

A Survey on Overconfidence, Insurance and Self-Assessment Training Programs*

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Abstract

As argued by Werner DeBondt and Richard H. Thaler (1995): “Perhaps the most robust finding in the psychology of judgment is that people are overconfident.” This paper surveys part of the vast empirical and experimental literature on overconfidence. We find broad evidence that many subjects underestimate their health and driving risk, and that this often results in underinvestment in precautions such as insurance. We conclude our review by discussing training techniques developed to reduce driving overconfidence and improve traffic safety.

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1 Introduction

As argued by DeBondt and Thaler (1995): “Perhaps the most robust finding in the psychology of judgment is that people are overconfident.” This paper surveys part of the vast empirical and experimental literature on overconfidence. We begin our review by discussing the evidence found in survey studies. These studies establish that most individuals believe that their driving, health and financial risks are smaller than the median individual. These results may be taken either as evidence that individuals underestimate their personal risk, or overestimate the risk of others. In order to settle this issue, we review experimental studies which compare the subjects’ self-reported risk with their actual risk determined objectively or by external examiners. The evidence in this experiments establishes that subjects underestimate their own personal risk. We conclude the first section of our survey by reviewing the experimental and empirical evidence on the relationship between overconfidence and age. the main findings of this literature are that overconfidence is particularly pervasive among young adults, but does not vanish with learning and experience.

Once discussed the broad evidence that many individuals are overconfident, and underestimate personal risks, we turn to review the literature that assesses the implications of these findings with the respect to precautionary activity. The second section of our survey reports broad evidence that overconfident agents underinvest in precautions. For example, drivers’ overconfidence is considered one of the main variables affecting of traffic safety. Focusing on the choice of insurance, we discuss the evidence that individuals may underinsure in driving and health insurance because they misperceive their risk. The number of individuals who choose not to purchase health or motorist insurance is significantly large, and overconfidence is one of the explanations for this phenomenon. We devote the third section to discussing training techniques developed by practitioners of accident prevention to reduce driving overconfidence and improve traffic safety. We conclude our survey in the fourth section.

2 Evidence of Overconfidence

Survey studies Well established survey evidence finds that most individuals underestimate their driving, health and financial risks relative to the median individual. This has been detected in samples of several nations and any different age, sex, educational, or occupational group. Weinstein (1980) finds strong evidence of such overoptimism in an experiment at Rutgers University where subjects are asked to predict their chances to experience 18 positive and 24 negative events: For example, 6 subjects out of 7 believe their chances to like their postgraduation job higher than the median individual, 4 out of 5 believe to have a higher starting salary, 7 out of 8 that they are less likely to develop a drinking problem, or to be fired from a job. Analogous findings have been replicated by Wengler and Svenson (1982) and by Wengler and Rosen (2000) in Sweden, by Seaward and Kemp (2000) in New Zealand, by Peeters et al. (1997) in 19 samples of Belgian, Moroccan, and Polish subjects, by Pulford and Colman (1996) in the UK, by Darvill and Johnson (1991) in Hawaii, with a sample of undergraduate students of diverse ancestry, by Schwaiger (1991) in Switzerland, and by Otten and Van der Pligt (1996) in the Netherlands.

Similar results have been found by Weinstein (1982) when asking a sample of 100 college students to judge their chances of 45 health- and life-threatening problems. These findings were then replicated by Weinstein (1987) in a community-wide sample, by Fontaine and Smith (1995) in US and UK subject samples, by Hoorens and Harris (1998) and Hoorens and Buunk (1993) in the Netherlands, by Barnoy et al (2003) in an Israeli experiment on the risk of breast and cervical cancer, by Renner et al (2000) in a vast sample of men and women between 14 and 87 years in a study on the risk of cardiovascular diseases, by Astrom et al. (1999) in experiments with Tanzanian and Norwegian women on the risk of tooth decay, by Lipkus et al. (1996) in a community health center study on colorectal cancer, by Vandervelde et al (1994) in a vast survey of Amsterdam residents on the risk of contracting HIV infection, and by Gerrard et al. (1991) in a study of 432 Marine women on the risk of pregnancy and contracting AIDS.

Survey studies from a number of countries show that although most drivers possess fairly accurate perceptions of societal risks, they also believe that these risks do not pertain to them personally; that they are less likely to be involved in an accident than is the average driver. Such overconfidence has been observed in drivers from Australia (Cairney, 1982; Job, 1990), the United States (Svensen, Fischhoff, and MacGregor, 1985), Canada (Matthews and Moran, 1986), Britain (Groeger and Brown, 1989), Sweden (Svenson, 1981), Finland (Näätänen and Summala, 1974), Germany (Sivak, Soler, and Tränkle, 1989a), Spain (Sivak et al., 1989a), Brazil (Sivak et al., 1989), New Zealand (Mc-Cormick et al., 1986), and France (Delhomme, 1991).¹

Objective testing As well as survey studies asking subjects to rank their risk relative to others, there are several experimental studies which compare the subjects' self-reported risk with their actual risk determined objectively or by external examiners. Such studies find strong evidence that subjects underestimate their personal risks. Highhouse et al. (2004) simulate a computer-based recruitment job fair: Subjects manifest overreaction bias to positive employer feedback and underreaction to negative feedback. Fischhoff, Slovic and Lichtenstein (1977) found that subjects' hit rate when answering quizzes is typically 60% when they are 90% certain; Dunning et al. (1990) found that subjects overestimate their predicted accuracy to responses, Buehler et al. (1994) established that people expect to complete projects in less time than it actually takes; Moreland and Sweeney (1984), Radhakrishnan et al. (1996) found that students expect to receive higher scores on exams than they actually receive; Hoch (1985) showed that MBA students overestimate the number of job offers they will receive, and the magnitude of their salary. In a vast UK study with 10,551 men and women aged 55-64 years, Robb et al. (2004) detected underestimation of medical risk by comparing subjects' estimate their chances of developing colorectal cancer

¹In principle, these outcomes may be either due to drivers underestimating their fellow drivers' skills, or by overestimating their own abilities. McKenna et al. (1991) asked drivers to estimate themselves, as well as the average driver, on separate scales. The average driver received an estimation above the middle of the scale, but the personal estimation was even higher, supporting the "positive self" hypothesis. In another experimental test, McKenna (1993) concluded that there is "clear support for the illusion of control" hypothesis.

with their medical exams with flexible sigmoidoscopy screening. Kreuter and Strecher (1995) established evidence of health (heart attack, stroke, cancer) risk underestimation in a sample of 1,317 adult patients in a primary care setting in relation to the outcome of their medical exams. Evidence of overconfidence is also reported by Hamermesh (1985) in his study on the individual's self perception of life expectancy.

Experimental studies where actual driving skill has been rated by an independent observer conclude that drivers perceive themselves as more skillful and safer than they actually are. Groeger and Grande (1996) found direct evidence of over-confidence by asking over 100 British adult experienced drivers to assess their driving ability and then had their actual driving skills assessed by a driving instructor; with the same methodology, Hall and West (1996) found evidence of overconfidence in a cross-sectional study of 805 British learner drivers. Walton and McKeown (2001) found evidence of overconfidence by comparing self-reported average speed of 113 drivers, and the actual average speed, in two conditions (50 and 100 kph zones). Marottoli and Richardson (1998) found evidence of overconfidence by comparing self-rating of driving ability in a representative cohort of age 77 years and older active drivers in New Haven, CT, with their personal histories of accidents and violations for approximately the past 6 years. Weinger et al. (1999) found in a clinical study published on the American Journal of Medicine that both young and middle-aged experienced drivers with type 1 diabetes underestimate the risk of driving during insulin-induced hypoglycemia episodes. Heikkila et al. (1999) had 20 male stroke patients evaluate their own driving ability. The neurologists evaluated 60% of the stroke patients being unable to drive, but the patients had a clear tendency to overestimate driving ability.

The Relationship between Overconfidence and Age The experimental and empirical evidence on the relationship between overconfidence and age establish that overconfidence is particularly pervasive among young adults, but it does not vanish with learning and experience.

Young novice drivers' overconfidence is considered one of the main explanations for their

overrepresentation in accidents (e.g. in the U.S., they make up about 8 percent of the population, but they account for about 15 percent of motor vehicle deaths, Smith, 1994). According to studies by Deery (1999) and by Brown (1982) novice drivers develop vehicle control skills quickly and efficiently and interpret this as evidence that they are highly skilled drivers. However, they are actually overconfident because hazard detection and risk perception are not yet adequately developed. As a result they are more willing to accept risk while driving than experienced drivers. Finn and Bragg (1986) and Matthews and Moran (1986) found that on average young drivers consider themselves more skilled than any other driver, whether young or old.

While the overconfidence problem is particularly severe for young novice drivers, there is also established evidence that overconfidence may persist with experience. Using an Australian data set, Job (1990) found an increase in confidence with age up to 40 years, after which confidence changed little. Confidence in ability to drive after consuming alcohol increased steadily with age. This suggests that overconfidence may be actually increasing over an intermediate time range, because researchers concur that a driver's learning curve levels off in after 5-7 years and 50,000 km of driving (e.g. Evans, 1987; Massie et al., 1995; Summala, 1996a).² Overconfidence does not seem to vanish even in the most experienced class of drivers, such as professional drivers, whose rate of accidents per mile driven is the smallest in the drivers' population. Dalziel and Job (1997) studied a group of metropolitan taxi drivers from Sydney, Australia across a two-year period. Long working hours and a significant correlation between fatigue and accident rate were observed; yet the subjects were overoptimistic about driving-related issues, including the ability to drive safely while

²At the same time, some specific drivers' functions have been found to deteriorate with experience. According to some studies, young drivers driving knowledge is often better than that of mature drivers in some aspects. One important variable in learning is feedback: the information to the driver of whether an action is important or not for safety. Where feedback is good, experience may bring expertise, but where feedback is poor, skills may deteriorate over time.

Duncan et al. (1991) showed that the novice drivers performed better than mature drivers in scanning patterns (e.g., mirror checking), anticipation (e.g., braking into an intersection), and safety margin; similar results were obtained by Summala, Lamble and Laakso (1998), and by Heikkila (2000). Chapman and Underwood (2000) found that drivers forget nearly one third of their accidents each year; and an estimated 80% of near-accidents in just two weeks.

fatigued.

There is also strong evidence that overconfidence relative to personal health risks does not vanish with learning. In a study in Germany, Renner (2004) finds that subjects discount negative health feedback and accept positive feedback; and Morton and Duck (2001) find that media campaigns are not effective in correcting overconfidence about health conditions. Quite strikingly, there is also established evidence that overconfidence with respect of health conditions persists even in medical trained subjects (Mc Gee and Cairns 1994). Newby-Clark and Ross (2003), Ross and Newby-Clark (1998) and Robinson and Ryff (1999) find while unbiased about recalling past events, subjects maintain overoptimistic about futures events. Wright et al. (1985) find that subjects self attribute positive but not negative personal life events.

3 The Implications of Overconfidence

Overconfidence and Precautions We have so far established that there is broad evidence that many individuals are overconfident, and underestimate personal risks. The implication of these findings with the respect to precautionary activity have been highlighted in several studies. Acceptance of personal vulnerability is an important aspect of progress toward responsible risk management. Individuals who underestimate individual risk are less prone to adopt precautions facing risk. Health risk underestimation has been widely recognized as a major barrier preventing healthy behavior. An early review of empirical evidence is presented by Janz and Becker (1984). More recently, Davidson and Prkachin (1997) found that overoptimistic subjects are less likely to engage in physical exercise and to be aware of healthy life style behavior; whereas Weinstein and Lyon (1999) established that optimistic biases about personal risk are barriers to precautionary action in an experimental study designed to encourage home radon testing. Hoorens (1994) reviews evidence that overconfidence hinders health and safety precautionary behavior. Health care communication experts deem patients underestimation of risks as one of the major obstacles in doctor patient

communication, see for example the “Introductory paper” published by the MRC Health Services Research Collaboration, in the United Kingdom (Bowling and Ebrahim 2001).

Drivers’ overconfidence has been recognized as a major determinant of traffic safety in several institutional studies. For example, a study by the Swedish Road and Transport Research Institute quotes “It is obvious that there is a relationship between estimated risk and estimated ability. If a driver believes that he is a skilled driver able to handle a dangerous situation, the situation is not interpreted to be as dangerous.” (Gregersen 1996, page 244). The report published Hatakka et al. (2002) for the European Union project titled “Guarding Automobile Drivers through Guidance, Education and Technology” (GADGET) quotes “An analysis of the driver’s task and accidents has shown that adequate psychomotor skills and physiological functions are not sufficient for good and safe performance as a driver. Excellent skills for mastery of traffic situations are necessarily not enough for safe driving. [...] It is important that driver training does not create the impression that the driver’s task is mainly a manoeuvring task.” (Hatakka et al. 2002, page 207-208). The report published by Bartl and Stummvoll (2000) for the European Union project titled “Description and Analysis of Post Licensing Measures for Novice Drivers” quotes “In terms of driving, it is important that people evaluate their abilities as accurately as possible.” (Bartl and Stummvoll 2000, page 231). Furthermore, the survey of Ranney (1994) about models of driving behavior suggest that motives, anticipation, self-confidence and other factors might be even more important in safe driving than the skills themselves.

There is also some empirical evidence that overconfidence is correlated with poor financial planning. For example, Benartzi (2001) finds that employees’ severely underestimate the risk prospects of their own company stock (particularly, only 16.4 % of subjects perceive their company as riskier than the median stock, the percentage drops to 6.5% for employees without college education); at the same time, own company stock is dramatically overrepresented in employees’ retirement saving plans. About a third of the assets in large retirement savings plans are invested in company stock, and even the worst-performance companies’ stocks attract 10.37 percent of their employees’ discretionary contributions. This over-representation

of one's own company stock is believed to reflect an overoptimistic illusion of control bias.

Overconfidence and Insurance The previous section surveys evidence that overconfident individuals are less likely to take precautions, this section focuses on the insurance choices of overconfident individuals. The econometric studies we know on the subject establish that overconfident individuals are likely to underinsure.

As a consequence of proposed welfare reforms in the UK (Department of Social Security, Green paper, 1999), Cebulla (1999) conducted surveys on behalf of the ESRC Risk and Human Behavior Program, on circa 1000 employed regarding the perception of the risk of becoming unemployed and the willingness to purchase unemployment insurance. Underestimation of risk was detected by comparing self-reported assessments with statistical assessments based on the subjects economic and demographic characteristics. Most importantly, the proportion of insurance seekers among those considering to be at risk of losing their job was higher than for those who considered their position secure. Even stronger was the effect on the willingness of seeking insurance of the assessment of the risk of becoming unemployed relative to the median worker.

Bhattacharya, Goldmann and Sood (2004) present evidence that risk underestimation makes one less willing to hold insurance coverage in secondary life-insurance markets, where consumers with a life-threatening illness may opt to sell their life insurance policies (viaticate) to insurance firms in return for an up-front payment. They use a rich dataset (the HIV Costs and Services Utilization Study) that followed a cohort of HIV positive patients over three subsequent interview waves. They find that the most seriously ill individuals are more likely to viaticate. This is consistent both with agents overestimating their life expectancy or, in a model with unbiased agents, with the willingness to substitute bequeathed wealth with current income. But contrary to the 'standard' model's predictions, the patients' income and illiquid assets are not positively related with the choice to viaticate.

Beyond such econometric studies, many believe that underestimation of health risks may be one of the factors explaining the large number of individuals without health insurance

in the U.S. (an estimated 15.2 percent of the population in 2002, or 43.6 million people, according to the US Census report released on September 30). For example, in presenting proposals for reorganizing the health insurance market, Peter Diamond's 1992 Econometric Society Presidential Address quotes "Except for a few totally unable to purchase insurance [...] it is natural to say that people are without insurance because it costs more than it appears to be worth to them [...] It seems useful to divide the population without insurance into three groups. Some are without insurance because they misperceive the risks or consequences of this decision", Diamond (1992), page 1236.³

There is also a wide spread belief among practitioners the very limited purchase of long-term care insurance the U.S. (roughly 10% of those aged 65 and over in 2000, according to Finkelstein and McGarry 2004), may be blamed on the public underestimation of the risk involved in being uninsured (see for example the article "The Growing Need for Long Term Care Insurance," by David C. Comer, Insurance Journal 22 March 2004).

Drivers' overconfidence is likely to be one of the factors explaining the uninsured motorist problem. Despite this being illegal in most States, a large number of drivers do not buy health insurance. According to the data published by the Insurance Research Council, an average of 14.9% of drivers was not insured in the period from 1989 to 1997. In 1997 alone approximately \$2.4 billion was paid out under private passenger insurance covering bodily injuries by an uninsured motorist.

However, the overconfidence explanation for the uninsured motorist problem applies only to personal loss insurance. Compulsory automobile insurance was initially introduced in the US only in the form of liability insurance, to ensure financial assistance to accident victims when drivers at fault have limited assets. Nowadays, however, many States require mandatory insurance for personal loss in the forms of Personal Injury Protection and Uninsured Motorist insurance (see the *Summary of Selected State Laws* published by American

³Other complementary explanations for the large fraction of individuals without health insurance, can be found in adverse selection, which predicts that low-risk agents are partially insured to separate them from high-risk agents. Also, agents may refuse to buy health insurance as they would be able to access publicly provided basic health care in case of life-threatening situations.

Insurance Association, 1976-2003).

One alternative explanation for the uninsured motorist problem is centered on liability insurance and identifies in bankruptcy potential a rationale for choosing not to fully insure Sinn (see (1982) and Huberman, Mayers and Smith (1983)). Severely budget-constrained drivers would choose not to insure as the insurance premium consists in too large a size of their income, and in the case of accident they do not fully internalize the incurred losses as they may opt to declare bankruptcy.

We inspected the survey data collected by the IRC Public Attitude Monitor tracking the self-reported incidences of households with uninsured vehicles⁴ and found evidence supporting both the “overconfidence hypothesis” and the “budget constraint hypothesis”, this suggests that the two explanations are not mutually exclusive, but rather they complement each other. The data indicate that younger, less educated, and lower income drivers are more likely to have no auto insurance. Indirect evidence for the relevance of overconfidence lies in the relation between age and education and choice not to insure. As we reported in the previous section, it is well documented in the experimental literature that young novice drivers are more likely overconfident about their own driving skills. The presence of both overconfidence and high rate of uninsurance among young novice drivers suggests a relation between this two phenomena.

Overconfidence is also negatively related with access to education, and this may be also seen as indirect evidence of the relevance of overconfidence.⁵ It is also suggestive that driving education is administered in high school (but not in college), and that completion of high school is enough to induce a dramatic drop in the chances of reporting an uninsured vehicle, while the effect of further schooling is much smaller. Specifically, in 1999, 15% of owners with less than a high school education reported having an uninsured vehicles, whereas the

⁴In the 1995 survey, 17 % of respondents admitted to have one or more uninsured vehicle in their household. In the 1999 survey the percentage is slightly smaller: 16 %, and it falls to 12% in the 2000 and 2001 surveys.

⁵Guerin (1994) found evidence that both older and younger people rated themselves better than peers. University students rated their peers as being more similar to themselves than did non-university younger people.

percentage drops to 6% for high-school graduates, and 3% for college graduates.⁶

Direct evidence for the significance of overconfidence as a determinant of uninsurance may be gathered by inspecting the self-reported reasons that respondents of the Public Attitude Monitor survey gave for not purchasing insurance. About 41% of these responses may be taken as evidence of the “budget constraint hypothesis”, whereas 31% can be taken as direct evidence for the “overconfidence hypothesis” (given that insurance is compulsory in 43 of the 50 states, the 10% of respondents claiming that they ‘do not need insurance’ is particularly impressive); the remaining 28% of responses is consistent with both hypotheses.

We conclude this section with an important qualification. While there is strong evidence that subjects underestimate risk on uncertain activities that they believe are under their control, such as driving or financial planning, or that pertain to their self-image, such as health, there is no empirical evidence (to our knowledge) that subjects underestimate the risk of other uncertain events such as fires, floods, earthquakes, theft, malfunctioning of durable goods etc. Hence our analysis does not apply to such insurance markets. Among the experimental papers studying some of these markets, some suggest that subjects overinsure (e.g. Eisner at Strotz, 1961, on airplane travel insurance) and some that they underinsure (e.g. Kuhnreuter et al., 1978, on disaster insurance).

4 Self-Assessment Training Techniques

Overconfidence has been recognized as a major determinant of traffic safety by practitioners, and traditional driving education, mainly focusing on providing drivers with adequate skills for maneuvering, has been widely criticized because it fails to make drivers aware of their limits, and to make drivers avoid taking risks.⁷ The empirical literature failed to demonstrate

⁶The relationship between income and uninsurance is evidence for the "budget constraint hypothesis". This makes it difficult to disentangle the evidence for the "overconfidence" hypothesis from the evidence for the alternative hypothesis, because income, education and age are highly correlated. However, the data shows that income is less significant than age and education as a determinant of the choice not to insure.

⁷For example, the project for the reform of drivers education published by Hatakka et al. (2002) within the EU-funded research project GADGET (Guarding Automobile Drivers through Guidance, Education and Technology) quotes: “An analysis of the driver’s task and accidents has shown that adequate psychomotor

a positive effect on safety of traditional driver education (a general presentation of these results is in the report prepared by the OECD, 1990).⁸ It has been documented that learners overestimate the safety effects of traditional training programs. Katila et al. 1996 found that driver training that provides easy practice under constant conditions with positive feedback may inflate self-confidence. Keskinen et al. (1992) showed that traditional skid training in Nordic countries resulted in an increase in slippery road accidents, due to an increase in drivers' confidence. Evans (1991) found that increased technical skills are likely to lead to an increase in drivers' risk taking (such as driving faster or overtaking in heavier traffic), rather than to an increase in safety.

Following these findings, practitioners have developed a new approach to safe driving training programs. Training should not focus only on improving driving skill, it should also make the driver aware that he cannot rely on his own skill in handling a critical situation. The aim of such training is to calibrate the driver's self-assessment and to encourage them to drive with larger safety margins.⁹ The project published by Hatakka et al. (2002) for the EU-funded research project GADGET (Guarding Automobile Drivers through Guidance, Education and Technology) presents a framework outlining the "goals for driver education": basic driving skills, knowledge of risk factors, and skills for self-evaluation, and describing

skills and physiological functions are not sufficient for good and safe performance as a driver. [...] The high interest in cars and driving traditionally exhibited by males does not lead to lower crash rates even though it may lead to higher levels of skill and knowledge (Evans, 1991, p. 136). Training courses focusing on technical mastery of traffic situations, and on producing relaxed and confident drivers, may desensitize the driver to fear in more risky situations (Job, 1990). [...] training of skills that are intended for use in hazardous situations seems to bear a possibility for misuse or development of overconfidence in technical driving skills." [pages 207 and 208]. The report by Bartl and Stummvoll (2000) for the EU-project titled "Description and Analysis of Post Licensing Measures for Novice Drivers" states: "In terms of driving, it is important that people evaluate their abilities as accurately as possible." [page 231]

⁸One of the most well known trials of traditional driver education was conducted from 1978 to 1983 in the Dekalb County School District (a suburb of Atlanta, GA). In a review of its evaluations, Mayhew and Simpson (1996) concluded that it did not provide evidence of a reduction of accident rate. The project has been criticized because very little of the time was spent in actual driving (about 25 hours), and hence it would unlikely give participants a good estimation of their own risk when driving. Another problem found with the evaluation of the DeKalb project was that participants tended to get their licence earlier and thus were more exposed to risk of accident.

⁹Public advertisement campaigns trying to make drivers aware that their skills are limited are insufficient to achieve this goal. Practitioners have concluded that the majority of safety campaigns have failed to document any effect on the number of accidents (see the OECD report, 1994).

educational methods to increase driver's skills for self-evaluation. Practitioners have indeed developed several promising techniques to reduce overconfidence and improve driving safety. These techniques have been successfully tested on novice learner drivers, as well as on experienced drivers, and even on professional drivers.

One such measure is to require drivers to self evaluate their risk as part of their training. Self-evaluation has been systematically added in the Finnish driving school education (Laapotti et al. 1995), and it is part of the program offered to reckless drivers in Austria (Panosch 1995) and in France (Billard 1995). A similar technique is commentary driving: the driver maintains a running verbal commentary while driving, explaining to the trainer which risks may arise and what counter-measures should be taken. Several studies have highlighted the effectiveness of commentary driving as a training technique (Gregersen, 1993; Spolander, 1990; Marek and Sten, 1997). Another educational method that has been successfully experimented is group discussion on road safety. Misumi (1978) conducted an experimental study in Japan on professional bus drivers. Even for such an experienced class of drivers, his data shows a sharp accident involvement reduction after group discussion. A reduction of traffic violations after participation in courses based on self-evaluative processes has been documented in Germany by Bartl and Stummvoll (2000) and Utzelmann and Jacobshagen (1997).

Regan, Deery, and Triggs (1998b) showed that the precautionary behavior of drivers can be enhanced through personal computer instruction. McKenna and Crick (1997) designed and successfully tested a risk perception training program, where the video was paused as traffic hazards were unfolding and participants were asked to make predictions about what might happen next. Ivancic and Hesketh (1996) conducted experiments with Australian young learner drivers to investigate the validity of a technique called 'error training' (see Frese and Altman, 1989) which fosters drivers to making errors during training on a driving simulator. Compared with errorless learning (where participants drove through a training run not designed to elicit errors), error training led to better skills acquisition, the difference being statistically significant at the 1% interval. The error training group reported lower

self-confidence than the errorless learning group following training, and the perceived self-confidence remained steady after skill testing.

In an experimental study sponsored by the Swedish National Road Administration, Gregersen (1996) compared a “skill” training strategy aimed at improving driving skills on icy roads, and an “insight” strategy aimed at making drivers realize his limits in handling this situation. In the “skill” group, the instructor gave instructions while the driver drove around a course. Instead, the drivers in the “insight” group were not instructed on how to drive. Subjects were then tested on the same course, and were requested to estimate their frequency of success in the upcoming test. The “skill” group had higher beliefs of their abilities than the “insight” group, and the difference was statistically significant at the 1% confidence level. However no statistically significant difference between the two groups was found in the actual skill. The “insight” group showed no statistically significant difference between their estimated skill and their actual skill. Moe (1986) employed a strategy similar to Gregersen (1996) for driving on dry roads, and reached similar conclusions.

In a study financed by the Swedish Road and Transport Research Institute (VTI), Gregersen, Brehmer and Moren (1996) test different measures to improve safety of professional experienced drivers employed by the Swedish telephone company. Driver training and group discussions gave the largest reduction in accident risk and costs: the control group was respectively 79% and 59% riskier than the groups to which such measures were administered, the reduction was statistically significant. The driver training comprised three blocks: manoeuvring skills, “insight” training, and commentary driving.

5 Conclusion

We have surveyed part of the vast empirical and experimental literature on overconfidence. We have found broad empirical evidence that many subjects underestimate their health and driving risk. As argued in the papers we reviewed, this often results in underinvestment in precautions, such as insurance. While overconfidence is not necessarily realistic in all

insurance markets, its relevance should not be dismissed for driving and health insurance. The last part of our review has discussed training techniques developed by practitioners in accident prevention, with the aim of reducing driving overconfidence and improve traffic safety.

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