering etc.). For instance, following an internal directive, the Magistrate Department 46 (MA 46) painted a red border around all pedestrian crossings/zebra crossings without traffic lights and which were located in the immediate vicinity of all schools, adding a signpost “School route” (“Schulweg”) in order to alert car drivers.

A fundamental element in school travel safety planning is a school travel plan. This is a map for pupils of primary schools showing dangerous spots and recommended school travel routes in school surroundings. Such a plan originates from accidents analysis, data provided by authorities, interviews with parents and inspection of the danger spots and it must provide clear recommendations for a 'safe' school trip.

The experts at KfV noticed a positive side effect of the joint inspection of the school environment, where the joint presence of technical experts and decision makers made it possible and contributed to the implementation of traffic engineering measures for enhanced traffic safety in locations which lie outside the examined school routes.

In 2002, the Austrian Road Safety Board (KfV) together with the General Accident Insurance Company (AUVA) and the City of Vienna/Magistrat Dpt 46 (MA 46) initiated

an attempt of enhancing safety of children's school trips by generating school travel plans for three primary schools in Vienna. By now, 2/3 of 280 public and private primary schools are equipped with a school travel plan.

In principle, the school travel plan is to be regarded as a sensible instrument which primarily serves as a control device (regulating the order of processing) since the financial and personnel resources allocated annually are limited. A good 10% of the measures carried out are of a structural nature and need 2 to 3 years to be implemented. The largest part of the implemented measures are traffic engineering interventions: road markings, partly a re-do of old, faded markings and/or erection of additional signs and, in a few cases, also traffic organizational measures (introduction of 30km/h speed limit or one way road regulation etc.).

Many such measures have already been implemented by the selected primary schools in the 2nd and 3rd district; in the 9th district, the corresponding (additional) traffic organizational measures of traffic engineering are bound to be prepared in the course of the current generation of the first school travel plans. The involved school authorities are looking forward to the execution of those plans.

The actual study as a part of an EU-project<sup>1</sup> was followed by an evaluation of the school travel plans with respect to their contribution to traffic safety of school children. In the evaluation, detailed information (on traffic behaviour, existing danger spots in school surroundings, etc.) as well as particular operations (keeping within the recommended school travel routes) or comments on the feeling of subjective safety (on the route to school) were sampled with the aid of questionnaires. The sample included 340 parents of primary school children in 6 primary schools and in order to ensure comparability, half the children come from schools with (as yet) no existing school travel plan.

Another around 400 behaviour monitorings in primary schools will provide information about children's actual behaviour with regard to crossing the road (zebra crossing) and road crossing options (recommended route to school).

Finally, the current study will also examine the intermediate construction changes in the school surroundings. Various authorities (teachers, traffic experts of AUVA, KfV, MA 46) who participated in designing and establishing of school travel plans will be questioned with respect to their estimation of the effectiveness and acceptance of the school travel plans.

In this context it must also be stated that all the primary schools involved – both with and without school travel plans – managed to establish active crossing guard services (performed by purpose-trained pupils, senior citizens or police staff members).

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<sup>1</sup> s.o.

## 2 Background

### 2.1 Children's Accidents and Accidents on the Way to School

In Austria, more than 4.000 children p.a. between the ages of 6-15 years are involved in a traffic accident. Of this number, about 30% are schoolchildren aged from 6-10 years. About 15% of these schoolchildren have an accident on their way to school. In Vienna, 3-5 schoolchildren p.a. are injured in a road accident on their way to school.

Injured children (0-14 years.)	2004	2005	2006	2007
Vienna	562	590	547	504
Austria	3.850	3.651	3.568	3.617

Fig. 1: Children accidents and accidents on the way to school in Austria

	2005	2006	2007
Kinderunfälle (Kinder: 0 - 14 Jahre)	3.273	3.283	3.346
Verletzte Kinder	3.651	3.568	3.617
Getötete Kinder	25	23	13
darunter als Fußgängerin, Fußgänger	10	7	3
mit Spiel- und Sportgeräten	-	1	-
mit dem Fahrrad	3	-	2
im Pkw	11	14	7
davon gesichert	6	11	4
ungesichert	5	3	3
Schulwegunfälle (Schulkinder: 6 - 15 Jahre)	387	437	423
Verletzte Schulkinder	465	463	455
Getötete Schulkinder	3	2	1

Source: Statistics Austria, road accidents statistics (website)

Altogether, the numbers of the injured children (0-14 years) dropped in Vienna within the last three years (Statistics Austria). The fortunately low number of casualties among the schoolchildren on the way to school is not conclusive when judging the effectiveness of school travel plans. Nevertheless, it would be false to imply that, as a rule, traffic safety is very high in the area of schools. It mustn't be ignored that this relatively high level of safety is being achieved every single day by the activities of escorts or employees of the executive in the immediate environment of the schools (in the form of pilot services). And many parents, too, do their best (by escorting their

children) to ensure a safe passage to school. The school travel plan is an important instrument supporting worried parents.

This engagement proves the safety deficit in daily practice in this area, though. It underlines the need to implement effective structural or traffic regulating measures for the increase of traffic safety in the school environment. The school travel plan raises consciousness of adults and children about traffic safety issues also outside the immediate school environment. To prove this might require a different examination, though.

## 2.2 The School Travel Plan – an Instrument of Road Safety

The school travel plan is an instrument for enhancing the traffic safety of children on their way to school. An exact analysis of the traffic situation alongside the most commonly used school roads enables the implementation of traffic regulating and traffic engineering measures which will eventually eliminate or at least mitigate the danger spots and consequently reduce the number of accidents.

Such measures can stretch from the easy-to-apply ones such as the trimming short of hedges and bushes to enable a better view, over to the quick-to-apply ones such as new or complementing road marking (a “Children” road sign, for instance) to the more complex and expensive ones including construction measures such as construction of pavement build-outs, lane separators, installation of signalling equipment or bicycle lane facilities. The latter takes place in the medium to long term.

The danger spots within the school travel plans where special attention is required can be highlighted in the meantime.

### ■ The Content of a School Travel Plan

The specific school travel plan for primary schools in Vienna, which is printed in A3 format, consists of a variety of information addressed to school children. Next to a short introduction with tips for children on how to behave in traffic, it includes a graphic illustration (marking) of recommended roads for the trip to and from school and the identification (partly using photographs) of danger spots and road sections requiring particular attention.

Fig. 2: School travel plan for a primary school at Petrusgasse 10; 3rd district (example)



**Liebe Eltern!**

Wir alle sehen eine wichtige Aufgabe darin, für einen sicheren Schulweg unserer Kinder zu sorgen. Die Eltern, die AUVA als soziale Unfallversicherung, die Bezirksvorstehung und die MA 46 als Gestalter der Verkehrssicherheit.

Daher befragen wir laufend die Eltern aller Wiener Volksschüler über den Schulweg ihrer Kinder.

Unsere Sicherheitsfachleute suchen immer noch dem sichersten Weg und nach Möglichkeiten, Gefahrenstellen zu beseitigen.

Das Ergebnis dieser Arbeit ist der Schulwegplan für Ihr Kind. Die Daten aus den Fragebögen werden aber auch von den Bezirken für bauliche Verbesserungen am Schulweg genutzt.

**Bitte besprechen und üben Sie den sichersten Schulweg für Ihr Kind mit Hilfe dieses Plans!**

**Sicherheitsberatung**

Die AUVA als soziale Unfallversicherung für Schüler hat den gesetzlichen Auftrag, Maßnahmen zur Unfallverhütung zu setzen.

Nach Unfällen in der Schule oder am Schulweg sorgt sie auch für Leistungen wie die Übernahme der Behandlungskosten, Rehabilitation und Entschädigungen. Zur Sicherheitsberatung von Schulen und Schülern stellen wir Unterrichtsmaterial und Lehrbehalte zur Verfügung. Auch für Eltern und Kinder gibt es Informationen.

Wenn Sie Fragen zur Sicherheit in der Schule und am Schulweg haben, wenden Sie sich bitte an uns:

**AUVA**  
Ing. Bernard Pfandler  
(01) 39 1 33 DW 297  
bernard.pfandler@auva.at

**MA 46**  
Dipl. Ing. Gabriele Steinbach  
(01) 811 14 92 998  
gabriele.steinbach@wien.gv.at

**Liebe Kinder!**

Der Schulweg ist oft der erste Weg, den ein Kind allein im Straßenverkehr zurücklegt. Leider sind noch immer zu viele Kinder auf diesem Weg in Gefahr. Mit etwas Übung lassen sich die Gefahren besser meistern. Beachte die folgenden Tipps!

**Schulweg sicher üben!**  
Übe den Schulweg gemeinsam mit vorbildlichen Erwachsenen, bis du dich sicher fühlst und auch alleine zurecht kommst.

**Fehler nicht nachmachen!**  
Kinder lernen viel von den Großen. Aber manche Erwachsene machen sehr schwere Fehler. Mache ihnen nicht alles nach, denn du weißt bald besser, was sicher ist.

**Gehen ist gesund!**  
Lass dich mit dem Auto zu einer sicheren Aussteigefleite bringen und nicht genau bis zum Schulfür. Dort dort das Auto überhaupt stehen bleiben? Wenn das viele machen, gibt es einen Verkehrsstau und noch mehr Gefahren. Steig dort aus, wo es sicher ist, und geh ein Stück.

**Nimm dir Zeit!**

Nimm dir Zeit für den Schulweg und geh rechtzeitig von zu Hause fort. Dann brauchst du nicht der Straßenbahn nachzulaufen. Du hast auch genug Zeit zu warten, bis alle Autos vorbeigefahren sind.

**Sicher über die Ampelkreuzung**  
Du gehst gerade mitten auf einer Kreuzung - plötzlich wird die Fußgängerampel rot! Geh flott weiter. Du brauchst keine Angst zu haben: Ampeln sind so eingestellt, dass du über die Straße kommst bevor die Autos wieder grün bekommen.

**Sicher am Zebrastreifen**  
Bei einem Zebrastreifen bleiben nicht alle Autofahrer sofort stehen, wenn du hinübergehen möchtest. Warte bis alle Autos stehen - in beiden Richtungen - und geh erst dann los.

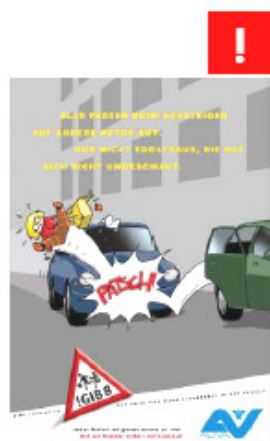
**Ausstoben**  
Wenn du noch langem Sitzen in der Schule nach Hause gehst, möchtest du dich endlich bewegen und laufen. Geh auf einen Spielplatz! Dort gibt es keinen gefährlichen Straßenverkehr.

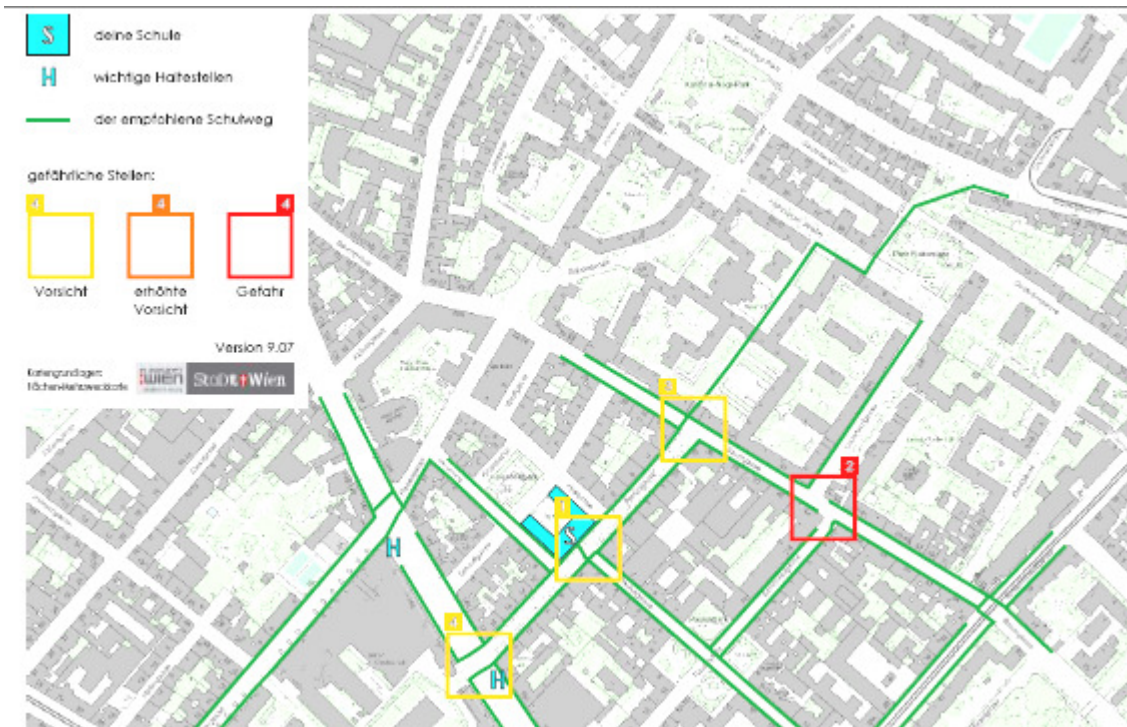


**S** Petrusgasse 10

Das Schülereinzugsgebiet erstreckt sich über die vom öffentlichen und privaten Verkehr stark frequentierte Landstraßer Hauptstraße. Dieser Verkehrsweg stellt eine erhöhte Anforderung an Ihr Kind, wenn es diesen auf dem Weg in die Schule oder am Heimweg queren muss. Es ist im Sinne der VolksschülerInnen sehr empfehlenswert, den Schulweg und hier vor allem das Überqueren aller Straßen und Kreuzungen intensiv zu üben. Es ist notwendig, sich auch vor dem Überqueren eines Zebrastreifens zu vergewissern, dass herannahende Fahrzeuge rechtzeitig anhalten.

Achten Sie auch darauf, dass Ihre Kinder rechtzeitig die Wohnung verlassen, damit sie den Schulweg in Ruhe und mit der notwendigen Aufmerksamkeit zurücklegen können.





1



Kreuzung Petrusgasse Paulusgasse: Die Petrusgasse ausschließlich beim Schließen überqueren und dessen Anweisungen unbedingt befolgen.



2



Kreuzung Leohainergasse Baumgasse Schimmelgasse: Keinerseits die Fahrbahnen der Leohainergasse und Baumgasse queren. Es sind die auf dem Schulwegplan empfohlenen Wege zu benutzen.



3



Kreuzung Petrusgasse Baumgasse: Überquere die Baumgasse nur am Zebrastreifen! Bleib am Fahrbahnrand stehen, schau den Autofahrern in die Augen und gehe erst los wenn das Fahrzeug angehalten hat.



4



Kreuzung Landstrasser Hauptstraße Petrusgasse: Benutze unbedingt die auf dem Schulwegplan eingezeichneten Wege und achte dabei auf abfahrende Fahrzeuge.



## ■ Preparation of the School Travel Plan

### **Selection Criteria for schools to be equipped with travel plans**

Basically, when choosing the schools, to be equipped with travel plans, priority is given to those which display a high number of casualties within the school catchment area and/or show a problematic school surroundings environment from the point of view of a strong volume of traffic, high velocity problem, dangerous crossings, narrow pavements or lack of safe pedestrian and bicycle path interconnections. For this purpose, an analysis of all the accidents involving casualties registered by the police must be conducted beforehand. If within the last few years structural changes were carried out in the area, then these have to be taken into account since the accident source may have already been removed.

Co-operation with the school administration is essential when generating school travel plans. Experience has shown that if the school administration, head of school, teachers, parents and children actively participate, a high rate (~ 70%) of return of required questionnaires is obtained (KfV 2002, 2007). This again is an important quality issue when generating a school travel plan. The evaluation of the questionnaires helped – among other things – to capture the routes to school used by children and to identify the corresponding danger spots. These spots are clearly marked in the school travel plan. In the next step, such danger spots will be eliminated with the aid of appropriate construction or traffic regulation measures within existing legislative, technical and financial possibilities.

In Vienna until recently, it was the district representatives and/or school authorities who initiated the distribution of school travel plans in schools with particularly problematic surroundings. Now, it is the AUVA which is aiming at providing all primary schools with school travel plans.

### **Demarcation of the monitored area**

The homes of the children serve usually as a source for the definition of area for monitoring, particularly homes of 1st grade children.

### **Parent questionnaire**

The questionnaire for the parents of primary school children helps to reconstruct the route to school using the information about the home address and the means of transportation used. Thus it is feasible to determine the particular traffic environment (foot-paths/stops/parking place) the school travel plan has to be designed for. It also enables for the parents to point to danger spots of the school route and make clear suggestions for its improvement. The questions are similar to those used in this report.

### **Standardized check list**

A standardized check list helps section by section to deliver 'subjective' judgments of

the pavements (i.e. too narrow, dangerous house entrance), the existing lane intersections and the accessibility of the bus or tram stops by the teaching personal (by each of them alone or as a result of a joint inspection with pupils within their traffic project). Each school may decide to take up this option.

### **Accident analysis**

The analysis of accidents involving casualties in the catchment area of a school is the task of MA 46 (the municipal authority department 46 in Vienna).

### **Specification of the work schedule**

Based on the previous steps and knowledge, the environment of each chosen school is to be determined and described in a work schedule. This schedule contains a cluster of places of residence of the pupils, the routes used every day, the stops of public transport if necessary, the danger spots mentioned by the pupils as well as the sites of accident according to the accident statistics where pupils were injured on their way to school within the last 3 years.

### **Inspection of the school environment by experts**

Employees of General Accident Insurance Company (AUVA), of the Austrian Road Safety Board (KfV, Institute for transportation engineering and road safety training), the Municipality/Department 46 (Dpt for road safety), representatives of district authorities, police and school authorities are provided with a work schedule. Together they inspect the critical road sections and determine those school routes that to date are considered safe; such routes are traced and pictures are taken of them. In the course of this inspection, actual and potential danger spots for the pupils are analysed – i.e. crossroads where special attention is required – and short or medium-term feasible measures for the danger reduction are laid down.

Besides the common approval of the relatively safe school routes, this committee was able to make structural and/or traffic organizational suggestions for improvement in the area of the defined danger spots early at this stage and a competent authority for the implementation (financing) could be appointed in the most cases as the experience shows (KfV 2007).

### **Preparation and press of the school travel plan**

Based on the previous steps the actual school travel plan is designed. This plan (A3-sized) shows which routes are relatively safe for the pupils in the school catchment area under present conditions. Photos and attached text highlight the danger spots which should be avoided as well as such spots where special attention is needed. Also attached to the plan are recommendations for the parents on how to practice the route to school with their children. Before the plans go to press, they are sent together with the protocol (taken during the local inspection) to the participants of the inspection for their assessment (control). Plans approved by all authorities are finally printed and at

the start of the school term (in autumn) are distributed to all pupils of the respective school.

### **Presentation of the school travel plan**

To guarantee the acceptance and comprehensibility of the school travel plan, the plans are presented to the pupils, parents and teachers by the experts involved (AUVA, KfV) in an event. As a rule, the school travel plans must be updated every year. This means that all changes of constructional and/or traffic organizational nature which has been executed in the meantime will be taken into account in the new plans designed for the next school term in autumn.

The designed school travel plans can be downloaded from the AUVA website under:

([http://www.auva.at/portal/index.html?ctrl:cmd=render&ctrl>window=auvaportal.channel\\_content.cmsWindow&p\\_menuid=63203&p\\_tabid=3](http://www.auva.at/portal/index.html?ctrl:cmd=render&ctrl>window=auvaportal.channel_content.cmsWindow&p_menuid=63203&p_tabid=3))

### **■ Financing of the School Travel Plan**

In Vienna, the price (source: 2006) of a school travel plan amounts to approx. 4.000 € of which 3/4 is contributed by AUVA and 1/4 by the district authority of the particular school. The costs cover printing and parts of the expert fees of KfV. Not included are expenses of police and Viennese administration. The municipality of Vienna/MA 41 provides the maps while the MA 46 covers the fees of the experts.

### **■ Results of the Evaluation of School Travel Plans for Secondary Schools**

The following gives some of the results of the evaluation of school travel plans for 16 primary schools (specifically, secondary schools and secondary schools for general education) in Austria; this evaluation study<sup>2</sup> was carried out by KfV two years after the school travel plans were generated.

In these school travel plans, routes to school were recommended for pedestrians and cyclists. The evaluation of school travel plans in 2007 was supposed to show whether the promised structural and traffic organization measures were actually implemented by the competent authorities. The students were also interviewed to assess their satisfaction with, and usage of, the school travel plan.

A total of 1.742 students of the 1st and 2nd grade and 1.450 students of the 3rd and 4th grade participated. 54% of students of the first two grades had 'already' heard of the school travel plan; 85% of all students had received the school travel plan from their teachers.

For almost 50% of all interviewed students, the recommended route in the school travel

<sup>2</sup> within the project "Generating School Travel Plans and Plans for Mobility Management for (Compulsory) Schools" (2007)

plan corresponds with their usual route to school. Only about 10% of them have changed their route to school in accordance with the recommendations.

Approximately 25% of the students feel safer with the school travel plan. 42% follow the plan's recommendations while 38% do not.

Many young people consider the school travel plan to be sensible (39% vs. 35%). For 90%, the school travel plan is 'easily' understood. A total of 10% of the students indicated danger spots on their way to school.

34 improvement measures were agreed upon in the course of the inspections: not all measures were executed to the full extent but, for the most part, a technical improvement in terms of traffic safety was achieved. In addition, 10 measures that were not originally planned were implemented.

In the conclusions of the study it is said that „the school travel plan is a useful instrument also if not all pupils follow the instructions. Anyhow it could be detected that a considerable amount of pupils feel safe due to the implemented school travel plans and even changed the accustomed school way”.

## 3 Method – Procedure

### 3.1 Evaluation: Aim, Criteria and Indicators

Generally, when speaking about evaluation we understand it as an assessment of measures that got examined for their effectiveness: the objectives are agreed upon and an initial survey is carried out. After that, appropriate measures for reaching those objectives are defined. In addition, measuring instruments or evaluation criteria must be developed in order to verify whether these measures have been successful. If there was an interim survey in the course of the implementation (or at the final poll), a success effect of a measure can be assessed and a new objective postulated so that the circle starts all over again. With this procedure, large areas are broken down into smaller auditable steps.

In this study, the evaluation of the school travel plans is carried out with regard to its effect on the road safety of schoolchildren, using criteria such as conscientisation of pupils and parents about the 'safe' route to school (questionnaire and behaviour monitoring) or executed measures for traffic regulation in the school environment, and the interviews of experts.

In the present study the general objective was to increase the road safety of the schoolchildren in Vienna from their homes to school with the aid of school travel plans. An evaluation of whether this goal was met by applying the list of criteria and corresponding indicators represented in the table below:

Tab. 1 Objectives, criteria and indicators for the evaluation of the school travel plans

<b>Aim:</b>	The road safety of the school children in Vienna has to be increased with the aid of school travel plans
<b>Possible criteria</b>	<b>Indicators</b>
All primary schools equipped with a school travel plan	<ul style="list-style-type: none"> <li>the number of Viennese primary schools with school travel plans increases</li> </ul>
Numbers of accidents	<ul style="list-style-type: none"> <li>the number of children involved in an accident on the way to school decreases</li> </ul>
Danger spots in school environment	<ul style="list-style-type: none"> <li>the number of implemented measures increases</li> <li>the number of mitigated danger spots increases</li> </ul>
Short/medium term measures for reduction of the number or the danger potential of the danger spots	<ul style="list-style-type: none"> <li>Increase in number of structural and traffic regulating measures that in short and medium term reduce the danger spots or its danger potential</li> </ul>

Conscientisation (estimate of danger spots) of pupils and parents	<ul style="list-style-type: none"> <li>• Increase of awareness or perception of the danger spots in the school environment</li> </ul>
Behaviour observations	<ul style="list-style-type: none"> <li>• Danger spots on the way to school are avoided or handled 'more safely'</li> </ul>
Well-being/feeling of safety of the pupils on the way to school	<ul style="list-style-type: none"> <li>• Increase of the feeling of safety (well-being) on the way to school</li> </ul>
Awareness and use of school travel plans	<ul style="list-style-type: none"> <li>• Increased number of pupils who know their school travel plan</li> <li>• Increased number of pupils who use the route to school recommended by school travel plan</li> </ul>
Reception of specific school design suggestions for planning norms for the authorities	<ul style="list-style-type: none"> <li>• specific structural and traffic regulating measures for future school environments planning became planning standard</li> </ul>
etc.	

## 3.2 Evaluation Methods

Of the common evaluation methods the following were used in the study:

- analysis (numbers of accidents, applied measures etc.)
- before-/ after evaluation (interviews with pupils without/with school travel plans)
- written interview (of teaching personnel, parents and pupils) and
- interviews (with experts, specialists)

## 3.3 Selected Criteria and Indicators for the Evaluation

In regard to the road safety, the evaluation was expected to show a reduction of probability of an accident to happen or a reduced number of accidents due to the implementation of the school travel plans. But since the number of accidents with pupil casualties registered by police is very low in Vienna – about 5 accidents on the way to school per annum in 280 primary schools – and because the period of time for a possible before/after examination should be 5 years, an evaluation of the school travel plans cannot have the expected effect on number of accidents.

Therefore, the study evaluates **organizational changes in traffic or changes in traffic engineering of the school environment**. It's the implementation of measures recommended during the school travel plan construction that is being evaluated at several primary schools after a monitoring period of 2-3 years.

Another aspect of the evaluation of school travel plans is the **conscientisation of pupils and parents for the road safety or the “safe” trip to school**. The assumption here is that pupils and parents who deal intensively with the issues of danger in traffic generally and danger on the way to school have more detailed information than pupils and parents who never before have collaborated on a preparation of a school travel plan.

Information (such as behaviour of pedestrians when crossing the road) is collected by a little field study and certain activities (i.e. if the recommended school route is being used) or statements concerning the subjective feeling of safety (on the way to school) are monitored (self-reported behaviour) by a questionnaire distributed to 340 parents of pupils (of 4th grade) of the primary schools; half of the pupils come from school where no school travel plans were generated (yet).

About 400 behaviour monitorings in front of primary schools in Vienna provide information on the actual behaviour of pupils when crossing the street and about their choice of crossing (accordingly to 'recommended school route').

In the end, **experts** who are involved in the preparation and implementation of the school travel plan (teachers, traffic engineering specialists – from AUVA, KfV, MA 46) were asked to give their assessment of the effectiveness and acceptability of the school travel plans.

### 3.4 Behaviour Observations of Schoolchildren

The complexity of the traffic reality and its understanding by children (which in the pre-school age is still lacking) require specific road safety training together with a change in attitudes of the adults in their mobility behaviour to enable effective protection for children since they are the most vulnerable link in the reality of traffic. The education authorities, parents, nursery schools and schools deal with this topic. It is important to adapt the contents and methods of the road safety training to the respective ages and abilities (KLEBELSBERG 1982).

Road safety training has been established in the teaching curriculum of Austrian schools since 1960. Every year 10 hours is the obligatory exercise required from the 1st to 4th school grade. Among other things, the curriculum offers topics such as 'traffic adapted social behaviour', 'appropriate traffic behaviour as a pedestrian and a car passenger'. 'Correct traffic behaviour of a pedestrian' is also an essential topic of the school travel plan. Instructions for correct traffic behaviour namely when crossing the road (where and how) are part of the plan as well as recommendations for safe routes to school (chosen according to certain safety criteria).

While 'road safety training' is an obligatory component of the teaching curriculum in all primary schools, the assumption of the study is (*working hypothesis*) that it is rather the pupils equipped with the school travel plan who adopt the correct traffic behaviour when crossing the road more easily than pupils without it. As for the specification of the criteria for wrong and correct behaviour when crossing the road, the findings of KfV on evaluation schema for a type derivation yielded from traffic education knowledge on the one hand and an examination design – developed by KfV as well – for monitoring of pedestrians on zebra crossings on the other hand served as a basis (LIMBOURG 2001, WÖLFL 2006).

## ■ Evaluation Scheme for the Type Derivation

Within a study by KÖRMER 2003, 155 behaviour observations were made in front of three Viennese primary schools and 16 narrative interviews with parents carried out. The obtained results provided information about the actual behaviour of children and their escorts with regard to the mode of their participation in traffic, their crossing behaviour mode and their choice of crossing. Any behaviour observation was inter-subjectively analysed, marked and subdivided into 4 behaviour types by a team of experts. This division represents a combination of similar behaviours where a Type 1 behaviour tends to be road safe and a Type 4 behaviour represents rather risky traffic behaviour. The assignment is carried out in a narrow context of traffic and structural environment where parameters of traffic engineering and traffic structure such as low/high volume of traffic, low/high velocity as well as small/easily comprehensible or large/more complex crossings/intersections are taken into consideration.

Using this type classification as a base, a minor modification was added to the study:

TYP1: unobtrusive behaviour or highly attentive behaviour of the monitored person

- crosses quietly, short look,
- consciously stops in front of the crossing,
- looks attentively in both directions,
- attentive eye contact with interacting partner (motor vehicle driver).

TYP2: minor misconduct of the monitored person

- careless crossing of the road (follows the person ahead, talking),
- crossing the road diagonally,
- running when going over the zebra crossing,
- other minor misconduct (i.e. crossing the road between jammed or slow vehicles in 1-way traffic)

TYP3: major misconduct of the monitored person

- looks one way only (in 2-way traffic)
- crosses/runs over the road right in front of motor vehicles,
- crosses between jammed or slow vehicles (in 2-way traffic)
- other major misconduct (stops on the road, turns around; jostling, pushing etc.)

## ■ Examination Design for Pedestrian Monitoring in the Area of Pedestrian Crossings

### Evaluation mode and data

Monitoring of pedestrians behaviour in the area of a pedestrian and/or zebra crossing is based on behaviour monitoring of pedestrians and drivers in a defined conflict area (see diagram).

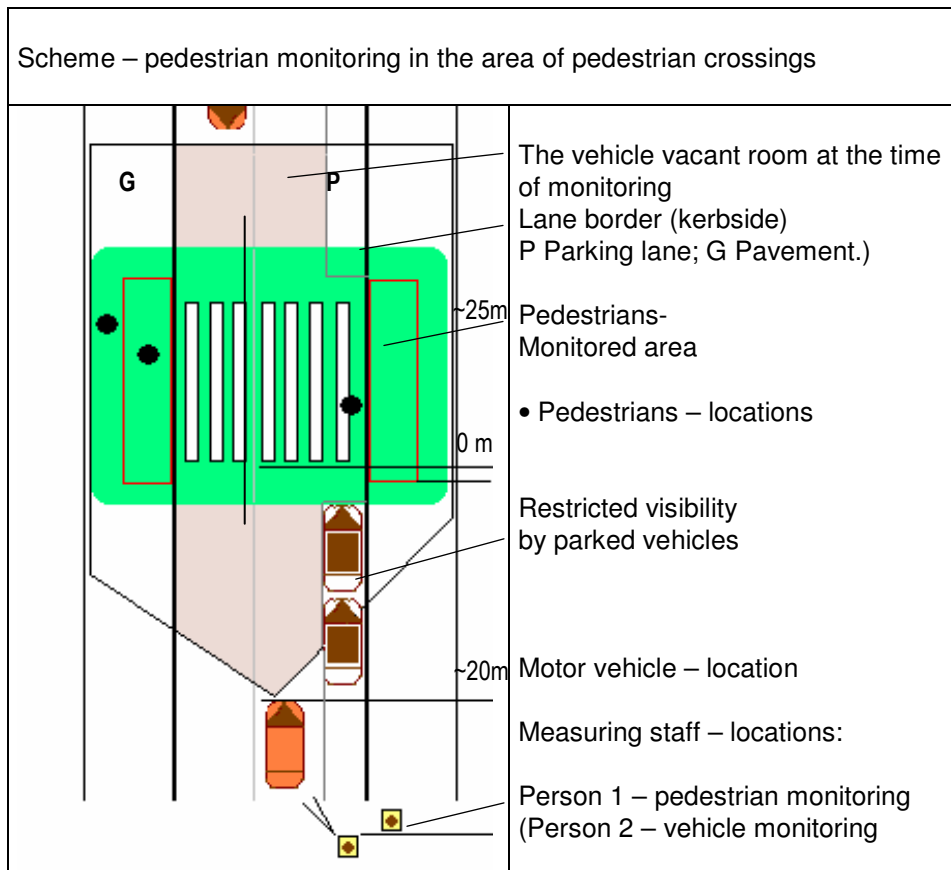
A monitoring example (a data set) in the study is established when a single person

(child or adult) or the first child in a group of people crosses a crossing within the monitored area.

Next to “Place”, “Day” and “Time” the following parameters were registered for these pedestrian monitorings (see also survey forms):

- traffic direction of the motor vehicle
- traffic direction of the bicycles (often against the traffic flow)
- existing field of view (limited by parked vehicles for instance)
- a vehicle pulls up near to pedestrian crossing – less than 30 m
- number of adults who cross the road within the monitored area
- number of children (pupils) crossing the road within the monitored area
- concrete behaviour (according to type) of monitored pedestrians

Fig. 3: Survey scheme of pedestrian monitoring



Apart from this, only a few additional parameters – i.e. a single vehicle or a group leader (first vehicle of a convoy), a vehicle turning into or off the road or a vehicle drawing nearer – can be registered by 2 observers as a rule. To be able to bring these data of interactions (pedestrians’ behaviour and the vehicle’s driver behaviour) faultlessly together for each monitored case, the observers must be in continuous detailed verbal contact; they label the monitored interactions with the same ongoing numbers.

A short 15-minute long vehicle counting in both traffic directions at the beginning and/or at the end of the behaviour monitoring gives a rough assessment of the average daily traffic and, given a short description of its location, illustrates the characteristics of the measuring job.

The measuring staff (observers) is positioned in approx. 15m distance from pedestrian crossing which largely eliminates the undesired influence their presence might have on the monitored road users.

## ■ Choice of Schools and Monitoring Locations

There are approx. 280 private and public primary schools in Vienna currently. Almost 2/3 of these primary schools are equipped with school travel plans in the meantime.

When choosing the schools for the parent interviews and monitoring (particularly of the children in front of the schools) – four essential criteria have been considered for the choice of schools:

- schools both with and without school travel plans were chosen
- to ensure the comparability of the results of the interviews and behaviour monitoring, large attention has been paid to similar infrastructural parameters (city centre/suburbs, location of the school, neighbourhood, stops of public transport, pedestrian crossings etc.);
- the daily traffic density on the streets in front of the selected schools is about 500 to at a maximum 3,500 vehicles per 24 hours.
- the school authority (directors) must co-operate;
- finally, the competent authority (STADTSCHULRAT FÜR WIEN) must give the necessary permission for the planned examinations, too.

The discussion with representatives of the general accident insurance company and the municipal authorities revealed that primary schools of the inner municipal districts 2 and 9 were, as usual, equipped with school travel plans in the school year 2007/2008. As for infrastructure, for a narrower selection, schools were chosen that are not situated directly on a main street (with several lanes, high volume of traffic, signal regulated intersections) but in a 'side' street with no regulated intersections but with a pedestrian crossings/zebra crossing in their immediate environment.

Selected primary schools which (as yet) have no school travel plan:

- Vs Galileigasse 5, 9. district
- Vs Gillegasse 12, 9. district
- Vs Grünentorgasse 9, 9th district

Selected primary schools with an existing school travel plan for 2006/07:

- VS Kleine Sperlgasse 2a, 2. Bezirk
- VS Eslarngasse 23, 3. Bezirk
- VS Petrusgasse 10, 3. Bezirk

The education authority for Vienna (Der Stadtschulrat für Wien) issued a permit (GZ 100 015/0021/2008) for the examination of those schools in April 2008.

## ■ Short Description of the School Locations

**VS Galileigasse 5:** The primary school in the 9th district lies in the immediate proximity of the intersection Nußdorferstarße/Alserbachstraße on the tram 5, 33, 37, 38 routes. A branch of this intersection forms the Sechschimmelstraße. The primary school is located in a side street off the Sechschimmelstraße. The spot for monitoring was located at the immediate entry area which has a pavement build-out and a bordering cycle track.

**VS Gilgegasse 12:** The primary school in the 9th district is located in the tiny dead end Gilgegasse off Bründlbaggasse. The Bründlbaggasse connects the Alserstraße (on tram routes 43 and 44) with Lazarettgasse. The monitored pedestrian crossing runs across the Lazarettgasse.

**VS Grünentorgasse 9:** The primary school is located in the 9th district (in Serviten-Quarter area). The Grünentorgasse (Grüentor-lane) connects the Roßauer Lände with the Porzellangasse where the tram D-line is running. The street has been “traffic-calmed” by various traffic regulating interventions (one-way residential road, and cobble-stone paving). The monitored pedestrian crossing runs across the Grünentorgasse near the intersection with Porzellangasse.

**VS Kleine Sperlgasse 2a:** The primary school is located in the Carmelite-Quarter in the 2nd district. Kleine Sperlgasse (lane) connects two important roads of this quarter: the Leopoldgasse with the bus line 5 A and the Taborstraße with the tram routes N, 21. Both intersections are traffic light regulated. The Kleine Sperlgasse is a “traffic-calmed” street: speed limit 30km/h, one way traffic. The immediate forecourt of the school has a large pavement and a few car parking places. The monitored pedestrian crossing connects this forecourt with the beginning of Große Sperlgasse on the opposite side of the road.

**VS Eslarngasse 23:** The primary school is located in the 3rd district. The Eslarngasse (lane) connects two important streets of the district: the Landstraßer Hauptstraße with its bus line 74 A and the Rennweg with the tram route 71. Both intersections are traffic light regulated. The immediate area of Eslarngasse in front of the school is built out with a pavement and metallic railings and is partly “traffic-calmed” since a large part of the traffic turns into Klimschgasse. The monitored pedestrian crossing is located at this intersection.

**VS Petrusgasse 10:** The primary school is located at the Petrusgasse which connects Landstraßer Hauptstraße with Baumgasse. The monitored pedestrian crossing runs across Baumgasse and leads closely to the entrance area of a large residential building; this results in some of the children and adults crossing the street almost diagonally.

## ■ Survey Documents for the Behaviour Monitoring

The behaviour monitorings were carried out at the listed schools in the area of the street junction crossing the nearest main street. These junctions have a pedestrian crossing but no light signalling.

The number and location of all pedestrian crossings running through this crossroads plateau are sampled in a special survey sheet (behaviour monitoring locality) as well as the pedestrian crossings selected for the monitoring of children on their way to school.

Fig. 4: Survey documents for behaviour monitoring: Selection of locality and of important equipment features

<b>Verhaltensbeobachtungen – Örtlichkeit</b>		
<b>Auswahl der Örtlichkeit</b>		
<ul style="list-style-type: none"> <li>• Kreuzung, die durch die Straße mit der Schule (S) und der nächstgelegenen „Haupt“-Straße gebildet wird.</li> <li>• keine VLSA (Ampel)</li> </ul>		
Skizzen	Angaben	Beispiele
	<b>Straßennamen / Besonderheiten</b> <ul style="list-style-type: none"> <li>• Nebenstraße (mit Schule):</li> <li>• Haupt-/Quer-Straße:</li> </ul>	
	<b>Eintragungen</b> <ul style="list-style-type: none"> <li>• Eintragen aller empfohlener „Geh-Routen“ (Schulwege ●●●●)</li> <li>• Eintragen aller vorhandenen Schutzwege □□□□</li> <li>• Auswahl des beobachteten Schutzweges (BSW)</li> </ul>	
	<b>Fahrrelationen des Kfz-Verkehrs</b> Die Richtungsangaben der Fahrrelationen (Einbahnen) erfolgt anhand der Ziffern 1 bis 4, wobei die Zuordnung im Uhrzeigersinn erfolgt (1 = Straße mit Schule). von → nach <input type="checkbox"/> 1 → 2 <input type="checkbox"/> 2 → 1 <input type="checkbox"/> 3 → 1 <input type="checkbox"/> 4 → 1 <input type="checkbox"/> 1 → 3 <input type="checkbox"/> 2 → 3 <input type="checkbox"/> 3 → 2 <input type="checkbox"/> 4 → 2 <input type="checkbox"/> 1 → 4 <input type="checkbox"/> 2 → 4 <input type="checkbox"/> 3 → 4 <input type="checkbox"/> 4 → 3  <b>spezielle Fahrrelationen des Radverk. (geg. Einbahn)</b> <input type="checkbox"/> 1 → 2 <input type="checkbox"/> 2 → 1 <input type="checkbox"/> 3 → 1 <input type="checkbox"/> 4 → 1 <input type="checkbox"/> 1 → 3 <input type="checkbox"/> 2 → 3 <input type="checkbox"/> 3 → 2 <input type="checkbox"/> 4 → 2 <input type="checkbox"/> 1 → 4 <input type="checkbox"/> 2 → 4 <input type="checkbox"/> 3 → 4 <input type="checkbox"/> 4 → 3	
Kode:	<b>Kode oder Kurzbezeichnung der ausgewählten Beobachtungsstelle</b> Zuordnung/Eintragung in Datenblätter	zB: <b>B3</b>

This 'route' is mapped into the existing school travel plan as a recommended route.

Finally, the interaction of vehicle and bicycle traffic is noted in order to aid interpretation of this survey.

Fig. 5: Survey documents for behaviour monitoring: Data sheet

Verhaltensbeobachtungen – Datenblatt		Beobachtungsfall (BF) ist eine Einzelperson (Kind) oder eine best. Person (zB 1. Kind) einer Gruppe von Personen, die einen Schutzweg/Zebrastrreifen quert.					I Örtlichkeit: (Name/Kode)					Beobachter: Datum:					
												1 Blatt-Nr:					
		3 Zeit:															
Beobachtungsmerkmale	Anmerkungen	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF
<b>4 Anzahl der Kinder</b>																	
<b>5 Anzahl der Erwachsenen</b>																	
<b>6 herannahendes Kfz</b>	< 30 m vor Zebrastrreifen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7 Querungsverhalten</b>																	
kein auffälliges Verhalten	quert ruhig, kurzes schauen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
besonders aufmerksames V.																	
bewusstes Anhalten vor ZS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auffälliges Schauen in beide Ri		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auffälliger Blickkontakt mit IP	Interaktionspartner=Kfz-Lenk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
leichtes Fehlverhalten																	
unaufmerksames Queren	plaudern, folgt vorausgehender Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
schräge Querung		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
laufen beim Queren		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sonstiges leichtes FV	zB quert zw. anhaltenden Kfz (bei 1 Fahrtrichtung)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
schweres Fehlverhalten																	
schaut nur in 1 Richtung	bei 2 Fahrtrichtungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
quert/rennt knapp vor Kfz		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
quert zw. anhaltenden Fzg	bei 2 Fahrtrichtungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sonstiges schweres FV	bleibt auf Fahrbahn stehen, oder kehrt um, rempelt/stößt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>8 nicht empfohl. Schulweg</b>	laut Schulwegplan						14						14				
Anmerkungen:																	

### 3.5 Parent Questionnaires

Another aspect of the evaluation of school travel plans is the rise in awareness by pupils and parents of the issues of road safety and what constitutes a 'safe' trip to school. The *assumption* is that those pupils and parents who have collaborated in the preparation of a school travel plan deal more often with, and are better informed about, the dangers of traffic generally and dangers on the way to school in particular, than those pupils and parents who were not involved in the preparation of a school travel plan yet

Factual information – such as behaviour of pedestrians or possible danger spots in the school proximity or certain actions (like following the recommended route) or statements concerning the subjective feeling of safety (on the way to school) was collected through a questionnaire distributed to 340 parents of pupils of 6 primary schools; half of the pupils come from schools where no school travel plans were generated (yet); 180 of those questionnaires were filled out and returned (response rate 53%).

#### ■ The Parent Questionnaire

The questionnaire includes the introduction, the definition of the school travel plan and the following 22 questions (see also appendix).



## 4 Results

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### 4.1 Behaviour Observations

The behaviour observations were carried out in the immediate environment of the selected schools in April/May 2008. In front of those schools which are equipped with school travel plans 300 cases were monitored (BEOBACHTUNGSFÄLLE – BF), the rest, 125 cases, were monitored in front of schools with no school travel plan.

The 300 (125) monitored cases show that 129 (100) children travelling alone or in the company of an adult<sup>3</sup> crossed the pedestrian crossing in front of the school and 171 (25) adults crossed the road alone.

If an entire class of pupils guarded by an adult/teacher crossed the monitored crossing, they were not registered.

All of the 425 monitored cases were sorted accordingly to the school, time, monitored individuals (child/adult person) into two evaluation sheets (for schools with or without a school travel plan)

<sup>3</sup> but not holding the hand

<b>Verhaltensbeobachtungen – Auswertungen</b>	Beobachtungsfall (BF) ist eine Einzelperson (Kind oder Erwachsener) oder eine bestimmte Person (zB 1. Kind) einer Gruppe von Personen, die einen Schutzweg quert.	K ... Kind / Jugendliche(r) E ... Erwachsene Person (inkl. Erw. mit Kind an der Hand)	Blatt-Nr:	1

Ort/ Schule	Datum	Uhrzeit	K E	Beobachtungs- fälle	Interaktions- fälle	kein a. Verhalten	besonders aufmerksames Verhalten (Mehrfachnennungen)			leichtes Fehlverhalten (Mehrfachnennungen)				schweres Fehlverhalten (Mehrfachnennungen)				Schulweg	Anmerkungen
							beobachtete Person	Anzahl der beobachteten Personen	Kfz oder Motorrad	kein auffälliges Verhalten	bewusstes Anhalten vor Zebrastreifen	auffälliges Schauen in beide Ri	auffälliger Blickkontakt mit IP	unaufmerksames Queren	schräges Queren	laufen beim Queren	sonstiges leichtes FV		
Schule mit Schulwegplan																			
ESL	28.05.08	11:30-12:30	K	28	7	18		3	1	4	4	1						4	eingeschränkte Sicht
			E	30	4	18				1	10								
ESL	30.05.08	11:30-12:45	K	44	4	26	1	3	2	4	4	2	1					2	
			E	46	14	25			1		18	1							
KSP	26.05.08	12:00-12:30	K	16	4	6	2		2	4	2	1						0	ab 12:30 Polizistin
			E	4	1	2	1		1	1									
PET	29.05.08	11:15-12:15	K	12	3	4				1	4	2						1	eingeschränkte Sicht
			E	46	13	23				1	22	1							
PET	29.05.08	12:15-13:15	K	29	11	18		1	1	2	5	1						6	
			E	45	7	25				1	19								
		Summe:	K	129	29	72	3	7	6	15	19	7	1					13	
			E	171	39	93	1		2	4	69	2							

ESL (VS Eslarn-gasse), KSP (VS Kleine Sperlgasse), PET (VS Petrusgasse)

ra/2008

<b>Verhaltensbeobachtungen – Auswertungen</b>	Beobachtungsfall (BF) ist eine Einzelperson (Kind oder Erwachsener) oder eine bestimmte Person (zB 1. Kind) einer Gruppe von Personen, die einen Schutzweg quert.	K ... Kind / Jugendliche(r) E ... Erwachsene Person (inkl. Erw. mit Kind an der Hand)	Blatt-Nr:	2

Ort/ Schule	Datum	Uhrzeit	K E	Beobachtungs-- fälle	Interaktions-- fälle	kein a. Verhalten	besonders aufmerksames Verhalten (Mehrfachnennungen)			leichtes Fehlverhalten (Mehrfachnennungen)				schweres Fehlverhalten (Mehrfachnennungen)				Schulweg	Anmerkungen
							beobachtete Person	Anzahl der beobachteten Personen	Kfz oder Motorrad	kein auffälliges Verhalten	bewusstes Anhalten vor Zebrastreifen	auffälliges Schauen in beide Ri	auffälliger Blickkontakt mit IP	unaufmerksames Queren	schräges Queren	laufen beim Queren	sonstiges leichtes FV		
Schule <b>ohne</b> Schulwegplan																			
	15.04.08	7:30 - 8:30	K	48	13	22	6	3	2	13	4	4							
			E	17	2	15				2	1								
GTO	27.05.08	12:15-13:15	K	36	2*	5	1	6	1	10	2	2	1					(4)	* einbiegende Kfz
			E	4		2				2									
GTO	28.05.08	12:00-12:30	K	16	1*	6	2		2	4	2	1						(1)	* einbiegendes Kfz
			E	4	1*	2	1		1	1									* einb. Kfz
		Summe:	K	100	16	33	9	9	5	27	8	7	1					(5)	(offiziell kein Schulweg)
			E	25	3	19	1		1	5	1								

### **Case study**

On May 28th 2008, in front of primary school VS Eslarngasse (ESL) children (pupils) and 30 adults were monitored when crossing the pedestrian crossing between 11:30 and 12:30.

7 children had an “interaction partner”, i.e. a motor vehicle or a motorcycle draw near to the pedestrian crossing at the time of the crossing within a distance of approx. 30 m.

18 children did not show any obtrusive behaviour. In 3 cases, 'looking attentively in both directions' behaviour was registered, in 1 case 'attentive eye contact with the interaction partner' was noted. In 4 monitored cases 'careless crossing' or 'crossing diagonally' (the pedestrian crossing) was registered. 1 child ran over the pedestrian crossing.

4 children did not follow the recommended route to school (which was the monitored pedestrian crossing) but crossed the road at another spot.

### **Summary of all individual observations in front of schools with school travel plans**

72 of the total of 129 monitored children (pupils) did not show any conspicuous behaviour in front of schools with school travel plans. At least 7 children showed particularly attentive behaviour (attentive looks in both directions or attentive eye contact with the driver of an approaching vehicle) before crossing the road. At least 79 children (61%) can therefore be assigned to behaviour Type1.

At least 19 (15 %) children showed minor misconduct (Type2). Particularly striking in this context is the frequently observed 'diagonal crossing of the road' – a minor misconduct committed in most cases by the adults (though this applies primarily to the monitored pedestrian crossing in front of VS Petrusgasse which runs into the entrance area of a large residential building – the reason that some of the children and adults cross the street almost diagonally). 15 children 'crossed carelessly'; 7 children ran over the pedestrian crossing; 1 child crossed the pedestrian crossing between jammed and/or turning motor vehicles.

A major misconduct (Type3) was not observed in this examination due to the fact that all the selected pedestrian crossings are located in 'side streets' where the volume of traffic is relatively low.

Altogether 13 (10 %) children did not cross the road during the time of monitoring at the recommended crossing (as marked in the school travel plan).

### **Summary of all individual observations in front of schools without school travel plans**

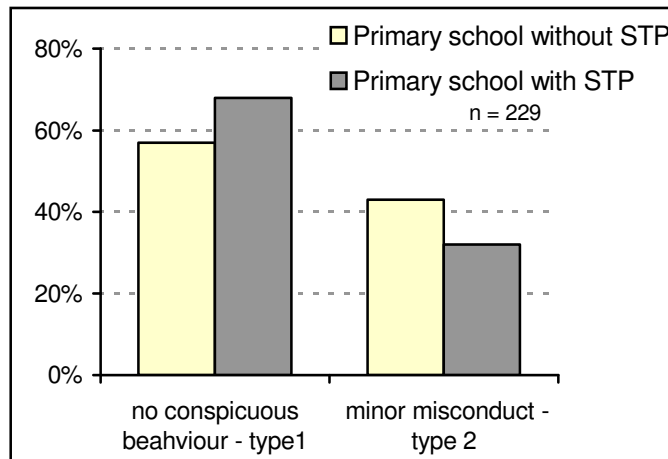
33 of the total of 100 monitored children showed no conspicuous behaviour and at least 9 children showed particularly attentive behaviour in front of the schools without school travel plans (42%; Type1).

At least 27 (21 %) children showed minor misconduct (Type2); 8 children crossed the

road diagonally, 7 children ran over the pedestrian crossing.

A total of 5 (5%) children chose a road crossing which most probably would not be recommended in the future school travel plan.

Fig. 6: Behaviour monitoring of 229 schoolchildren without and/or with school travel plans, when crossing the road on a pedestrian crossing not regulated by traffic lights in the proximity of six primary schools.



The summarized results of the behaviour monitoring do not show any significant differences, but they do reveal tendentious differences in behaviour of children with or without school travel plans when crossing the road: there was no conspicuous behaviour among the children of primary schools with school travel plans in 68% of cases while the same applies to 57% of pupils from primary schools with no school travel plans when crossing the road over a pedestrian crossing; at least 43% of those pupils show minor misconduct. About 32% of pupils from primary schools with school travel plans showed minor misconduct.

## 4.2 Parent Questionnaires

The questioned aspects will be sorted according to school with or without a school travel plan and will be listed in the following 20 tables and then briefly described.

Safe school ways by implementing school travel plans in primary schools in Vienna

Parents	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Mother	66	85%	85	83%	151	84%
Father	10	13%	14	14%	24	13%
n.a.	2	3%	3	3%	5	3%
Total	78	100%	102	100%	180	100%

Age	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
9 Y	14	18%	33	32%	47	26%
10 Y	52	67%	55	54%	107	59%
11 Y	9	12%	12	12%	21	12%
12 Y	2	3%	2	2%	4	2%
n.a.	1	1%			1	1%
Total	78	100%	102	100%	180	100%

Sex	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Male	43	55%	44	43%	87	48%
Female	35	45%	57	56%	92	51%
n.a.			1	1%	1	1%
Total	78	100%	102	100%	180	100%

Car in household	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	57	73%	69	68%	126	70%
No	21	27%	32	31%	53	29%
n.a.			1	1%	1	1%
Total	78	100%	102	100%	180	100%

Means of transport	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Pedestrian	48	62%	59	58%	107	59%
Car passenger	6	8%	14	14%	20	11%
Public transport	24	31%	29	28%	53	29%
Total	78	100%	102	100%	180	100%

The authorities are doing for the safety on the school way...	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
"nothing"	7	9%	6	6%	13	7%
"little"	38	49%	42	41%	80	44%
"a lot"	24	31%	39	38%	63	35%
n.a.	9	12%	15	15%	24	13%
Total	78	100%	102	100%	180	100%

Feeling of safety on the school way	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Child is feeling safe	63	81%	73	72%	136	76%
Child is feeling unsafe	7	9%	17	17%	24	13%
n.a./do not know	8	10%	12	12%	20	11%
Total	78	100%	102	100%	180	100%

Have been advised about the mistake?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	69	88%	85	83%	154	86%
No	5	6%	14	14%	19	11%
n.a.	4	5%	3	3%	7	4%
Total	78	100%	102	100%	180	100%

Danger spots	Primary school without STP		Primary school with STP		Total:	
	n	%	n	%	n	%
No traffic lights are present	29	45%	19	25%	48	34%
no zebra crossing is present	11	17%	14	18%	25	18%
The traffic density is too high	19	29%	25	32%	44	31%
The vehicles go too fast	28	43%	31	40%	59	42%
It has to be paid attention to turning cars	24	37%	34	44%	58	41%
The street is too wide	4	6%	4	5%	8	6%
The green light for pedestrians is too short	5	8%	16	21%	21	15%
Due to parking cars the sight is bad	6	9%	13	17%	19	13%
Due to trees the sight is bad			1	1%	1	1%
The pavement is very narrow	2	3%	1	1%	3	2%
Dangerous garage-/exit	1	2%	16	21%	17	12%
The tramway stops in the middle of the road	14	22%	5	6%	19	13%
other problems	7	11%	11	14%	18	13%
Total	65	100%	77	100%	142	100%

Dangerous spot has been reported to authorities?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	17	22%	14	14%	31	17%
No	60	77%	84	82%	144	80%
n.a.	1	1%	4	4%	5	3%
Total	78	100%	102	100%	180	100%

Traffic ruling measures?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	9	12%	34	33%	43	24%
No	37	47%	24	24%	61	34%
Do not know	31	40%	37	36%	68	38%
n.a.	1	1%	7	7%	8	4%
Total	78	100%	102	100%	180	100%

Infrastructural measure?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	8	10%	21	21%	29	16%
No	41	53%	43	42%	84	47%
Do not know	26	33%	29	28%	55	31%
n.a.	3	4%	9	9%	12	7%
Total	78	100%	102	100%	180	100%

Daily school crossing guard?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	34	44%	48	47%	82	46%
No	34	44%	34	33%	68	38%
Do not know	6	8%	14	14%	20	11%
n.a.	4	5%	6	6%	10	6%
Total	78	100%	102	100%	180	100%

STP known?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	48	62%	84	82%	132	73%
No	28	36%	16	16%	44	24%
n.a.	2	3%	2	2%	4	2%
Total	78	100%	102	100%	180	100%

STP expedient?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	60	77%	71	70%	131	73%
No	10	13%	22	22%	32	18%
n.a.	8	10%	9	9%	17	9%
Total	78	100%	102	100%	180	100%

STP used?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	17	22%	34	33%	51	28%
No	47	60%	52	51%	99	55%
Do not know	8	10%	10	10%	18	10%
n.a.	6	8%	6	6%	12	7%
Total	78	100%	102	100%	180	100%

Recommended school way used?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	25	32%	50	49%	75	42%
No	22	28%	27	26%	49	27%
Do not know	16	21%	16	16%	32	18%
n.a.	15	19%	9	9%	24	13%
Total	78	100%	102	100%	180	100%

Behaviour at school way changed?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes – different school way	1	1%	15	15%	16	9%
Yes – other	1	1%	4	4%	5	3%
No	45	58%	54	53%	99	55%
n.a.	31	40%	29	28%	60	33%
Total	78	100%	102	100%	180	100%

Changes wished at STP?	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Yes	2	3%	11	11%	13	7%
No	46	59%	68	67%	114	63%
n.a.	30	38%	23	23%	53	29%
Total	78	100%	102	100%	180	100%

Changes at STP	Primary school without STP		Primary school with STP		Total	
	n	%	n	%	n	%
Suggestions	2	3%	5	5%	7	4%
n.a.	76	97%	97	95%	173	96%
Total	78	100%	102	100%	180	100%



The majority of the 180 questionnaires were filled out by the mothers of the schoolchildren (84%). Half of the children were female and half were male; almost all children were aged 9 or 10 years.

Chi square was used for test the significance<sup>4</sup>. These tests do not show any meaningful differences in individual characteristics between the parents and pupils of the schools without or with school travel plans. The same applies also to the means of transportation used.

About 70% of the questioned parents have a car. 11% of them claim to take their child to school by car. The majority of the pupils, approx. 60%, walk to school; 30% use public transport.

To the question whether the authorities are sufficiently active when it comes to the safety on the route to school, 51% of the parents answered that the authorities do 'little' or 'nothing' for safety, while approx. 35% of them praise the authorities for doing "a lot" for safety on the route to school; 13% do not give any answer to this.

The significance test does not show any statistically meaningful difference greater than the 5% margin of error between schools without or with school travel plans.

The same also applies to the question about the feeling of safety of children on their way to school. About 76% (13%) of the parents say that their child feels 'safe' ('not safe'); 11% do not give any clear answer.

Clear differences, however, show up in answers to the question about reported danger spots and traffic regulating measures. While 22% of the parents of schoolchildren with no school travel plan reported to the authorities or to the school authorities on 'subjectively felt danger spots' on their child's route to school, 'only' 14% of parents with school travel plans reported on 'subjectively felt danger spots'.

One interpretation of this result may be that because many of the desired technical improvements in the school environment were actually implemented in the course of preparation of the school travel plan, the parent's needs for more safety were satisfied and therefore no danger spots need to be (or must be) reported.

This thesis is confirmed also by the response behaviour of the parents to the question about the traffic regulating measures which have been implemented within the area of school within the last 2 years. There are significantly meaningful differences (considering a 5% margin of error) between the interviewed parents of pupils without or with school travel plans: while 'only' 12% of parents of pupils without school travel plans noticed any executed traffic regulating measures, at total of 33% of parents of children with school travel plans noticed traffic regulating measures.

This result can be imputed to the fact that traffic regulating measures suggested in the course of preparation of the school travel plan – such as introduction of a 30km/h

<sup>4</sup> The significance test doesn't show any important differences. The result of each Chi-Quadrat test (i.e. SACHS 1997) shows that the hypothesis (all the random samples scored the same) doesn't have to be ruled out. The probability that the deviations between expected and empirical frequency ( $\chi^2$ -value as per PEARSON) are coincidental is smaller than 0,05.

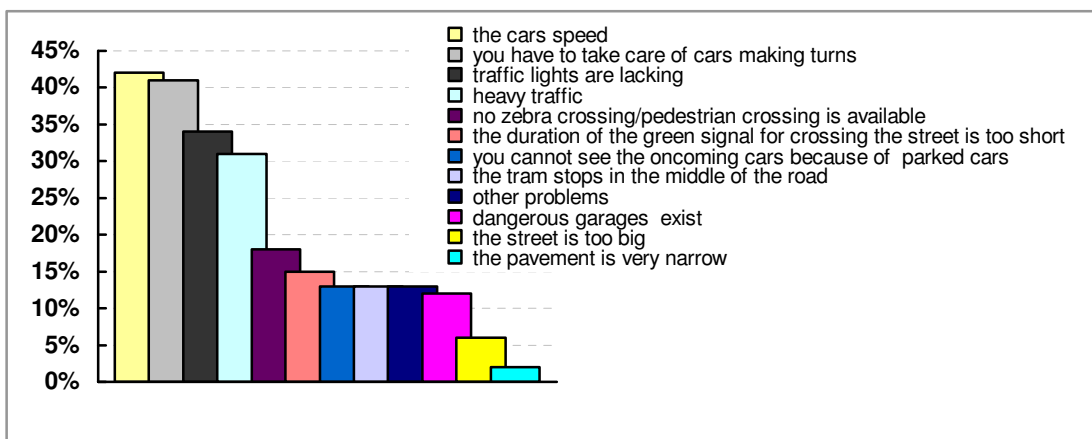
speed zone, one way road regulation, installation of additional signposts or a street marking (i.e.'Caution' children) or introduction of speed control – were implemented and approved by the parents.

The answers to the question about possible structural street redesigning, like elevation of the road or the erection of a traffic island in a street, or employing crossing guards also confirm such conjectures; despite the fact that the differences are rather small, all the more so as such elaborate and relatively expensive solutions are implemented only seldom.

The parents' answers to the question about the danger spots 'felt subjectively' on their child's way to school do not show any 'school travel plan specific' differences. More than 40% of all answers (142) indicate that the highest danger is speeding motor vehicles and vehicles turning off the street.

This supports effectively the desire for a non-stop 30km/h speed zone throughout the densely build-up area of the city as stated in the 'Masterplan Verkehr' (Master Traffic Plan)<sup>5</sup> generated by the Municipality of Vienna. Apart from the existing school travel plan, effective traffic calming measures should receive a high priority. Also, we mustn't forget that a school route starts virtually in front of every front door.

Fig. 7: (Multiple-) answers as to 'subjective' danger spots encountered on the way to school (12 specifications; n= 142 interviewed parents)



One of many measures to render danger spots safe in the immediate school area is to establish a regular crossing guard service by hiring a young/older purpose-trained person who, when the school starts/ends, acts as a traffic regulating agent and at a non-regulated crossing helps the children cross the road safely.

Approximately half of the parents mentioned a functioning crossing guard service independently of the existence of a school travel plan in the vicinity of their children's school.

The parents' answers as to their familiarity with the school travel plan of their children

<sup>5</sup> Masterplan Verkehr Wien 2003; Stadtentwicklung Wien, MA 18 page 84f

shows, as expected, significant differences, since this particular feature was considered a differentiator. Nevertheless, 62% of the parents of children without a school travel plan knew about its existence. This can be explained by the fact that either other children in the family go to a school with a school travel plan or because of the ongoing discussion about a preparation of a school travel plan for the selected schools.

About 73% of all parents are convinced of the advisability of the school travel plan while only 30% of the parents say that their child has at one time or another made use of such a plan. This relatively small percentage can perhaps be put down to the fact that some parents consider only the current situation and many of the 4th grade pupils do not take the school travel plan into consideration (any more).

After all, about 50% of the children from schools with school travel plans use the recommended route to school every day. And about 20% claim to have changed their route according to the school travel plan or according to the executed traffic engineering measures (setting up of a pedestrian crossing).

These results harmonize well with the findings of the KfV received within an evaluation study of school travel plans in 16 primary schools in Austria (KfV 2007; see below).

There were no suggestions for changes in school travel plans whatsoever. The seven individual cases suggest – apart an updating of the existing school travel plan – adjustments of 'danger spots' which are located some way away from the school.

### **To school by car...**

From the analysis of the road accidents and of accidents on the way to school in particular, we know that car traffic represents the greatest danger. It follows that the response behaviour of parents who own a car also deserves to be looked at closely in this study.

In the opinion of many experts, taking children to school by car is not a long term solution to the problem of road safety. It sets off a rather dangerous vicious circle: because many parents feel endangered and unsafe in the traffic, they prefer to take their children to school by a car which causes even denser traffic especially in the vicinity of the school; this, in turn, increases the danger and adds to the feeling of insecurity in parents.

This can be detected in the response behaviour of parents when answering the question about danger spots. Many parents perceive vehicle speed and high traffic volumes as constituting the greatest dangers to their children on their way to school (see above).

Also worth mentioning here are the answers of parents as car users; they differ considerably from the answers of other parents (i.e. those who don't use a car), though the absolute number (20 persons) is very small. While about 42% of parents of pupils who arrive at school by public transport or who walk to school claim that drivers are speeding; only 33% of car driving parents make the same claim.

The same applies to the danger caused by cars turning off the street: only of 27% of the car users perceive such a situation as dangerous, while about 40% of the parents without a car feel endangered by cars turning off the street.

dangerous spots	Means of transport to school						Total	
	Pedestrian		Car passenger		Public transport		n	%
	n	%	n	%	n	%		
No traffic lights are present	33	39%	2	13%	13	31%	48	34%
No zebra crossing is present	14	16%	3	20%	8	19%	25	18%
The traffic density is too high	29	34%	5	33%	10	24%	44	31%
The vehicles go too fast	36	42%	5	33%	18	43%	59	42%
It has to be paid attention to turning cars	38	45%	4	27%	16	38%	58	41%
The street is too wide	4	5%			4	10%	8	6%
The green light for pedestrians is too short	11	13%	4	27%	6	14%	21	15%
Due to parking cars the sight is bad	14	16%	1	7%	4	10%	19	13%
Due to trees the sight is bad	1	1%					1	1%
The pavement is very narrow	3	4%					3	2%
Dangerous garage-/exit	12	14%	3	20%	2	5%	17	12%
The tramway stops in the middle of the road	7	8%	2	13%	10	24%	19	13%
Other problems	12	14%			6	14%	18	13%
Total	85	100%	15	100%	42	100%	142	100%

On the other hand, the responses of the car users to the question about the reported danger spots also indicate their familiarity with the dangers of road traffic: 21% of these parents have pointed out a 'special danger spot' to the authorities or to the school authority. Of the interviewed parents who did not have a car 'only' 8% have done so.

Dangerous spots have been reported to authorities?	Car in household?				Total	
	Yes		No		n	%
	n	%	n	%		
Yes	27	21%	4	8%	31	17%
No	95	75%	49	92%	144	80%
n.a.	5	4%			5	3%
Total	127	100%	53	100%	180	100%

The data analysis shows a statistically significant difference (as expected) between the homes with or without a car with regard to the means of transportation chosen by the pupils. No discernible difference appears between the pupils who walk to school and those using public transport; both groups scored about 60% on this question. But as for the use of public transport, the responses differ: about 25% of pupils of parents with car use public transportation versus 40% of pupils of parents with no car.

Since the average distance to school is less than 1.2 km in Vienna, the reasons for taking their child to school by car instead of having them use public transport might include 'time advantage' or 'comfort'. A certain discomfort concerning 'safety' could possibly also lure these parents to take their child to school by car.

## 5 Summary

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### ■ Background

The surroundings of primary schools are considered a particularly problematic area in terms of traffic safety.

The school travel plan for primary schools children is a crucial instrument for making the trips to and from school safe. The plan is generated from accident analysis, data provided by authorities, and interviews with parents. The plan must provide clear recommendations for a 'safe' school trip. Using the plan, the children should be able to avoid the danger spots on their way to school or be able to cope with those better.

In 2002, the Austrian Road Safety Board (KfV) together with the General Accident Insurance Company (AUVA) and the City of Vienna/Magistrate Department started the preparation of school travel plans for three primary schools in Vienna. Meanwhile, 2/3 of 280 public and private primary schools are equipped with a school travel plan.

The present study, which is part of an EU-project (APOLLO), performed an evaluation of school travel plans with respect to their contribution to the traffic safety of school children.

### ■ Aims and Methods

Specifically, detailed information (on traffic behaviour, on existing danger spots in school surroundings, etc.) as well as particular operations (keeping within the recommended school travel routes) or subjective comments on feeling safe (on the route to school) were collected with the aid of questionnaires. A total of 340 parents of primary school children in 6 primary schools were interviewed (it was a questionnaire based survey and 180 parents actually participated) and in order to ensure comparability, half the children came from schools with (as yet) no existing school travel plan.

Another 425 behaviour monitorings in primary schools provided information about children's actual behaviour with regard to crossing the road (at pedestrian crossings) and existing road crossing options (recommended route to school).

Finally, the completed construction changes in the school surroundings were evaluated

and various authorities (teachers, specialists) who participated in the designing and establishing of school travel plans were questioned with respect to their estimation of the effectiveness and acceptance of the school travel plans.

Once the subject of the study was defined, the preparation and the financing set up, the results of the study (carried out by KfV), in which school travel plans were prepared for 16 compulsory schools in Austria, were presented.

The evaluation of these school travel plans with regard to their effect on the road safety of schoolchildren processes the selected criteria such as raising awareness of pupils and parents about the 'safe' trip to school and the traffic regulating measures carried out in the school surroundings. The assessment of the increased awareness of pupils and parents is done by means of behaviour monitorings of schoolchildren and in transcribed interviews with the parents of pupils of the 4th grade.

### **Injury figures**

An evaluation of the school travel plans focusing on numbers of accidents is not a reliable indicator since, fortunately, only very few schoolchildren have accidents in the catchment area of their schools in Vienna. Nevertheless, it must not be ignored that this relatively high level of safety is being achieved by the untiring, daily efforts of crossing guard services provided by employees of the school or police corps or parents themselves.

In Austria, more than 4.000 children p.a. between the ages of 6-15 years are involved in a traffic accident. About 30% of them are schoolchildren aged from 6-10 years and about 15% of these schoolchildren have an accident on their way to school.

### **Hypotheses**

Raising awareness of pupils and parents on the issues of road safety is an essential aspect of the evaluation of school travel plans.

While 'road safety training' is part of the teaching curriculum in all primary schools, the working hypothesis assumes that pupils of primary schools equipped with a school travel plan will demonstrate more traffic sensitized behaviour when crossing the road than pupils of schools without a school travel plan.

The next hypothesis assumes that those pupils and parents who participated in the preparation of a school travel plan deal with various dangers of traffic generally, and danger in traffic on the way to school in particular, are therefore more and better informed than pupils and parents who never participated in a preparation of a school travel plan. This assumption should also be supported in the results for subjectively felt safety.

### **Behavioural observations**

When specifying the criteria for wrong and correct behaviour when crossing the road, the judgement scheme for the type derivation based on the knowledge from traffic

education and the examination design for observation of pedestrians on pedestrian crossings (which was developed by KfV) becomes a useful instrument.

3 behaviour types have been established. Type 1 – the monitored individual/child displays unobtrusive or highly attentive behaviour. The criteria for Type 1 are: crosses quietly, conscious stopping in front of a pedestrian crossing, attentive eye contact with the car driver etc.

Type 2 – the child shows minor misconduct – careless crossing of the road, only following the person going ahead, crosses diagonally or runs diagonally across the pedestrian crossing.

Type 3 – displays major misconduct, i.e. crosses/runs across the road right in front of cars, stopping on the road, turning around, jostling, pushing etc.

### **Selection of schools**

To ensure an approximate comparability of the results of monitoring and of consequent interviewing, the selected schools must have similar infrastructural parameters (as location of the school in a 'side' street with no traffic lights in close proximity) and a comparable traffic density.

After the selected schools and their principals were contacted, their collaboration secured, and the approval of the local authority for education (Stadschulrat) in Vienna obtained, the following schools qualified for the evaluation study:

Primary schools without school travel plans: VS Galileigasse 5, VS Gillegasse 12 and VS Grünentorgasse 9, all in the 9th district of Vienna);

Primary schools with school travel plans: VS Kleine Sperlgasse 2A, 2nd district; VS Eslarngasse 23 and VS Petrusgasse 10, both in 3rd district).

## **■ Results**

### **Behavioural observations**

A total of 425 pupils (and adults) were monitored in front of primary schools and their behaviour while crossing the road and their choices of crossing spots (pedestrian crossing; recommended crossing) was registered.

The summarized results of the monitored behaviour do not display any significant differences, though tendential differences could be found in the mode of crossing the road among pupils without or with school travel plans.

While 61% of the pupils from schools with school travel plans showed no remarkable or obtrusive behaviour when crossing the road via pedestrian crossings, there were 42% of pupils from schools with no school travel plans who showed some. Not less than 21% showed minor misconduct. Among the pupils from schools with school travel plans, 15% showed minor misconduct, 10% of those pupils did not cross the road at the recommended crossing.

The Type 3-behaviour – i.e. showing major misconduct – could not be observed; partly because the chosen monitoring locations lie, characteristically, on side streets and have a relatively low volume of traffic.

The conclusion is that, with the use of the instrument of school travel plan, a positive impact on the correct traffic behaviour can be achieved.

### **Parent questionnaires**

Another aspect of the evaluation of school travel plans is the raising of awareness of the parents about road safety issues and safe routes to school for their children. The question was posed whether those parents who were involved in the preparation of a school travel plan and therefore are more aware of dangers in traffic and dangers on the way to school of their children in particular, are more and better informed than parents who did not participate (as yet) in a preparation of a school travel plan.

Factual information (such as behaviour of pedestrians when crossing the road or on danger spots within the school area) was collected and certain activities (i.e. if the recommended school route is being used) or statements concerning the subjective feeling of safety (on the way to school) were registered in a questionnaire distributed to 340 parents of pupils of the primary schools; and to ensure comparability, half of the pupils selected came from schools where no school travel plans were generated (yet).

In total, 340 questionnaires containing 22 questions were distributed to pupils of the 4th grade at 6 primary schools. 180 completed questionnaires were returned (return rate: 53 %).

Tests of significance do not show any statistically important differences among individual characteristics of the parents and pupils from schools without or with school travel plans. The same applies also to the means of transportation used as called for in the questionnaire.

About 70% of the parents have a car, 11% claim to take their child to school by car. A large part, approx. 60% of the pupils walk to school; 30% of them use public transport.

About half of the parents claim that the authorities do 'little' or 'nothing' for the safety of their children on the way to school; about 35% of them praise the authorities for their efforts regarding safety.

The significance test using the 5% margin of error rule does not reveal any statistically important differences between the schools with/without school travel plans here either.

The same applies to subjectively felt safety: About 76% of the interviewed parents say that their child feels 'safe' on the way to school.

Clear differences, however, arise when it comes to the reported and implemented traffic regulating measures. While 22% of the parents of children with no school travel plans reported either to the competent authorities or to the school authority 'subjectively felt danger spots' on the school route of their child, it was only 14% of the parents of children with school travel plans who reported the same.

This can be put down to the fact that, despite all efforts, it was not always possible to choose primary schools with similar infrastructure; there were always some differences to be found as to the size and nature of the school surrounding area. On the other hand, in the course of the preparation of the school travel plans it was possible to satisfy the needs of many parents for safety by enhancing technical improvements in the catchment area of school; this again resulted in fewer or no reports about danger spots.

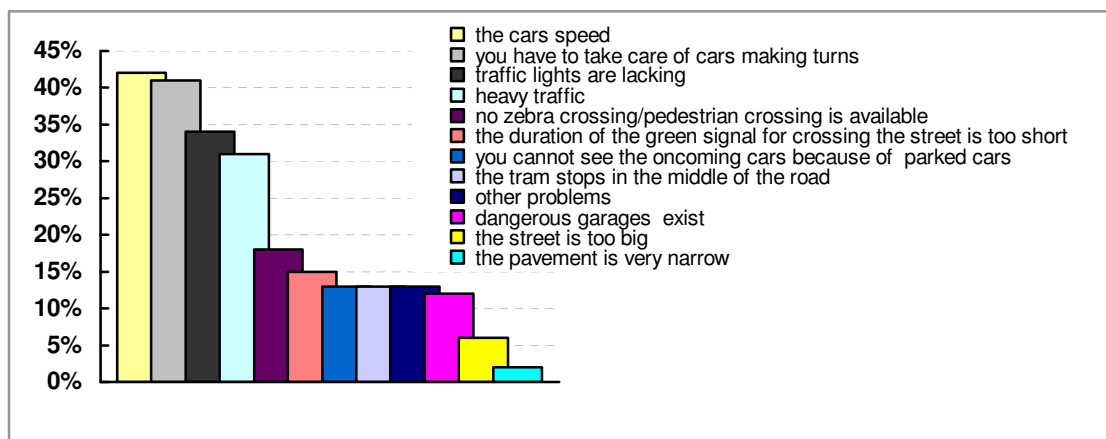
This thesis is also supported by the responses of the interviewed parents when asked about the traffic regulating measures that have been implemented in the school area within the last 2 years. There are significant differences (exceeding the 5% margin of error) between the parents of pupils with/without school travel plans. While only 12% of the parents of children with no school travel plans noticed any traffic regulating changes implemented by the responsible authorities, 33% of the parents of pupils with school travel plans have noticed such changes.

This may be interpreted to mean that, if certain traffic regulating measures had been implemented in the course of the preparation of the school travel plan, those would have been endorsed by the parents. Such regulations might be for instance the introduction of 30 km/h speed limit, one way road, erecting of additional signposts or road marking (i.e. "Caution children") or speed supervisions.

The answers to the question about possible structural street redesigns, like paving elevation or the erection of a traffic island as a crossing aid also point in this direction, although the differences tend to be a little smaller since such expensive and comparatively costly solutions are executed rather rarely.

The answers of the parents to the question about the kind of subjectively felt danger spots on their child's route to school do not show any 'school travel plan specific' differences. More than 40% of all parents' state that the cars' speed together with cars turning off the street represent the most serious danger.

Fig. 8: (Multiple-) answers as to the subjectively felt danger spots encountered on the way to the child's school (12 specifications; n=142 interviewed parents)



Once again the desire has been expressed for an uninterrupted 30km/h speed zone

throughout the densely build-up urban area – a goal which has been postulated in the Masterplan Verkehr (Master Plan Traffic). Implementation of effective traffic calming measures should consequently enjoy priority, independently of the existence of a school travel plan.

About 73% of all parents are convinced of the advisability of the school travel plan; about 30% of the parents admit that their child has used the plan. Perhaps this relatively low percentage can be derived from the fact that some parents 'only' take the current situation into consideration, and for many children of the 4th grade, the plan doesn't play such an important role (anymore).

After all, not less than 50% of the children from schools with school travel plans take the recommended route to school daily. And 20% of them claim they changed their school route in accordance with the school travel plan and its resulting measures (the erection of a pedestrian crossing, for instance).

No suggestions were made as for changes in school travel plans. The seven individual cases tackle – in addition to an update of the existing school travel plan – other danger spots located at some distance from the school.

An interesting link lies in the responses of the car users which significantly differ from those of other parents though the absolute number – 20 persons – is very small. While about 42% of parents of children who either walk to school or use public transportation complain about high speed, it is only 33% of parent-car users who claim the same.

Likewise, only 27% of the car users feel endangered by cars turning off while 40% of non-driving parents perceive cars turning off as a danger.

On the other hand, the responses of cars users about 'reported danger spots' are conclusive as to their familiarity with the dangers of traffic. 21% of car-driving parents have notified the authorities of a 'special' danger spot. Of the parents without any car only 8% have done this.

The data analysis shows statistically significant differences (as expected) in the choice of transportation between children coming from families with or without cars. No important difference shows among the pupils who walk to the school – the corresponding share is 60% for both groups. But when it comes to the use of public transportation it is 25% of pupils of parents with car who use public transport versus about 40% of pupils of parents with no car.

Since the distance to school is on average less than 1.2km in Vienna, the reasons for taking their child to school by car instead of having them use public transport might include 'time advantage' or 'comfort'. Possibly, too, concerns about 'safety' could lure parents to take their child to school by car.

### **Community, experts and institutions**

For years, attempts at district level – with rather varying degrees of success – were made to enhance safety in close proximity of (primary) schools in Vienna even without a school travel plan by implementing numerous measures (organization of traffic,

structural measures concerning traffic engineering etc.). For instance, following an internal directive, the Magistrate Department 46 (MA 46) painted a red border around all pedestrian crossings with no traffic lights and which were located in the immediate vicinity of all schools, adding a signpost "School route" ("Schulweg") in order to alert car drivers.

The school travel plan can be regarded as a sensible instrument which primarily serves as a control device (regulating the order of processing) since the financial and personnel resources allocated annually are limited.

A good 10% of the measures carried out are of a structural nature and need 2 to 3 years to be implemented. The largest part of the implemented measures are traffic engineering interventions: road markings, partly a re-doing of old, faded markings and/or erection of additional signs and, in a few cases, also traffic organizational measures (introduction of 30km/h speed limit or one way road regulation etc.). The involved school authorities are looking forward to the execution of those plans.

The experts of KfV noticed a positive side effect of the joint inspection of the school environment, where the joint presence of technical experts and decision makers made it possible and contributed to the implementation of traffic engineering measures for enhanced traffic safety in locations that lie outside the examined school routes.

For the police - who are conducting the traffic safety lessons in primary schools - school travel plans are helpful working tools.

Finally, it can be pointed out that the instrument of School Travel Plan 2003 is an integral part of a brochure 'Nicht Motorisierter Verkehr – Gestaltung des Schulumfeldes' (RVS 03.04.14; 'Non-motorised traffic – Designing a Route to School') in the section for guidelines and directions for road engineering of the Austrian Research Institute for Road-Rail-Traffic (Österreichische Forschungsgesellschaft Straße–Schiene – Verkehr -FSV).



## 6 Conclusions

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In spite of the fact that no accident statistics can be used for evaluation purposes due to temporal constraints (school travel plans for primary schools exist for past 1-2 years) and because of spatial restrictions (only few immediate areas in front of primary schools in Vienna available), the results of the evaluation allow the conclusion that the school travel plan as generated in the primary schools in Vienna can serve as a valuable instrument for enhancing of road safety.

Behaviour monitorings of pupils (when crossing the road) and the interviews conducted with parents (about their subjective feeling of safety, traffic behaviour or improvements carried out in catchment areas of the schools) show some tendencies and in some aspects also statistically significant differences between the pupils and parents of schools without or with school travel plans.

But the direct attribution of the individual results to school travel plans alone appears difficult; particularly since the 'road safety training' is a part of the teaching curriculum in all primary schools in Austria and therefore could have influenced the monitored and/or distinctive features assessed.

We can reasonably conclude, therefore, that the school travel plan is an important supplement to road safety training.

Additionally, all of the monitored schools – including those without school travel plans – provide crossing guard services, partly performed by members of police force, and which also exert an influence on traffic behaviour when crossing the road or on the choice of the crossing spot.

Experts from different institutions (AUVA, KfV, municipal authorities, police) advocate the advisability of school travel plans. The other effect of those plans is their awareness-forming dimension, and their influence on behaviour in the context of the discussion accompanying the preparation of the school travel plan, focusing primarily on the elimination of danger spots by applying technical and traffic organizational measures.

The school travel plan therefore constitutes an important part of 'Road safety education'.

The points of critique focus mostly on organizational improvements (regarding the preparation of school travel plans or the implementation of the measures within agreed time) and on personnel as well as on financial resources which at present only allow for the preparation of 30 school travel plans per year.

However, there is a positive development: according to the General Accident Insurance Company (AUVA) and the KfV, many schools and municipalities outside Vienna show

growing interest in the preparation of a school travel plan. Also recommendations for cycle tracks for secondary schools are taken into consideration.

As to the financing of school travel plans, the KfV suggested finding sponsors who could at least cover a part of the cost of drawing up such a plan for each school. In return, the sponsor would have the option of including an advertisement in the school travel plan. The remaining cost would have to be borne by the school or by the municipality.

*... and since children do not accommodate traffic, is it necessary to accommodate traffic to children!*

## 7 Literature

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## 8 Lists of Illustrations & Tables

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## 9 Annex

Fig. 9: (Multiple-) answers as to the subjectively felt danger spots encountered on the way to the child's school; separated by schools

Danger spots	Volksschulen												Total	
	Petrus-gasse		Eslam-gasse		Galilei-gasse		Grünentor-gasse		Gilge-gasse		Kl.Sperl-gasse		n	%
	n	%	n	%	n	%	n	%	n	%	n	%		
No traffic lights are present	3	18%	6	21%	9	53%	12	41%	8	42%	10	31%	48	34%
No zebra crossing is present	1	6%	8	29%	3	18%	5	17%	3	16%	5	16%	25	18%
The traffic density is too high	3	18%	8	29%	6	35%	9	31%	4	21%	14	44%	44	31%
The vehicles go too fast	4	24%	11	39%	9	53%	13	45%	6	32%	16	50%	59	42%
It has to be paid attention to turning cars	6	35%	15	54%	9	53%	9	31%	6	32%	13	41%	58	41%
The street is too wide	1	6%	1	4%	2	12%			2	11%	2	6%	8	6%
The green light for pedestrians is too short	7	41%	7	25%	1	6%	1	3%	3	16%	2	6%	21	15%
Due to parking cars the sight is bad	3	18%	5	18%	2	12%	1	3%	3	16%	5	16%	19	13%
The pavement is very narrow							1	3%	1	5%	1	3%	3	2%
Dangerous garage/-exit	4	24%	6	21%			1	3%			6	19%	17	12%
The tramway Stops in the middle of the road	1	6%	3	11%	6	35%	2	7%	6	32%	1	3%	19	13%
Other problems	2	12%	3	11%	3	18%	4	14%			6	19%	18	13%
Total	17	100%	28	100%	17	100%	29	100%	19	100%	32	100%	142	100%

Fig. 10: Answers of interviewed parents if their child feels 'safe' on the way to school; separated by means of transportation

Feeling of safety on the school way	Means of transport to school						Total	
	As pedestrian)		By car (passenger)		Public transport		n	%
	n	%	n	%	n	%		
Child is feeling safe	82	77%	15	75%	39	74%	136	76%
Child is feeling unsafe	15	14%	2	10%	7	13%	24	13%
n.a./do not know	10	9%	3	15%	7	13%	20	11%
Total	107	100%	20	100%	53	100%	180	100%

Fig. 11: Parent questionnaire



Thema: Verkehrssicherheit am Schulweg

## Eltern - Fragebogen

FB-NR.  
SCHULK.002

Sehr geehrte Eltern!

Mit dem *'Schulwegplan'* haben das Kuratorium für Verkehrssicherheit (KfV), die Allgemeine Unfallversicherungsanstalt (AUVA), die Stadt Wien (MA 46) und VertreterInnen des Bezirks 2002 eine Initiative für mehr Sicherheit ihrer Kinder am Schulweg erfolgreich gestartet.

Dank Ihrer Hilfe können im Schulumfeld 'besondere' Gefahrenstellen erkannt, in die Schulwegpläne eingetragen und so relativ sichere Schulwege für alle Volksschulkinder empfohlen werden.

Das *Kuratorium für Verkehrssicherheit* möchte nun mit dem vorliegenden Eltern-Fragebogen versuchen, Ihre Erfahrungen (Anwendung, Lesbarkeit etc), Verbesserungsvorschläge und Wünsche im Zusammenhang mit dem Schulwegplan zu erfassen.

Wir bitten wiederum um Ihre Mitarbeit, auch wenn für die Volksschule Ihres Kindes (noch) kein Schulwegplan erstellt wurde.

Vielen Dank im Voraus

Wien, Mai 2008

DI Alexander Risser

Der *Schulwegplan*, der in Wien für jede Volksschule erstellt wird, zeigt welche Wege im unmittelbaren Schulumfeld unter den aktuellen Bedingungen am 'sichersten' sind. Mit Fotos und begleitendem Text wird auf Gefahrenstellen, die gemeldet werden sollten und auf jene Stellen, bei denen besondere Aufmerksamkeit geboten ist, hingewiesen.

Bitte folgende 22 Fragen beantworten und den ausgefüllten Fragebogen in der Volksschule Ihres Kindes wieder abgeben!

Zutreffendes bitte ankreuzen  und/oder konkrete Zahlen oder Text eintragen (.....)



1	Sind Sie Mutter/Vater des Volksschulkindes der 3. bzw. 4. Klasse? <input type="checkbox"/> Mutter <input type="checkbox"/> Vater <input type="checkbox"/> sonstiges Verhältnis (.....)
2	Wohnort/Strasse ( )
3	Schule des Kindes ( )
4	Klasse des Kindes ( )
5	Alter des Kindes ( ..... Jahre)
6	Geschlecht des Kindes <input type="checkbox"/> männlich <input type="checkbox"/> weiblich
7	Gibt es in Ihrem Haushalt einen Pkw. ? <input type="checkbox"/> ja <input type="checkbox"/> nein <i>fortsetzung</i> → →

8	Wie gelangt normalerweise Ihr Kind zur Schule? (Mehrfachnennungen möglich) <input type="checkbox"/> zu Fuß <input type="checkbox"/> Fahrrad <input type="checkbox"/> Bus/Straßenbahn/U-Bahn/S-Bahn <input type="checkbox"/> Auto (Mitfahrer) <input type="checkbox"/> sonstiges Verkehrsmittel
9	Glauben Sie, dass die Behörden für die Sicherheit der Kinder am Weg zur Schule <input type="checkbox"/> nichts <input type="checkbox"/> wenig <input type="checkbox"/> viel machen?
10	Fühlt sich Ihr Kind auf dem Schulweg <input type="checkbox"/> sicher <input type="checkbox"/> unsicher <input type="checkbox"/> weiß nicht?
11	Haben Sie Ihr Kind zu Schulbeginn am Schulweg von Zeit zu Zeit beobachtet und auf Fehler aufmerksam gemacht? <input type="checkbox"/> ja <input type="checkbox"/> nein
12	Was sind Ihrer Meinung nach die Gefahrenstellen auf dem Schulweg Ihres Kindes? Das Überqueren der Straße (.....) ist schwierig, weil <input type="checkbox"/> keine Ampel vorhanden ist <input type="checkbox"/> kein Zebrastreifen/Schutzweg vorhanden ist <input type="checkbox"/> der Verkehr zu stark ist <input type="checkbox"/> zu schnell gefahren wird <input type="checkbox"/> abbiegende Autos zu beachten sind <input type="checkbox"/> die Straße zu breit ist <input type="checkbox"/> das ‚Grün für Fußgänger‘ der Ampel zu kurz ist <input type="checkbox"/> die Sicht auf die fahrenden Autos durch parkende Autos schlecht ist <input type="checkbox"/> die Sicht auf die fahrenden Autos durch Hecken/Bäume schlecht ist  Das Benützen der Straße (.....) ist schwierig, weil <input type="checkbox"/> der Gehsteig sehr schmal ist <input type="checkbox"/> gefährliche (Garagen-) Ausfahrten vorhanden sind <input type="checkbox"/> die Straßenbahn in der Fahrbahnmitte hält <input type="checkbox"/> sonstige Probleme: (.....)
13	Haben Sie in den letzten 2 Jahren ‚besondere‘ Gefahrenstellen an die Schule oder Behörde gemeldet? <input type="checkbox"/> ja <input type="checkbox"/> nein
14	Sind in den letzten 2 Jahren im Bereich der Schule verkehrsregelnde Maßnahmen gesetzt worden? (Tempo30, Einbahn, Parkverbot, Hinweisschild ‚Achtung Kinder‘, Geschwindigkeits-Überwachung usw.) <input type="checkbox"/> ja <input type="checkbox"/> nein <input type="checkbox"/> weiß nicht
15	Sind in den letzten 2 Jahren im Bereich der Schule bauliche Maßnahmen gesetzt worden? (Fahrbahn-Anhebung, Mittelinsel, etc) <input type="checkbox"/> ja <input type="checkbox"/> nein <input type="checkbox"/> weiß nicht
16	Gibt es einen tagl. Schulerlotsen-Dienst vor der Schule? <input type="checkbox"/> ja <input type="checkbox"/> nein <input type="checkbox"/> weiß nicht
17	Kennen Sie den Schulwegplan der Schule Ihres Kindes? <input type="checkbox"/> ja <input type="checkbox"/> nein
18	Halten Sie einen Schulwegplan für sinnvoll? <input type="checkbox"/> ja <input type="checkbox"/> nein
19	Hat Ihr Kind jemals einen Schulwegplan verwendet? <input type="checkbox"/> ja <input type="checkbox"/> nein <input type="checkbox"/> weiß nicht
20	Benutzt Ihr Kind den im Schulwegplan empfohlenen Schulweg? <input type="checkbox"/> ja <input type="checkbox"/> nein <input type="checkbox"/> weiß nicht
21	Hat sich aufgrund des Schulwegplans das Verhalten Ihres Kindes am Schulweg geändert? <input type="checkbox"/> ja, das Kind hat einen anderen (sicheren) Schulweg gewählt <input type="checkbox"/> ja, das Kind (.....) <input type="checkbox"/> nein
22	Wünschen Sie Veränderungen im Schulwegplan? <input type="checkbox"/> ja <input type="checkbox"/> nein Wenn ja, welche? (.....)

Vielen Dank für Ihre Bemühungen!

Den ausgefüllten Fragebogen bitte in der Schule abgeben!

Bei Unklarheiten und Zweifeln: E-Mail: sandroulissen@gmail.at  
Kuratorium für Verkehrssicherheit | Projektleitung: Mag<sup>a</sup> Claudia Kömer

Fig. 12: Worksheet of behaviour monitoring

Verhaltensbeobachtungen – Datenblatt		Beobachtungsfall (BF) ist eine Einzelperson (Kind) oder eine best. Person (zB 1 Kind) einer Gruppe von Personen, die einen Schutzweg/Zebrastrreifen quert.		1 Örtlichkeit (Name/Kode)		Beobachter: <b>2 Blatt-Nr:</b>		Datum:	
		3 Zeit		BF	BF	BF	BF	BF	BF
Beobachtungsmerkmale	Anmerkungen	BF	BF	BF	BF	BF	BF	BF	BF
<b>4 Anzahl der Kinder</b>									
<b>5 Anzahl der Erwachsenen</b>									
<b>6 herannahendes Kfz</b>	< 30 m vor Zebrastreifen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7 Querungsverhalten</b>									
kein auffälliges Verhalten	quert ruhig, kurzes schauen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
besonders aufmerksames V.									
bewusstes Anhalten vor ZS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auffälliges Schauen in beide Ri		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auffälliger Blickkontakt mit IP	Interaktionspartner= Kfz-Lenk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
leichtes Fehlverhalten									
unaufmerksames Queren	plötzlich, folgt vorausgehender Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
schräge Querung		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
laufen beim Queren		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sonstiges leichtes FV	zB quert zw. anhaltenden Kfz (bei 1 FahrRichtung)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>schweres Fehlverhalten</b>									
schaud nur in 1 Richtung	bei 2 FahrRichtungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
quert/ rennt knapp vor Kfz		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
quert zw. anhaltenden Fzg	bei 2 FahrRichtungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sonstiges schweres FV	kleiklauf Fahrlehn stehen, oder kehrt um, rempeltstößt laut Schulwegplan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>8 nicht empfohl. Schulweg</b>						14			
Anmerkungen:									

rv.2008