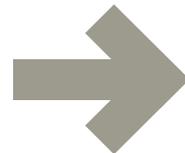




OR YAROK

ASSOCIATION FOR
SAFER DRIVING
IN ISRAEL



The Or Yarok Association for Safer Driving in Israel was founded in 1997 due to recognition of the critical importance of the uncompromising struggle against traffic accidents and the importance of community involvement in the struggle. The declared goal of the association is to minimize the number of casualties in traffic accidents as much as possible and to affect a change in Israel's driving culture.

Since its foundation, the association has sparked a genuine revolution in public awareness, in the field of road crashes, both in terms of its direct activity and in the encouragement that this activity has given to other organizations involved in this field.

The association's budget has been last year \$8 million, and entirely financed through independent means, without external donations or government or public support of any kind.

The association's chairman and founder is Avi Naor, father of the late Ran Naor, who was killed in a traffic accident during his military service before he was 20 years old.



Mr. Avi Naor – Chairman

Mr. Shmuel Aboav – CEO

Mr. Shlomo Aharonishky -Retired Police Commissioner

Mr. Yehudah Vilk - Retired Police Commissioner

Ms. Dalia Yairi - Communication

Prof. David Mahale - Transport

Rabbi Avraham Elimelech Firer - Society

Mr. Aric Raz - Society

Mr. Ilan Cohen – Former CEO of Prime Minister office

Mr. Moti Dotan –The Mayor of Lower Galilee Regional Council

Mr. Yossi Nishri - The Mayor of Kiryat Ono

Ms. Merav Naor Weinstock - Communication

Mr. Aharon Lapidot – PR & Communication

The "Or Yarok" association believes that only a holistic approach that incorporates all parties involved in the struggle against road crashes will enable achievements. The efforts must be made in all levels of action:

On the personal level: the association calls for improved driving culture. The driving culture must be fostered through education – and primarily by serving as a role model – beginning at a very early age. This is an action that every one of us can take, beginning with the close circle, of our family, our children and our home. The Association believes that every citizen can and must contribute to the struggle personally, and, at the very least, drive responsibly to protect his own life and the life of his family.

On the community and local authorities' level: underlying community action is cooperation with the local authorities that can facilitate tremendous achievements. Delegation of some of the responsibilities in the struggle against accidents to the community, in areas such as instruction, education or identification of hazards – will increase community involvement in the field, and will affect the reduction of the number of road crashes and casualties. In 2008 Or Yarok launched the first "Or Yarok Club", and a couple of years later there are more than 30 operating Clubs. The Club is designed to be an alert factor, sensitive to road safety problems on the local level – city or local authority. The Club compiles information about road safety weak-points, alerts the local authority and helps in finding a solution. Another example of community recruitment for the struggle against road crashes: volunteering to police traffic units. That's the way, community can prevent accidents – and enable change.

On the national level: the Israeli government must realize its responsibility and actively lead the struggle against traffic accidents, within the confines of the national road safety program that it passed in July 2005, and adopted as law by the Knesset in July 2006. The struggle against traffic accidents should be placed high on the public agenda, and should be managed as well as coordinated on the national level. Clearly defined and quantitative goals should be set for the struggle, and program recommendations implemented, making the struggle against traffic accidents into a rational, life-saving struggle. Alongside the painful human aspects of traffic accidents is the significant financial and economic aspect, and the cost the economy huge amounts every year in terms of loss of work days, hospitalization and rehabilitation, as well as in direct and indirect expenses.

A cornerstone for success in this struggle is allowing the Israeli Road Safety Authority (RSA) that began its activity in January 2007 based on the approved national program, to fulfill its duties as the main coordinator of the national road safety effort. However, administrative procedures, different agendas and other impediments prevent the RSA from maximizing its potential. This is a situation Or Yarok strives to change.

The activities of Or Yarok association are carried out in four arenas: applied projects, research, public advocacy and public motivation. In these arenas, the Association emphasizes the following areas of activity:

Applied projects – Or Yarok initiated, performed and evaluated several projects to promote road safety in Israel. These projects are used to demonstrate both feasibility and effectiveness of specific counter measures with the ultimate goal of transferring them to the Government or creating a continuity mechanism for their long-term implementation.

These projects include:

Improvement of young drivers' training process and its effective implementation. Or Yarok is conducting, through volunteers, personal guidance to parents and young drivers throughout the accompanied driving phase. This project was thoroughly researched and proved to be highly effective. It has also created general awareness to the importance of the accompanied driving phase, and a legislation suggestion to structure the training system accordingly.

Cooperation with the police and the national road safety authority to create and empower a volunteer traffic unit that incorporates over 10,000 volunteers.

Promoting road safety in the local authorities through the "safe city" compendium of activities.

Research – establishment of the "evidence based road safety" concept adopted from leading countries in road safety. The concept of evidence based road safety is implemented in all of OR YAROK's activities and serves as a guidance for a nation-wide adaptation both on the ministerial & Government level as well as in all road safety activities carried out in Israel. The Ran Naor Research Foundation was established to promote research and advance professional education and training in road safety.

Public advocacy – monitoring, evaluating and criticizing (if necessary) all the organizations that are in charge of road safety.

Information – public motivation through increased awareness to road safety issues, concepts, responsibility and call for action to a complete implementation of the national long-term road safety plan.

Young drivers are the focus of the activities of the association, which has accumulated knowledge, experience and expertise in handling this issue. Within the confines of young driver programs, Or Yarok operates the "Or Yarok for Life" program: In Israel, as in most countries around the world, the young driver population is accident-prone, and is involved in twice as many accidents compared to their size. A new driver in Israel is bound by law to drive with an experienced driver during the first three months after having received a license. The association aims to cause all new drivers in Israel to be entitled to have effective supervision throughout the period prescribed by law. In order to accomplish this, the association has created a novice program targeting both parents and young drivers during the accompanied driving phase.



The program includes an instructional meeting of the family host from Or Yarok with the new driver and his family, usually at the driver's home. After the meeting, the family is granted, at no cost, a sophisticated kit that is meant to provide an answer to both professional questions, related to safety driving, and to issues that might arise in the interaction between young drivers and their escorts. By the end of 2009, Or Yarok has carried out over 180,000 of these types of instructional meetings. The association acts to incorporate young drivers from the Arab sector in the program, and is, for this purpose, establishing a family host system and informative material in Arabic. In addition, in the sphere of young drivers – Or Yarok supports the establishment of GDL, Graduated Driver Licensing, and is working to advance the law on this issue.



In 2007, a joint venture between the Israel police, the National Road Safety Authority and the Ministry of Finance was launched – "Mitnadvim be Tnuah", which is an extension of the first project launched by "Or Yarok" – a project to encourage volunteering in the police department's traffic units across the country.

In this new venture, the police volunteer force, in the traffic (intercity) division and in the city traffic units will receive an annual budget of NIS 21 million for operating the force, for purchasing equipment, for instructional purposes and for improving the quality of the volunteers. Or Yarok contributed approximately 140 patrol cars to the project, and all ancillary equipment required to operate them. Since launching this project, the number of traffic volunteers has risen from 1000 at the beginning of the project to 10,000 today. The results are visible: increased presence of units and officers in city streets and roads.

In the joint venture, emphasis is placed on activities such as increased enforcement in the area of alcohol, reinforcement of conscious deterrence, etc.



A significant percentage of traffic accidents (approximately 74%) take place within towns. Most pedestrians who are injured within towns are children and senior citizens. The association has therefore decided to act in the area of local authorities in order to help towns become safer.

An examination of actions taken around the world revealed that successes have been achieved when a systematic intervention program was implemented in the town in various layers (infrastructure, education, society and enforcement) by the local authorities in a range of factors affecting road safety in that town. The success of the actions depends on the full cooperation and assumption of responsibility by the local authority leadership.

In addition to the establishment of the "Or Yarok Clubs" (mentioned above) in several towns, the association will act as a facilitating and influential factor on national and local authorities in road safety management and activities that will reduce the number of traffic accidents and casualties in towns.



Senior citizens' activities with kindergarten children - In this unique program, senior citizens volunteers visit kindergartens once a week to deliver road safety messages through different activities such as games and stories.

Elementary schools - Diverse activities are performed at schools, aimed to train the youngsters to take individual responsibility as road users, and to convey road safety messages to their families.

Gender differences - Involvement in road crashes is more prevalent among men than among women, especially when young drivers are concerned. Not only are women more cautious and responsible on the road, they can also exert positive influence on men. In this program, designed for women only, participants take part in a special training course, during which they acquire tools to help them calm their young male counterparts on the road.

High schools and the military - Or-yarok reaches out to young drivers in high schools and in the army service. These programs address the main problems of young driving, such as inexperience, peer pressure, and driving under the influence of alcohol. Some of these activities involve training youth to be young leaders and serve as agents for social change in the field of road safety. In the army, commanders are trained to discuss road safety issues with their soldiers as part of their military routine, and when off-duty on weekends and vacations.

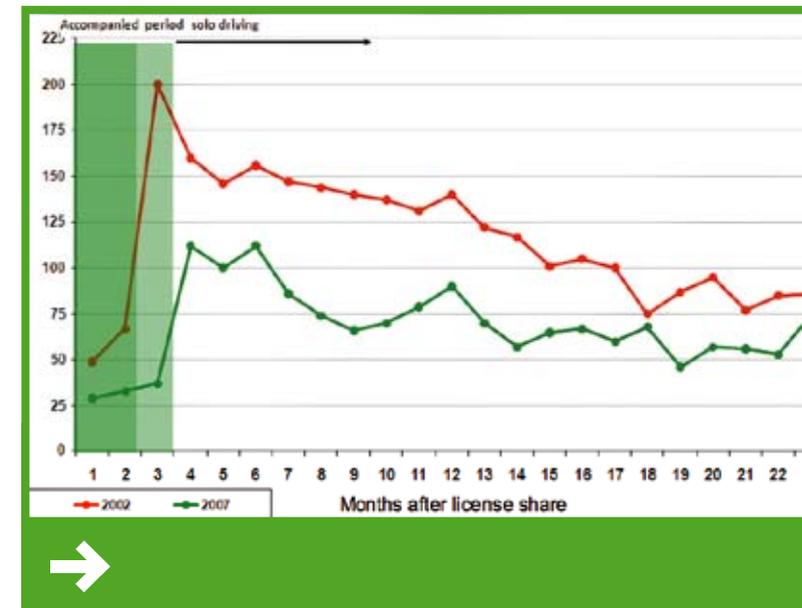
Lectures in workplaces - Or yarok provides lectures on road safety issues to drivers in workplaces, in order to raise their awareness to safe driving, and to bring about behavioral change. These lectures help create road safety consciousness among both employers and employees in the workplace itself as well as in the wider community.

Lectures to the senior community - Because of the physical and cognitive deterioration with age, there are special road safety issues, which characterize the elderly. In order to improve the road safety of the senior community, Or-yarok has developed special training course, dealing with the main hazards for pedestrians and drivers at this age.

Research provides the basis to all of Or Yarok's activities and accompanies all aspects of its operation. Or Yarok promotes an Evidence-Based-Safety approach both in its own activities and in the overall road safety community in Israel. For this purpose, it initiates, finances and manages a wide spectrum of research activities and is actively involved in implementing and disseminating their conclusions. Through this approach Or Yarok strives to bridge and connect between academia and practice, in an effort to enhance knowledge regarding the causes of road crashes and their characteristics, and to examine and implement effective countermeasures.

The research activity is carried out in cooperation with researchers from the Israeli and global academic community in various fields, all related to road safety, and in cooperation with research departments of Universities and organizations in Israel dealing with road safety.

Dr. Tsippy Lotan is the chief scientist of Or Yarok.



The Association was extremely active in the establishment of the road safety lobby in the Knesset, the Israeli parliament. This lobby is the largest ever in the Knesset since its establishment, and involves 62 MKs (of the 120 MKs) from every faction. The lobby convenes regularly, and sponsors as well as supports safety legislations, etc. In 2005, the lobby signed 93 MKs on a demand from the government to implement the national road safety program. The association encourages safety legislation in the Knesset, and provides research and data to legislators. It also maintains a regular presence in the Knesset through its lobbyist. Among the laws the association was involved in is the extension of the new driver escorting law, a law enabling the impoundment of cars due to deliberate offences, the new road safety authority, etc.

The Or Yarok Association sees itself as a representative of the public interest in road safety. In this framework, the association monitors the actions of all the official and government organizations in charge of road safety, and reports to the public about the activities as well as alert them to failures and mishaps.

Among the issues that the public advocacy focuses on are: backing an independent national road safety authority (RSA), the Israel National Roads Company (Ma'atz), the legal system and rulings on traffic, enforcement with emphasis on driving under the influence of alcohol, pedestrian behavior, wearing seat belts, health and safety, two-wheel vehicle, etc.

Or Yarok convenes an international conference dedicated to road safety every year. To date, seven conferences have been convened. The conference brings together all parties involved in road safety in Israel – from officials at the Ministry of Transportation and National Road Safety Authority, to Israel Police, researchers and academicians, safety experts from Israel and around the world, road safety associations, etc. The issues that are discussed include road safety issues at the top of the public agenda. The conference convenes every year and is attended by the Prime Minister, ministers and MKs.



List of main topics of Or Yarok's seminars, conferences and workshops (partial list):

Children Safety, 2005

Young Drivers and GDL, 2005

Safety Measures and Indicators, 2007

Alcohol and Driving, 2007

Annual Or Yarok Safety Conferences – Main topics:

New Road Safety Authority (2006)

Local Authorities

Speeding

Enforcement

Technology

Safety improvements in Infrastructure, 2008

Passive Safety in Vehicles, 2008

Road Safety in workplaces, 2009

Workshops on implementation of research in road safety 2009

Education for road safety, 2009



Or Yarok and the National Road Safety Program

The Or Yarok association believes that the struggle against road accidents can succeed by focusing and coordinating efforts made by the various authorities, to coalesce into one comprehensive program, a national road safety program. This is an excellent formula for achieving significant success in the struggle against traffic accidents and international experience does indeed confirm that when a country sets the struggle against traffic accidents as a national goal, and determines a multi-annual plan accompanied by performance goals and carries out multidisciplinary actions – they can – and manage to – lower the number of accidents and casualties by dozens of percentages!

In the first half of 2005, Or Yarok launched a large public campaign under the slogan – "Road Safety – Not Fate, but Fault", in which it signed more than 1,200,000 citizens on a petition calling on the government to adopt and implement a national program. The Or Yarok association asked the government to define in the plan, its numerical goals for a reduction in the number of people killed and seriously injured.

On July 17, 2005, the Israeli government passed by a vast majority (19 for, 2 abstentions) a resolution adopting and implementing a national road safety program, based on the recommendations of the committee report headed by Dr. Yacov Shaynin. In July 2006, the Knesset also passed the New National Road Safety Authority Law, based on the Shaynin Report.

Basic Value – Human Life

The Or Yarok association acts out of recognition of the supreme importance of the uncompromising battle against traffic accidents and of the importance of community involvement in this battle.

Or Yarok strives to reduce the number of casualties in traffic accidents, to influence a change in Israel's driving culture and to reinforce a civil society that is involved and active in the struggle against traffic accidents.

Or Yarok believes that this change is possible by strictly and meticulously maintaining traffic laws, safety rules, cautious and generous behavior while showing consideration for others – all based on a humane approach that endeavors to prevent traffic accidents and their consequences. The people of Or Yarok set the saving of human life on the roads as their prime goal.

Responsibility

The people of Or Yarok will assume responsibility for exercising the association's basic value and will work while constantly demonstrating involvement, initiative and diligence, within the spheres of its authority.

Reliability and Fairness

The people of Or Yarok will introduce issues in their entity, in their entirety, accurately, in planning, performance and reporting. They will act so that their colleagues can rely on their performance of the tasks. The people of Or Yarok will behave fairly and with appropriate transparency towards those who work with them in the association and with their partners.

Personal Example

The people of Or Yarok will serve as personal role models in terms of their behavior on the job and in their driving. They will do exactly what they demand that others do, while acknowledging their ability and responsibility.

Professionalism and Excellence

The people of Or Yarok will work to acquire the professional knowledge and skills required to carry out their job, will apply them while striving to continually improve personal and system achievements. Furthermore, the people of Or Yarok will not be satisfied with only professionalism but will make every effort to achieve excellence in every sphere pertaining to the association's work.

Mission

The people of Or Yarok will view their work and membership at Or Yarok as a human and social mission that may significantly impact Israeli society.

Friendship

The people of Or Yarok will work together in a spirit of unity, friendship and mutual support for the common goal.

 This is a partial list of selected publications in recent years.
All publications are in Hebrew unless otherwise noted.

Position Papers and Status Reports

Driving Under the Influence in Israel

Bicycle helmets

Roadside advertising

Two Wheelers

Vehicle Impoundment

Research Publications

Alcohol and Driving- Examples from International Experience (2007)

Drink driving Barometer - Public attitude Surveys

International Comparisons

A comparison between Israeli and European Drivers, Sartre III (2007)

Road Safety Measures in Israel in Compared to Europe- Summary of PIN Reports, 2008

Public Opinion Surveys

Public Opinion Survey Regarding Road Safety in Israel
(ANNUAL SURVEY SINCE 2004)

Public Opinion Survey Regarding a National Plan for Road Safety (2005)

Public Opinion Survey Regarding traffic Enforcement in Israel (2006)

Young Drivers

Driving purpose and exposure (2009)

Evaluating the Safety Implications & Research Potential of “Green Box” for Young Drivers (2005)

A Novel Program to Enhance Safety for Young Drivers in Israel (2007)¹

Public Opinions about New Legislation concerning Young Drivers’ Training (2005)

Young Drivers Involvement in Road Crashes – Data, Trends and Research (2nd ed. 2008)

Other Topics

Literature Review of The Effectiveness of Fear Appeal on Risk Taking in Driving (2005)

Road Safety in Israel in Urban Areas 2004-2005 (2006)

Road safety research and education in Israel (2007)

GreenBox (IVDR)²

An In-Vehicle Data Recorder for Evaluation of Driving Behavior and Safety

Tsippy Lotan, Tomer Toledo

Paper for TRB Annual conference, 2006

1. Abstract in English is attached
2. In this section all papers are ones published in professional and academic journals and publications. Abstracts in English for all papers are attached.

Driving Patterns of Young Drivers within a Graduated Driver Licensing System

Tsippy Lotan, Tomer Toledo

Paper for the TRB Annual conference, 2007

Evaluating the Safety Implications & Research Potential of “Green Box” for Young Drivers

Tsippy Lotan, Tomer Toledo

Paper for the 3th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design 2005

Intra-Familial Transmission of Driving Behavior: Evidence from In-Vehicle Data Recorders

Carlo Giacomo Prato, Tsippy Lotan, Tomer Toledo

Paper TRB Annual Conference, 2009

In-Vehicle Data Recorders for Monitoring and Feedback on Drivers’ Behavior

Tomer Toledo, Oren Musicant, Tsippy Lotan

An abstract of an article from Transportation Research Part C 16 (2008) 320–331

Modeling the Behavior of Novice Young Drivers During the First Year After Licensure

Carlo Giacomo Prato, Tomer Toledo, Tsippy Lotan, Orit Taubman - Ben-Ari

An abstract of an article from Accident Analysis and Prevention (forthcoming)

Modeling the Behavior of Novice Young Drivers Using Data from In-vehicle Data Recorders

Tsippy Lotan, Tomer Toledo, Carlo G. Prato

Paper for the 5th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design 2009

Safety Correlation and Implications of an In-Vehicle Data Recorder on Driver Behavior

Oren Musicant, Tsippy Lotan, Tomer Toledo

Paper TRB Annual Conference, 2007

The Ran Naor Research Foundation - Publications¹

Explanatory research by means of data mining for investigating relationships among infrastructure, drivers and the nature of offences

Dr. Shlomo Bekhor, Prof. David Mahalel - Transportation Research Institute, Technion

Different methods of coping with driving fatigue during prolonged driving – an in-depth study

Prof. David Shinar, Dr. Adi Ronen - Dept. of Industrial Engineering and Management, Ben-Gurion University of the Negev

The effect of installing a speed limiter in vehicles on the number and severity of road accidents

Prof. Avishai Ceder, Faculty of Civil and Environmental Engineering, Technion-Israel Institute of Technology

Statistical-prediction model for accidents at non-urban intersections in Israel

Dr. Hillel Bar-Gera, Dept. of Industrial Engineering and Management, Ben-Gurion University of the Negev

1. The following is a partial list of selected studies made for Ran Naor Foundation in 2005-2007.

Analysis and modeling of driving behavior using an in-vehicle data recorder

Prof. Yoram Shiftan – Faculty of Civil and Environmental Engineering,
Technion-Israel Institute of Technology

The relation between driving experience and the recognition of road signs according to their locations

Prof. Joachim Meyer, Dept. of Industrial Engineering and Management,
Ben-Gurion University of the Negev

Working conditions, fatigue and crashes among truck drivers in the Arab sector, in comparison with the Jewish sector.

Prof. Elliot Berry, Prof. Elihu Richter - Hebrew University, Hadassah School of Public Health and Community Medicine.

Driving-related adaptation patterns among elderly drivers in Israel: Description, antecedents and well-being outcomes

Prof. Sara Carmel, Department of Sociology of Health and Gerontology, Faculty of Health Sciences, Ben Gurion University of the Negev

Child injuries associated with school transportation

Sharon Goldman, Center for Trauma and Emergency Medicine Research, the Gertner Institute for Epidemiology and Health Policy Research

**”Pedestrian-oriented environments” - The protection of pedestrians’ rights -
Improving the quality of life in urban environments.**

Prof. Moshe Margalith, School of Architecture, Tel-Aviv University

Injured pedestrians – circumstances, injury profile and outcome

Malka Avitzour, Center for Trauma and Emergency Medicine Research,
Gertner Institute for Epidemiology and Health Policy Research

**Towards developing a hazard-perception training program for young
inexperienced drivers**

Dr. Tal Oron-Gilad, Dept. of Industrial Engineering and Management,
Ben-Gurion University of the Negev

**Legal regulation of older drivers: a critical international
comparative perspective.**

Dr. Israel Doron, Department of Gerontology, Haifa University

A decision-support system for sentencing of traffic offenders

Prof. Uri J. Schild, Department of Computer Science, Dr. Ruth Kannai, Faculty of Law,
Bar Ilan University

Automatic monitoring and enforcement of traffic regulations

Dr. Tomer Toledo, Dr. Filin Sagi, Transportation Research Institute, Technion – Israel Institute of Technology

Characteristics of bicycle-related injuries and safety issues as a basis for injury prevention programs

Dr. Kobi Peleg, Center for Trauma and Emergency Medicine Research, Gertner Institute for Epidemiology and Health Policy Research

Using incentives for reducing the frequency of deviant driving speeds

Prof. David Navon, Department of Psychology, Haifa University

The effect of an employer-provided car and associated taxation policy on road safety

Prof. Yoram Shiftan – Faculty of Civil and Environmental Engineering, Technion-Israel Institute of Technology

**How can communication campaigns influence road safety behavior?
Which theories and models are used, and what could be the potential contribution of theories and models that have not been used?**

Dr. Nurit Guttman, Department of Communications, Dr. Yechiel Klar, Department of Psychology, Tel Aviv University

**Risk factors for car accidents due to the reduction of visual abilities
in low light conditions**

Dr. Uri Polat, Sackler School of Medicine, Tel Aviv University

Detection and automatic alarm for obstacles on road-rail crossings

Prof. Yehoshua Zeevi, Faculty of Electrical Engineering, Technion – Israel Institute of Technology

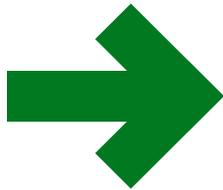
**Development of tools for a safety examination of detailed plans of urban streets
with mixed land uses**

Prof. Doron Balasha, Dr. Victoria Gitelman, Transportation Research Institute, Faculty of Civil and Environmental Engineering, Technion – Israel Institute of Technology

**Barriers to the implementation of traffic calming in Israeli towns and cities and
the policy required to overcome them**

Dr. Yodan Rofè, Department of Man in the Desert, J. Blaustein Institute of Desert Research, Ben-Gurion University of the Negev.

APPENDIX I:
OR YAROK
PAPER'S
ABSTRACTS



A NOVEL PROGRAM TO ENHANCE SAFETY FOR YOUNG DRIVERS IN ISRAEL

Tsippy Lotan, Tomer Toledo

Paper for "Road Safety On 4 Continents" conference, 2007

Young drivers in Israel, as in other parts of the world, are involved in car crashes more than any other age group. In Israel, a graduated driver licensing (GDL) system has been introduced, which requires all new drivers to be accompanied by an experienced driver whenever they drive for the first three months after obtaining a driving license. In an effort to make the accompanied driving phase more effective, a novel program which targets both young drivers and their parents was initiated. The program administers a personal meeting with the young driver and the accompanying parent scheduled for the beginning of the accompanied driving phase. During this meeting guidance is given regarding best practices for the accompanied driving period, as well as tips for dealing with in-vehicle parent-teen dynamics. More than 70,000 families of young drivers have already participated in the program. In order to evaluate the effectiveness of the program, official crash records (as documented by the police and reported by the Central Bureau of Statistics) of young drivers who participated in the program were compared with crash records of all other license holders at the same time period. The results obtained indicate statistically significant lower crash record for those who participated in the program.

An In-Vehicle Data Recorder for Evaluation of Driving Behavior and Safety

Tsippy Lotan, Tomer Toledo

Paper for TRB Annual conference, 2006

This paper describes the overall framework and components of an in-vehicle data recorder (IVDR) called DriveDiagnostics, and presents results from a study to validate its performance. The IVDR has been designed for the purpose of monitoring and analyzing driver behavior in normal driving situations and not only crash or pre-crash events. It records the movement of the vehicle and uses this information to indicate on the overall trip safety. The validation study involved 33 drivers, whose vehicles were instrumented with the IVDR. The experiment first included a blind profiling stage in which drivers did not receive any feedback from the system, followed by a feedback stage in which drivers had access to personal web pages with the information recorded by the system. Data collected in the blind profiling stage was used to investigate the connection between drivers' safety indices as captured by the system, and historic crash data. The results show significant correlations between the two datasets. Thus, suggesting that the driving risk indices can be used as indicators to the risk of involvement in car crashes. This connection enabled us to also investigate the potential impact of the system on driving behavior and on safety. The results show that the initial exposure of drivers to the system has a significant positive impact on their behavior and on safety. Access to the feedback provided by the system has further impact on drivers' performance. However, if follow-up efforts are not made both these positive impact are not sustained over time.

Driving Patterns of Young Drivers within a Graduated Driver Licensing System

Tsippy Lotan, Tomer Toledo

Paper for the TRB Annual conference, 2007

Young drivers in Israel, as in other parts of the world, are involved in car crashes more than any other age group. In Israel, a graduated driver licensing (GDL) system has been introduced, which requires all new drivers to be accompanied by an experienced driver whenever they drive for the first three months after obtaining a driving license. As part of the efforts to characterize the driving behavior of young drivers in the accompanied driving period and the period immediately thereafter and we conduct a novel experiment, which uses information gathered from an in-vehicle data recorder (IVDR). In the experiment, an IVDR system is installed in the primary vehicles driven by the young drivers in the families that participate in the experiment. The system monitors all trips made by the vehicle and all drivers are identified. We report on results of the analysis of these data. In particular we study the amount of driving young drivers undertake in the accompanied driving period and the period thereafter, and the characteristics of the temporal distributions of these trips. We find striking differences between the driving patterns characteristics in the two periods in all these aspects, and between the IVDR measurements and similar statistics obtained through self reports.

Evaluating the Safety Implications & Research Potential of “Green Box” for Young Drivers

Tsippy Lotan, Tomer Toledo

Paper for the 3th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design 2005

Young drivers in Israel, as in other parts of the world, are involved in car crashes more than any other age group. Green Light for Life is a new program that seeks to improve the quality of the experience of young drivers during the mandatory accompanied driving period. As part of the efforts to evaluate the effectiveness of this program a novel experiment, which uses information gathered from an in-vehicle data recorder (IVDR) is conducted. The DriveDiagnostics IVDR system, which is used in this study, can identify over 20 different maneuver types in raw measurements and use this information to indicate overall trip safety. Drivers receive feedback through various summary reports, real-time text messages or an in-vehicle display unit. Preliminary validation tests with the system demonstrate promising potential. In the experiment, the DriveDiagnostics system is installed in the primary vehicle driven by the young driver in 120 families. The experiment is designed to test the impact on driving behavior of participation in the program and the type of feedback drivers receive from the system. The data collection part of the experiment is scheduled to run for 8 months for each family.

Intra-Familial Transmission of Driving Behavior: Evidence from In-Vehicle Data Recorders

Carlo Giacomo Prato, Tsippy Lotan, Tomer Toledo

Paper TRB Annual Conference, 2009

This study analyzes intra-familial transmission of driving behavior by examining driving patterns of newly licensed young drivers and their family members as recorded over a period of nine months using in-vehicle data recorders. Various maneuvers that the drivers undertook were identified in the measurements and used to compute risk indices for each driver during each month. The correlations between risk indices of drivers within the same family were studied. The results show intra-familial transmission of driving behavior and reveal that this transmission evolves over time, as the behavior of young drivers is initially more closely related to that of their family members, but gradually develops into a more differentiated personal driving style. Higher correlations are also found for specific maneuver types, such as braking and accelerating, and to a lesser extent for other maneuvers such as speeding. The findings of the present study indicate a need to carefully consider the role played by parents in the driving education of young adults, by advising parents to exert control over their offspring's driving through positive modeling, and not only through well-designed commentary driving.

In-Vehicle Data Recorders for Monitoring and Feedback on Drivers' Behavior

Tomer Toledo, Oren Musicant, Tsippy Lotan

An abstract of an article from Transportation Research Part C 16 (2008) 320–331

This paper describes the potential of in-vehicle data recorder (IVDR) systems to be used in various commercial and research applications as tools to monitor and provide feedback to drivers on their on-road behavior. The implementation of IVDR is demonstrated using the example of the DriveDiagnostics system. This system can identify various maneuver types that occur in the raw measurements, and use this information to calculate risk indices that indicate on the overall trip safety. Drivers receive feedback through various summary reports, real-time text messages or an in-vehicle display unit. Validation tests with the system demonstrate promising potential as a measurement tool to evaluate driving behavior. Reductions in crash rates and the risk indices are observed in the short-term.

MODELING THE BEHAVIOR OF NOVICE YOUNG DRIVERS USING DATA FROM INVEHICLE DATA RECORDERS

Tsippy Lotan, Tomer Toledo, Carlo G. Prato

Paper for the 5th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design 2009

Novice young drivers suffer from increased crash risk that translates into over-representation in road injuries. A better understanding of the driving behavior of novice young drivers and of their determinants is needed to tackle this problem. To this extent, this study analyzes the behavior of novice young drivers within a Graduated Driver Licensing (GDL) program. Data on driving behavior of novice drivers and their parents is collected using in-vehicle data recorders, which calculate compound risk indices as measures of the risk taking behavior of the various drivers. Data is used to estimate a negative binomial model to identify the major factors that affect the driving behavior of the young drivers. Estimation results suggest that the risk taking behavior of young drivers is influenced by that of their parents and decreases with higher levels of supervised driving and stricter monitoring by the parents.

Modeling the Behavior of Novice Young Drivers During the First Year After Licensure

Carlo Giacomo Prato, Tomer Toledo, Tsippy Lotan, Orit Taubman - Ben-Ari

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Novice young drivers suffer from increased crash risk that translates into over-representation in road injuries. In order to effectively confront this problem, a better understanding of the driving behavior of novice young drivers and of its determinants is needed. This study analyzes the behavior of novice young drivers within a Graduated Driver Licensing (GDL) program. Data on driving behavior of 62 novice drivers and their parents, who voluntarily participated in this experiment, were collected using in-vehicle data recorders that calculate compound risk indices as measures of the risk taking behavior of drivers. Data were used to estimate a negative binomial model to identify major determinants that affect the driving behavior of young drivers during the first year after licensure. Estimation results suggest that the risk taking behavior of young drivers is influenced by gender, sensation seeking tendency, driving behavior of their parents, amount of supervised driving and level of parental monitoring.

Safety Correlation and Implications of an In-Vehicle Data Recorder on Driver Behavior

Oren Musicant, Tsippy Lotan, Tomer Toledo

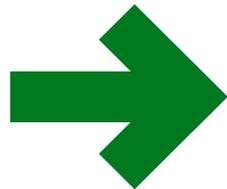
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Understanding individual on-road behavior has been a key issue in traffic safety research. A deeper insight into the driving patterns has been so far restricted, due to limited availability of actual longitudinal data and exposure data. This paper presents an innovative approach in which actual driving data is obtained by means of an in-vehicle data recorder (IVDR). This data are used to evaluate drivers' behavior and safety. In particular, two major issues regarding the validity of such systems as safety promoters are analyzed. The first is the correlation between the accident risk indices calculated based on the IVDR data and drivers' records of car crash involvement. Once this correlation is established, the second issue is the ability of drivers to change their behavior in the desired direction, namely to become safer drivers. The results obtained, based on observations of 103 drivers in 18173 trips and more than 8400 driving hours indicate that the risk indices and classifications calculated based on the IVDR data are significantly correlated with past car crash involvement. Exposure to the feedback generated from the system has a potentially high impact on collision reduction with over 40% reduction in crash rates using before and after data. Finally, this behavioral change has been maintained for 9 months after the exposure to the IVDR feedback.

APPENDIX II:

Ran Naor Foundation

**PAPER'S
ABSTRACTS**



Explanatory research by means of data mining for investigating relationships among infrastructure, drivers and the nature of offences

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Transportation Research Institute, Technion

Road-safety research has been conducted for many years, yet many issues still remain unexplored. The relationships between various characteristics (such as driver behavior, socio-economic background, infrastructure, weather conditions and season of the year) and road accidents are not fully understood.

In recent years, exploratory research has been conducted using data mining techniques to discover the relationship between several characteristics that are known to affect accidents such as the road, driver, vehicle, day of week and season of the year.

The proposed research will continue the investigation of data mining techniques in an attempt to establish relationships between a different set of variables (driver characteristics, infrastructure, weather, socio-economic status) and accident data.

The expected outcome of the research is a better understanding of the relationships between the variables, which will help in the efforts to reduce road accidents.

The research approach is oriented toward exploring the knowledge accumulated in existing databases. The significance of this research lies in the development of new insights into road accidents, which will provide valuable help in developing new methods to increase road safety, particularly at the stage of choosing appropriate means and allocating budgets.

Different methods of coping with driving fatigue during prolonged driving – an in-depth study

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The objective of this study is to design and evaluate different methods and combinations of methods that could enhance alertness during prolonged driving.

The hypotheses stem from recent results obtained in our laboratory and suggest that some mental tasks or games, combined with an energy drink or a simple secondary task involving manual dexterity (shelling and eating sunflower seeds) may enable a driver to maintain alertness during a prolonged trip. The purpose of this study is to validate this conjecture.

The study will be conducted in the driving-simulation laboratory of Ben-Gurion University of the Negev using an STISIM partially moving-based driving simulator that is integrated into a real passenger car. The study comprises four stages: 1. Developing advanced cognitive software, based on previous knowledge, using auditory and visual displays that will be activated on the basis of drivers' requests and reactions during a prolong trip. 2. Evaluating the software using the driving simulator. 3. Evaluating the relative benefits of the three methods intended to improve driving alertness: mental tasks (using software to be developed), energy drinks, and a manual-dexterity, gustatory secondary task. 4. Combining the two most effective methods in order to assess the synergistic effects of both, and the ability to project the benefits of these methods to real-life driving. During each experiment the subject's driving performance, subjective fatigue, and physiological state will be assessed.

The effect of installing a speed limiter in vehicles on the number and severity of road accidents

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On the basis of previous studies, a relationship has been found between travel-speed and the severity and quantity of road accidents. Lowering speed variability reduces conflicts between drivers and enables a more homogenous traffic flow. A speed limiter is a specific instrument associated with the Intelligent Speed Adaptation (ISA) system that is installed in a vehicle to prevent it from exceeding the maximum permitted speed. The Israeli Ministry of Transportation decided to adopt European Union regulations regarding the speed limiter and made it obligatory for trucks and buses to install the limiter as of 1996. The main objectives of this proposal are: (1) to investigate and estimate the impact on road accidents in Israel as the result of installing speed limiters in trucks and buses from 1996 to 2004, and (2) to estimate the expected changes, both in drivers' behavior and levels of road safety, following the installation of speed limiters (using different speed limiter values) on all, except emergency, vehicles. Expected changes in the speed distribution will be based on the assumption of similarity (in terms of correction factors) to differences observed worldwide in speed distributions due to new cuts in speed limits including radiating effects. The proposed methodology is based on (i) data collection and cross sections related to speed limiters and speed distributions in Israel, (ii) developing a simulation model for new speed distributions when all vehicles have a speed limiter, and (iii) quantitative analyses to achieve the proposal's objectives. The proposed examination of speed limiters across all, except emergency, vehicles will hopefully lead to operational recommendations that will presumably improve the level of highway safety level through changes in the driver's behavior and in the traffic-speed distribution.

Statistical-prediction model for accidents at non-urban intersections in Israel

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The purpose of the proposed research is to develop a statistical model that correlates the number of traffic accidents at non-urban intersections in Israel with various attributes of the intersection, particularly traffic volumes. Following the leading methodology in accident analyses of this type, we will develop a set of negative binomial models. Separate models will be developed for signalized 4-arm intersections, signalized 3-arm intersections, unsignalized 4-arm intersections, and unsignalized 3-arm intersections. Additional attention will be devoted to subgroups of accidents that are likely to be better modeled separately. The working hypothesis is that the family of negative binomial models that has proven to be successful in many safety studies around the world is applicable to the Israeli data. However, the specific parameters of the model must be re-estimated to achieve models that are suitable for Israel.

The results of this research will enable us to identify a risk parameter for every intersection, thereby providing a rational basis for the allocation of police enforcement resources to different intersections. The results will also help identify intersections that deviate from the norm and therefore require detailed inspection for potential deficiencies.

Analysis and modeling of driving behavior using an in-vehicle data recorder

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Human behavior is a major factor affecting road safety. Therefore it is important to investigate drivers' behavior and the factors that influence it. The purpose of this study is to develop a modeling framework to identify “normal” and “extreme” behavior and to model the connection between these behaviors and the driver's characteristics. In this study, we will utilize data collected by in-vehicle data recorders (IVDR), which monitor second-by-second actual driving behavior. We will also attempt to apply this framework and connect the observed driving behavior to the risk of involvement in traffic accidents.

The study will include several tasks. We will first collect driving-behavior data using IVDR and supplementary data such as responses to self-reporting questionnaires and records of driver history. This information will be used to identify driving patterns and extreme behaviors. We will then develop models that capture the relations between drivers' characteristics and their driving behavior. These models will increase understanding of the important factors that effect driving behavior and will help to identify those aspects of drivers' attitudes towards driving that need to be changed. The use of direct observation of driving behavior, as recorded by the IVDR, rather than self-reports, will improve the quality of the models and reduce estimation biases.

The relation between driving experience and the recognition of road signs according to their locations

Prof. Joachim Meyer

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The current study will examine situations in which experience might paradoxically lead to a failure in the identification of traffic signs, namely when they are located in unexpected places. According to police reports, disobeying traffic signs is one of the most frequent causes of accidents. Because experienced drivers have pre-determined schema for scanning the roadway, they may experience difficulties in identifying traffic signs when they are located in unexpected locations. In such situations, the tendency to blame these drivers for an accident is misplaced, because the problem is in the roadway environment. In contrast, novice drivers, who do not yet have pre-established schemas, may perform more poorly in general, but will do so at the same level for signs in both expected and unexpected locations. They may thus perform better than experienced drivers when the signs are located in unexpected locations. In the present study we will expose subjects briefly to street and road scenes in various traffic situations. Some of the pictures will contain "no right-turn" signs in the expected location (on the right curb) and some will contain the same sign in an unexpected location (on the left curb). Both placements have in fact been observed in streets in Israel. The research results will emphasize the need for stricter uniformity in the placing of signs in expected places. These operational guidelines will assist in reducing car accidents.

Working conditions, fatigue and crashes among truck drivers in the Arab sector, in comparison with the Jewish sector.

Prof. Elliot Berry, Prof. Elihu Richter

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B **ackground:** In Israel in 2002 there were 326,300 trucks, some 12% of the total number of vehicles, but these were involved in crashes resulting in 28% of road deaths, with risk increasing by vehicle weight. Risk is greater in the Arab sector than the Jewish sector, and appears to be associated with the younger age of drivers, longer working hours, lack of sleep, fatigue, parking problems in Arab towns, presence of pedestrians, and increased severity of injuries from higher-speed crashes.

Objective: To determine occupational and individual predictors of fatigue, falling asleep at the wheel and involvement in crashes with injuries and deaths among Arab truck drivers.

Setting and Method: Using validated questionnaires, we will interview some 200 Arab truck drivers from three towns in Northern Israel (25% sample out of 800), as well as 100 Jewish truck drivers. The questionnaires examine driver characteristics, workplace and driving conditions, employer-employee relations, relevant medical conditions, sleep quality, reported fatigue, falling asleep at the wheel, and prior history of involvement in road crashes. The research will assess differences between the Arab and Jewish sectors.

Importance and significance: The research will provide essential information on work conditions, fatigue, and crashes and their interrelationships in a high-risk setting. Data on the working conditions of individual Arab truck drivers, with an emphasis on fatigue, working hours and health status are essential for defining preventive programs.

Driving-related adaptation patterns among elderly drivers in Israel: Description, antecedents and well-being outcomes

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The purpose of this study is threefold: a) Identifying different patterns of adaptation to decline in driving-related capabilities, including self-imposed limitations on driving, and voluntary or compulsory cessation of driving, b) Assessing the factors that influence the choice of a specific driving-related pattern of adaptation (DPA), and c) Determining the associations between the DPA and general well-being, in terms of self-esteem and satisfaction with life. We hypothesize that in addition to socio-demographic status, health status, family/social support, and personal history of driving and car accidents, four factors influence the choice of a DPA: needs, accessible alternatives, importance of driving, and self-evaluation of driving-related capabilities. We further hypothesize that successful and normative adaptation patterns will be associated with perceived well-being.

A national random sample of 800 licensed drivers, aged 70+, will be drawn from the lists of the Israeli Ministry of Transportation. The participants will be interviewed in their homes by trained interviewers. The interviews will be based on a semi-structured questionnaire, developed on the basis of a theoretical model, current literature and an exploratory study.

Our findings will enhance the understanding of DPA in old age as a necessary condition for the development of effective interventions and educational programs intended to extend the years of safe driving and quality of life for elderly persons. The findings will also yield suggestions for effective and considerate licensing policies in Israel.

Child injuries associated with school transportation

Sharon Goldman

Center for Trauma and Emergency Medicine Research, the Gertner Institute for Epidemiology and Health Policy Research

A **im:** The ultimate goal of this study is to reduce childhood injuries and fatalities associated with school transportation. This goal will be achieved by providing policy makers with current information and recommendations regarding safety hazards and injury data related to school transportation.

Specific Objectives: To collect data on safety related regulations and behaviors associated with school transportation.

To determine the frequency, causes and types of injuries encountered by children traveling by means of school transportation (van, minibus, school bus).

Working hypothesis: Childhood injuries associated with school transportation exist. However, since the magnitude of the problem is unknown, an in-depth study is needed to determine the frequency and characteristics of the injuries. Furthermore, previously defined safety measures and recommendations should be backed up with relevant evidence.

Methodology: The study population will comprise children aged 5-17 who regularly use school transportation. The study period will be from May 2006 to December 2007. Background information will be obtained through an in-depth literature review of international and local standards and regulations.

Data and information will be acquired from government authorities, the Israel National Trauma Registry, the media, Israel Police, and on-site observations.

Significance of the proposed research: At present, precise data is lacking regarding the types and causes of school-transportation-related injuries, the number of children injured while traveling by school-based transportation, and the regulations for reporting school transportation injuries. This study will determine the circumstances and causes of these injuries, identify risk factors and characterize severe injuries and their implications based on data from the Israel National Trauma Registry.

”Pedestrian-oriented environments”

The protection of pedestrians’ rights - Improving the quality of life in urban environments.

Prof. Moshe Margalith

School of Architecture, Tel-Aviv University

The purpose of the research is to reduce accidents in which pedestrians’ rights are violated, and to propose models for urban environments suitable for pedestrians. The implementation of the research will thus improve the quality of life in urban environments.

The research will comprise three parts:

Collecting information based on field surveys in urban environments in Israel and abroad:

A/1. The percentage and classification of pedestrian road accidents.

A/2. The physical environments of pedestrian accidents: location, neighbourhoods, roads, land-use, activity systems, physical geometry and characteristics.

B. Analysis and evaluation of information using comparative methods. Models in Israel and abroad will be compared and evaluated as to their possible impact on the reduction of pedestrian accidents.

B/1. Evaluation of existing models, and proposals for new models for traffic reduction and control in urban environments.

B/2. Evaluation of existing and proposed land-uses and activities in relation to reduction of accidents, traffic control, and pedestrian safety.

B/3. Physical characteristics of existing and proposed "pedestrian-oriented planned environments", accompanied by diagrams, drawings, and illustrations.
Implementation of the research conclusions in coordination with governmental and municipal agencies.

C/1. Implementation of models for existing and planned environments.

C/2. Guidelines and standards for "pedestrian-oriented environments".

Injured pedestrians – circumstances, injury profile and outcome

Malka Avitzour

*Center for Trauma and Emergency Medicine Research,
Gertner Institute for Epidemiology and Health Policy Research*

A **im:** To provide a comprehensive report on injuries sustained by and care of pedestrians in order to facilitate evidence-based decision making for improved secondary prevention, thereby leading to better outcomes.

Objectives: Using data from the Israel National Trauma Registry in order:

To quantify the extent of hospitalized injured pedestrians (among all road users)

To characterize hospitalized injured pedestrians on the basis of demographic variables, circumstances of the injury, injury diagnosis profile, severity of the injury, treatment, nature of the hospitalization and outcome.

To describe the process of evacuation and transfer between hospitals for injured pedestrians

To analyse the data on outcomes of hospitalized injured pedestrians, by variables mentioned in clause 2 above.

Method : Data on 3,272 pedestrians registered in the Israel National Trauma Registry during 2003-2004 will be studied (all the injured pedestrians hospitalized in 10 hospitals). Descriptive statistics, including frequency distributions, means with standard deviations, median and quartiles, X² and t-tests will be used to compare categorical variables. Logistic regression will be used to analyse multi-variable models.

Significance and contribution of the study: Current data sources on pedestrian injuries in Israel are lacking. In order to facilitate evidence-based actions for reducing pedestrian morbidity and mortality, more complete data on the extent of injuries than that provided by the police is required. The Israel National Trauma Registry is the only source of data relating to all stages, from the accident through medical care to discharge from hospital. This study proposes increasing knowledge on pedestrian accidents in Israel.

Towards developing a hazard-perception training program for young inexperienced drivers

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Objectives: Hazard perception is highly correlated with driving accidents. With experience, the driver becomes familiar with hazardous situations and establishes a predetermined schema which enables him or her to both allocate attention to prominent locations where hazards are most likely to appear and to predict near-future hazardous events. Young-inexperienced (YI) drivers who lack the experience do not perceive immaterialized hazards and cannot predict near-future hazardous events.

Working hypotheses: The research will examine the efficiency of active hazard-perception training for improving YI drivers' ability to detect hazards and predict future hazardous situations. Methodology. YI drivers will be trained in an active program in which they will observe driver-perspective movies from a variety of typical traffic situations in Israel, and they will be required to interactively respond to hazards and classify the movies into an arbitrary number of groups according to the similarity in their hazardous situations. The control group will participate in a passive lecture program without any interactive experience in detecting hazards. YI drivers' performance and questionnaires e.g., DSI and DCQ will enable mapping of behavior patterns among this population.

Significance of the proposed research: The research will examine whether training YI drivers in the active program improves their ability to detect hazards as compared with drivers in the passive program. Also, whether the interactive program provides better ability to detect and predict hazards and as a result less willingness to take risks while driving. The research will assist in setting clear measures and criteria to evaluate the ability of YI drivers to detect hazards, and also whether hazard-perception training may encourage safer driving.

Legal regulation of older drivers: a critical international comparative perspective.

Dr. Israel Doron

Department of Gerontology, Haifa University

Objectives: To explore, describe, classify and analyze the different legal approaches towards regulating driving in old age in different legal systems around the world.

To examine the legitimacy of such legal regulations in light of empirical data regarding the involvement of older drivers in accidents and in light of social stigmas and stereotypes of old age (ageism).

To describe the Israeli regulation of older drivers and to propose its legal reform – if necessary.

Working hypothesis: The hypothesis is that despite differences in content and procedure, all countries legally regulate driving in old age, placing some restrictions and/or additional examinations or limits on older driving adults.

This hypothesis is based on a "ageist" approach towards old age, "painting" old age as time of loss and incapability.

Methodology: The research methodology of this research will be based upon comparative legal research. The laws of different countries regarding the legal regulation of older drivers will be described, analyzed and compared. More specifically, a diverse legal-culture and geographical sample will be chosen in order to provide a broad-as-possible comparative legal perspective.

Significance of the proposed research (uniqueness and possible benefits): The ageing of human society brings with it the ageing of the driver population. This study will provide a first-of-its-kind, broad international comparative legal perspective on the legal regulation of older drivers and provide an empirical basis for its legal reform.

A decision-support system for sentencing of traffic offenders

Prof. Uri J. Schild, *Department of Computer Science,*

Dr. Ruth Kannai, *Faculty of Law, Bar Ilan University*

Objectives: At present the criminal record of a traffic offender does not enable a judge to evaluate previous offences and sentences.

We propose to develop a decision-support system to analyze previous records and determine criminal trends, in order to assist judges in passing sentence. The system will expose aspects the judges themselves would discover only after protracted examination of past records. Judges do not have the time to do this.

Methodology : In the past we built a similar system for the general criminal domain using artificial intelligence methods, based on research and help from judges, lawyers, probation officers and academics. Previous offences and sentences are presented graphically, and indicate trends in the past record, for example, an increase in severity of offences or their frequency. The Israeli Attorney General has decided to introduce the system on a trial basis in the office of the prosecution in the Jerusalem district. The system was awarded the 2005 annual prize of the Ministry of Internal Security.

The proposed system will use a similar approach, drawing on the experience gained in developing the first system.

Significance of the proposed research (its uniqueness and possible benefits): The system will assist in identifying drivers who are dangerous to the public or are liable to be involved in future traffic offences and accidents. It will help in deciding which drivers should be prevented from driving in the future. The system will enable the user to see which sentences were imposed in the past and their effectiveness (or lack thereof), thus facilitating the decision of which sentence to give in the current case in order to deter the offender from future offences.

Automatic monitoring and enforcement of traffic regulations

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Enforcement is a critical component in the effort to improve traffic safety. One of the important roles of enforcement is to deter drivers from committing driving violations by increasing the perception of the risk of being caught and punished. Unfortunately, in many cases constraints related to the availability and cost of labor and other resources limit the amount of enforcement to levels that are well below what is desirable. Automatic enforcement, which relies on technology-based tools rather than human labor, may significantly improve the quality and effectiveness of enforcement. The objective of the proposed research is to study the core algorithmic capabilities necessary to develop a flexible system for automatic enforcement via videometry. The algorithmic development will also enable us to assess the feasibility of creating such systems and the potential benefits and costs associated with its operation.

Characteristics of bicycle-related injuries and safety issues as a basis for injury prevention programs

Dr. Kobi Peleg, Center for Trauma and Emergency Medicine Research,
Gertner Institute for Epidemiology and Health Policy Research

A **im:** Specific Objectives: To characterize bicycle-related injuries and identify high-risk groups in Israel. To develop an in-depth study focusing on the demographic and injury characteristics of the high-risk group, which will enable future intervention programs specific to this group.

Working hypothesis:

- 1.** Riding habits, the use of protective gear and bicycle-related injuries will be different among the various riding groups.
- 2.** High injury rates will be found among sport and leisure cyclists (SLC).
 - 2.1** Specific riding habits (frequency, time, location etc) will be identified among SLC.
 - 2.2** Over 80% of SLC use some form of protective gear (helmets, gloves, etc).
 - 2.3** The use of protective equipment will be more frequent among cyclists riding in groups compared with single riders.
 - 2.4** Road riders will have more severe injuries than off-road cyclists.

Methodology: Stage I: The study population will include all hospitalizations of cyclists in any of Israel's nine trauma centers between January 1, 2001 and December 31, 2005. This stage

examines trends, demographic characteristics, injury severity, time and place of event based on the National Trauma Registry. High-risk cycling groups will be identified. Stage II: Data collection from observations and questionnaires, focusing on riding habits; knowledge, attitudes and use of protective gear; and prior injuries among the high-risk group. The SAS statistical software version 9.1.3 will be used for statistical analysis, and statistical tests will be performed on the influential factors of injuries among cyclists.

Significance of the proposed research: There has been a dramatic increase in cycling among adults in Israel in recent years (an estimated 300,000 riders). Cyclists are at high risk for injury in view of the annual increase in reports of bicycle-related injuries. There is therefore an urgent necessity to characterize bicycle riders, their use of protective equipment, and the nature of the injuries in order to identify risk groups as a basis for developing specific injury prevention interventions.

Using incentives for reducing the frequency of deviant driving speeds

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This proposal describes a preliminary test of a novel multi-layered system (behavioral, legal, communicational and mechanical) intended to reduce speed-related road accidents on freeways. The system is based on two tenets: One, substituting the dichotomous principle dividing the speed continuum into an admissible range and a prohibited one, with a principle that has more resolution and flexibility, tuned to reinforce only a narrow range of speeds, thereby helping to reduce the variance of the speed distribution. Two, recording information on mean speed of each car by means of a device based on an elaboration of an existing technology. In sections 1 and 2 the reasoning underlying the concept and the features of the system, are presented. The proposed study, comprising four experiments, is described in sections 3 and 4. Three experiments will compare performance (in terms of speed, errors, and attention load) of subjects in a driving simulator operating in three conditions: the present enforcing regime, the proposed regime without online feedback, and the proposed regime with online feedback. In addition, the effects of various payoff functions, penalty severity, and secondary task difficulty will be examined. The fourth experiment is aimed at testing a rudimentary version of the system on Road 6.

The effect of an employer-provided car and associated taxation policy on road safety

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The main purpose of this research is to explore the effect of employer-provided cars and their associated taxation policy on road safety. The use of employer-provided cars is widespread in Israel, where approximately 25% of all private cars are employer cars given to employees. Road safety is clearly influenced by this phenomenon for various reasons that will be explored in the research. First, travel and driver behavior obviously differs with respect to a car that is not one's private property. Other reasons are the level of maintenance, which might be lower in order to reduce the employer's marginal cost, as well as the safety characteristics of such a car. We will survey hundreds of drivers in the research, both those who have an employer-provided car and those who maintain a privately owned car, in order to evaluate the differences between the groups in terms of factors such as car usage, driving style, and maintenance habits. The implication for safety will be assessed. The extent of the employer-provided-car phenomenon is influenced by government policy on the personal use of an employer-provided car and the taxation policy regarding these cars. The research will evaluate whether the recent call for a reassessment of the employer-provided car is justified.

How can communication campaigns influence road safety behavior? Which theories and models are used, and what could be the potential contribution of theories and models that have not been used?

Dr. Nurit Guttman, Department of Communications, Dr. Yechiel Klar,
Department of Psychology, Tel Aviv University

Objectives: The main purpose of this research is to create a systematic mapping of the theories and models currently used as the basis for road-safety communication campaigns and identify those that are currently not being used, but which have the potential to contribute to this area, in order to provide practical suggestions for the development of science-based road-safety communication campaigns.

Working Hypothesis : There is partial utilization of behavioral theories, in particular those related to norms and cognitive social learning, and extensive use of fear appeals, as opposed to limited use of social marketing approaches.

Methods: Data on road-safety-related media and social marketing campaigns will be obtained from a search of academic journals, major databases, and by searching the websites of government agencies and NGOs that deal with road safety issues. The analysis of the campaigns will be conducted on several levels: classification and analysis according to stated theories; identification of implicit theories; and identification of theories and models that are not being used.

Significance: The research project will contribute to broadening the scientific basis for influencing road-safety behaviors of diverse publics by providing a state-of-the art review of current behavior-influence approaches used in communication campaigns, their advantages and limitations, as well as pointing out gaps in utilizing available scientific and professional knowledge on behavior change. The study will provide practical suggestions and models, assess proposals and criteria for impact evaluation, as well as elaborate the current “best practices” for communication campaigns.

Risk factors for car accidents due to the reduction of visual abilities in low light conditions

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There is no objective practical tool for detecting individuals with significant deterioration of vision abilities in light-limited conditions, regardless of their vision abilities during daylight. The vision acuity test, which currently constitutes the criterion for driver's license approval is insufficient for predicting the level of night-vision. It has been clearly shown that night-vision impairment significantly delays reaction time, therefore placing drivers with such deficit at a higher risk of road accidents.

We propose a new technique for testing different functions of vision in light-limited conditions, including vision acuity, contrast-sensitivity and correlation with night-myopia. Moreover, the possibility of improving night-vision will be tested. We aim to develop a practical and effective tool for early detection of individuals with a higher risk of night-vision deficits.

Our preliminary results show that it is possible to predict the level of vision abilities in conditions of reduced visibility – findings that may improve the performance of drivers and thus reduce the incidence of road accidents at night.

The outcome of the proposed study will be the initiation, development and implementation of a specially designed device that will enable ophthalmologists and optometrists to easily detect individuals with a potentially higher risk of being involved in road accidents at night.

Detection and automatic alarm for obstacles on road-rail crossings

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This research program deals with the development of computer-vision and image processing-based algorithms for the detection of obstacles on railway tracks. We will use complex diffusion operators, geometric active contours combined with particle filters and efficient computation of optical flow, for the sharpening, detecting, segmenting and real-time tracking of objects in video scenes for detecting and tracking obstacles. These recently-developed state-of-the-art algorithms in image processing, computer vision and control, have proved themselves useful in similar tasks. The algorithms are powerful in object detection and tracking based on video streams subjected to rough conditions such as noisy environments and bad illumination conditions. The proposed research will be based on video images taken by a camera placed close to the train tracks, subject to the approval of the railway-safety authorities, using a computerized image acquisition and processing system. The overall system should also incorporate communication modules that will provide appropriate warning to either the control center or the driver of an approaching train. Since the proposed algorithms perform well under bad illumination, they will facilitate implementation on video taken at night. However, for night imaging, a camera with good IR capabilities will have to be incorporated into the dedicated system.

Development of tools for a safety examination of detailed plans of urban streets with mixed land uses

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The objective of the study is to develop tools to assist in planning and in preventing incorrect solutions at the stage of detailed plans ("taba") with regard to potential safety problems. The study hypothesis is that a relationship exists between planning decisions made at the detailed planning stage, and safety performance in urban areas. Such a relationship can be identified through a combined analysis of accidents, infrastructure characteristics and the detailed plans of the streets and the land uses. The study focuses on urban streets with mixed land uses, such as residential and commercial. A representative sample of 50-70 street sections from different towns and cities throughout the country will be considered. The streets will be characterized by the number of accidents and their characteristics; land uses along the street; speed and traffic indices; engineering arrangements; and features of the detailed plans. Using various criteria, we will define typical site categories and analyze statistical relationships between different characteristics in order to estimate differences in safety performance of the sites depending on the features of the detailed

plan and the engineering solutions adopted. For those sites identified as accident black-spots, we will conduct brainstorming sessions to seek possible improvements at the detailed planning stage that could reduce the safety problems on existing streets.

Practical significance of the results:

- Providing applicable tools to assess the safety aspects of detailed urban plans;
- Improving detailed plans and preventing features that could result in bad safety performance of streets with mixed land uses;
- Promoting the introduction of safety-impact studies at the preliminary planning stage.

Barriers to the implementation of traffic calming in Israeli towns and cities and the policy required to overcome them

Dr. Yodan Rofè

Department of Man in the Desert

J. Blaustein

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One third of traffic-accident casualties in Israel are pedestrians hit by vehicles. Traffic calming has proved to be effective in Europe and other parts of the world in reducing such accidents. The Ministry of Transport published guidelines for traffic-calming areas (30 km/h zones) in 2002. However, in the years following their publication few such areas were planned and built. The objective of this study is to understand the barriers to implementation, and propose policies to overcome them.

We conjecture that the possible reasons for the absence of implementation of traffic calming projects are a combination of several factors: the complexity and cost of planning and building such areas, especially when retrofitting is involved; the lack of public awareness and political interest at the local level; skepticism of traffic engineers who continue to see their main role as planning for automobility; and a lack of effective support and promotion by the Ministry of Transport.

This study will document the state-of-the-art of traffic calming in Israel. and will investigate attitudes and positions with regard to traffic calming among the relevant players. It will

investigate obstacles to its broad implementation, and will review past and existing policies for the promotion of traffic calming in Europe and elsewhere, as a source of possible policies that may help overcome these barriers. Our methods will include interviews with key policy makers in Israel, local officials, community leaders, regional officials of relevant government ministries, and a sample of traffic and road engineers. We will also solicit feedback from local officials and residents on three case studies of planned traffic-calming areas. In addition, we will undertake a literature review of foreign traffic-calming policies and carry out interviews with key policy makers in Europe in order to identify successful tools and approaches that could be employed to promote the implementation of traffic calming areas in Israel.

The research will sum up the obstacles to the implementation of traffic calming in Israel, and recommend policies to overcome them.

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