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## YOUNG DRIVERS

# Competent independent driving as an archetypal task of adolescence

F K Winston, T M Senserrick

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Supplement Editor, Dr Flaura K Winston, and Co-Editor, Dr Teresa Senserrick, introduce 10 papers covering the current science of safe driving among adolescents from the varied viewpoints of an international panel of experts. This Expert Panel, convened by the Center for Injury Research and Prevention (formerly TraumaLink) at the Children's Hospital of Philadelphia and State Farm Insurance Companies®, working jointly on the Youthful Driver Research Initiative, represents a wide range of expertise, thereby providing a broad understanding of driving, adolescence, and adolescent driving.

Adolescence encompasses the exciting, but challenging, transition from childhood to adulthood. During this period, which is marked by dramatic psychological and social maturation, many adolescents learn to drive. Positive development requires adolescents to learn new skills and have the freedom to explore the limits of their abilities, negotiate relationships, and—at times to their detriment—experiment with risk behaviors. Unfortunately, driving has a small margin for error and the mix of adolescent development and driving too often leads to tragic outcomes.

Traffic crashes occur disproportionately among newly driving young adults,<sup>1</sup> with one in four crash fatalities in the United States involving 16–24 year olds (based on US Department of Transportation's Fatality Analysis Reporting System data (see <http://www.nhtsa.dot.gov/people/ncsa/fars.html>)). The crash fatality rate (crash fatalities/100 000 population) is the lowest for learners and the highest for 16–17 year olds; the first six months after licensure are the most dangerous, and the rate remains high through age 24. For the age group 16–24, the crash fatality rate in 2003 was nearly twice as high as other age groups: 27.9 deaths/100 000 population for 16–24 year olds, compared with 15.4 for 25–54 year olds and 16.3 for those 55 and older.

The goal of adolescence is the emergence of a healthy, competent, independent adult. How, then, do we achieve competent, independent driving during adolescence without tragic outcomes? If the current crash fatality frequency continues unabated, over the next 10 years 100 000 adolescents and young adults will die in the United States alone. The purpose of this supplement is to explore the intersection between research on adolescents and research on driving in order to make recommendations for future, synergistic approaches.

The papers in this supplement were first presented in September 2005 in Boston, Massachusetts, USA, as part of an international panel of experts convened by the Center for Injury Research and Prevention (formerly "TraumaLink") at the Children's Hospital of Philadelphia (<http://traumalink.chop.edu>), Philadelphia, PA, USA, and State Farm Insurance Companies® (<http://www.statefarm.com>), Bloomington, IL, USA, working jointly on the Youthful Driver Research Initiative. The Expert Panel members represent a wide range

of areas of expertise, thereby providing a broad understanding of driving, adolescence, and adolescent driving. Each expert was asked to prepare a written summary report of state-of-the-art research and knowledge in their expertise area and apply it to the task of driving, and then to revise their text based on the discussions at the meeting and the most current research.

In the opening paper of the series, Allan Williams, PhD, formerly of the Insurance Institute for Highway Safety, Arlington, VA, USA, highlights the importance of a comprehensive approach built on the foundation of Graduated Driver Licensing laws to achieve meaningful young driver crash reductions. He provides an overview of the risky driving behaviors and situational driving risks of young beginning drivers, exploring the role of age, developmental, and inexperience factors.<sup>2</sup> He reviews past education, training, and licensing and enforcement initiatives that have aimed to address these risk factors, and suggests ways to strengthen them.

This is followed by a comprehensive overview of young driver behaviors, factors that influence them, and the implications for interventions from a public health perspective by Jean Shope, MSPH, PhD, Research Professor and Associate Director at the Transportation Research Institute, School of Public Health, University of Michigan, USA.<sup>3</sup> Concurring with Dr Williams, Dr Shope asserts that comprehensive, multilevel, theoretically grounded interventions are needed. In particular, three theoretical models are highlighted as most applicable to behavior change in young drivers. She details a framework of six categories of influences on youthful driving behavior, comprising driving ability, developmental factors, personality factors, demographics, the perceived environment, and the driving environment. Shope duly notes that certain factors (such as certain demographics, personality, and developmental factors) are not amenable to change, and that therefore intervention efforts must focus primarily on those factors that can be changed, using those that cannot to guide and inform.

Hans-Yngve Berg, PhD, of the Swedish Road Administration (Vägverket), broadens the perspective to include a European viewpoint.<sup>4</sup> Of note, in Europe, similar beginning driver risks to those in the US are reported, despite a later licensing age (generally 18 years). Dr Berg stresses the need to consider how lifestyle and other social and demographical factors influence driving behavior and safety in young people. Within a hierarchical model, he demonstrates goals and motivational factors for driving that at their lowest level involve achieving vehicle control and mastery of traffic situations. At the higher levels he explores the goals and context of driving, and, most broadly, how driving fits within life goals and skills.

Next, John Groeger, PhD, Professor of Cognitive Psychology at the Department of Psychology and a founding member of the Surrey Sleep Research Centre, University of Surrey, in the United Kingdom, argues "the young driver problem" as not one but a variety of multifaceted problems that therefore require multifaceted interventions, and highlights recent learnings

from brain development and personality research. He highlights promising new avenues for investigation that can capitalize on increasing technological capabilities.<sup>5</sup> His paper provides a thoughtful exploration of why inexperience and young age so significantly contribute to crash risk. Particular attention is given to the similar power-law relationships that exist between hours of driving and skill development, and months of driving or distance traveled and crash involvement. He concludes by emphasizing the importance of the much neglected but potentially profound role of fatigue in teen driver risk.

Donald Fisher, PhD, Professor of Mechanical and Industrial Engineering at the University of Massachusetts-Amherst, USA and his colleagues Alexander Pollatsek and Anuj Pradhan present a practical, skill building intervention that targets inexperience of new young drivers in hazard detection.<sup>6</sup> They report on a series of studies to develop and evaluate their personal computer based risk awareness and perception training program. The program aims to identify hazards, and explain why they are hazards. They demonstrate the ability of young drivers to achieve both “near transfer” (demonstrated ability to recognize similar driving hazards to those in the training), and “far transfer” (demonstrated ability to generalize the training to new hazards not represented in the training).

Bruce Simons-Morton, EdD, MPH, and his colleague, Marie Claude Ouimet, PhD, of the National Institutes of Health, Bethesda, MD, USA, offer recommendations to improve parental management of the learning and early driving experience.<sup>7</sup> They suggest parents are likely to remain the primary agents responsible for preparing teenagers for independent driving. They explore parental roles in supervising practice driving, deciding when their teen is ready for independent driving, and managing the teen’s initial independent driving experience, particularly via use of a parent-teen agreement. They identify several gaps in knowledge in relation to the role of parents in learner and early independent teen driving.

A very different, large scale approach to changing teen driving behavior—that of social marketing—is suggested by William Smith, EdD, of the Academy for Educational Development, Washington, DC, USA.<sup>8</sup> The paper opens with examples of successes and cautions from previous social marketing campaigns in transportation and other public health domains, as well as particular learnings regarding teens and marketing. The differences between commercial marketing and social marketing are detailed, and nine fundamental principles of social marketing are discussed. Included are a framework for measuring the success of a social marketing effort, and issues regarding sustainability of a campaign.

Most of the experts agreed that strong Graduated Driver Licensing laws should form the basis for young driver campaigns. In the next paper, Jacqueline Gillan of Advocates for Highway and Auto Safety, Washington, DC, USA, provides an overview of tactics used by her organisation and others in promoting effective initiatives to state and federal governments and organisations in the United States.<sup>9</sup> Her paper focuses on licensing reform, including the specific statistics underlying the need for reform. The benefits of complementary education, supporting public opinion polls, and the need for continued improvements in vehicle crashworthiness are also discussed.

The final expert panel paper addresses the issue of applying interventions to a large population and the importance of cultural appropriateness.<sup>10</sup> Nathan Stinson, Jr, MD, PhD, MPH, of the National Center for Optimal Health and the Department of Family and Community Medicine at Meharry Medical College, Nashville, TN, USA, and his colleagues, Paul Juarez, David Schlundt, and Irwin Goldzweig, apply a conceptual framework for optimal health to reducing risky

## The Center for Injury Research and Prevention at the Children’s Hospital of Philadelphia

The Center for Injury Research and Prevention at The Children’s Hospital of Philadelphia, formerly known as TraumaLink, is a comprehensive pediatric injury research center based at the Children’s Hospital of Philadelphia and the University of Pennsylvania. The center consists of a multidisciplinary team of experts who conduct and disseminate research on the causes of childhood, adolescent, and young adult injury and develop and evaluate interventions to prevent injury and its psychological effects. For more information on the Center, please visit <http://www.chop.edu/injury>.

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driver behaviors among teens. The multilevel framework incorporates characteristics of the individual; contextual factors of the motor vehicle; and physical, social/cultural, political, and economic environments of the family unit, peers, local neighborhood, broader community, and society at large. Particular attention is given to the crucial role of restraints and differences in usage rates, intervention approaches, and acceptability issues among minority youth.

The concluding paper in the supplement by Teresa Senserrick, PhD, of the Center for Injury Research and Prevention at the Children’s Hospital of Philadelphia, Philadelphia, PA, USA,<sup>11</sup> provides guidance for reducing the tremendous burden of crashes from young drivers. She suggests the highest priority young driver skill deficits and risk factors to address and how best to address them. She integrates the papers in the supplement and other research to recognize the complexity of the field, but she points to reasons for optimism. In particular, she highlights an emerging scientific foundation based on new research insights into adolescent development and driving, promising intervention directions, advanced safety technologies, and better understanding of effective policy and communication efforts.

## IMPLICATIONS

We are in an exciting era of rapid advances in our understanding of both adolescent development and the risks and skills associated with driving. These two previously separate areas of inquiry are beginning to merge to address a leading cause of death and acquired disability for youth and young adults globally: traffic crashes. Technological advances in advanced safety technologies and monitoring as well as the collective will for policy and legislative action as demonstrated through Graduated Driver Licensing laws point to a promising platform in which research can be translated into meaningful action and impact. While it is important to address the high young driver crash issue as efficiently and rapidly as possible, it is important to proceed with cautious, measured optimism. Many stakeholders from manufacturers to insurers to educators to policymakers and advocates are committed to the cause of reducing young driver fatalities, but most of their efforts are delivered to the public without plans for careful evaluation. We hope that this supplement provides those interested in this topic with a healthy view that this is not a simple problem with a quick-fix solution. Evaluation of the success as well as any unintended consequences will be essential as we proceed. Only a comprehensive iterative process of research, informed by adolescent development and current and local cultural and societal contexts, and leading to informed comprehensive intervention development, evaluation, and diffusion will lead us to meaningful reductions in road traffic deaths. It is important to incorporate the wisdom of teenagers and young adults in intervention development to ensure that the interventions are not only efficacious but also acceptable. It may be helpful to think of novice driving as an archetypal task of adolescence. Here is the challenge before us: non-driving teens, dependent on their parents and others for mobility, must become independent individuals who learn to make safe decisions, manage their passengers and peers, avoid the hazards of the road, while continuing to develop new competencies and capabilities and explore new horizons.

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