

Impaired Perception in Driving and Sport

Optimised visual and cognitive performance play a decisive role in traffic and sport. The laws of sensory physiology and cognitive processing are similar in sport or road traffic scenarios.

An example: perception and cognition in a traffic scenario

Fatal accident at a pedestrian crossing: the questioned truck driver swears, in all honesty, that he has not seen the child at the zebra crossing. In truth however, although the driver could see, he has not perceived. How could this be?

The capacity of our cognitive processing has a natural limit. Newer research suggests that activities requiring 'knee-jerk' - reactions (e.g. hockey, basketball, tennis (esp. doubles) and driving) may trigger adequate reactions at retinal circuit levels already - before more time consuming and complex cognitive processing can take place in higher visual pathways and centres. Once reaction of this sort takes place, a second one concurrently - maybe a third one, but there is a natural limit.

In a vivid and somewhat more understandable example: a sabre tooth tiger, with shining eyes (i.e. HI-LED moving light stimuli) stalks on his prey - which is on the run and completely unaware of the mesmerising effect.

ONE predator approaching - OK, maybe TWO or THREE, but FOUR or more may overwhelm "The System".

Even over millions years of evolution, in this respect nothing has changed, nor will change, neither for man or beast.

Other underappreciated factors are **Visual Short Term Memory (VSTM)** which stores data from the visual input and its processing.

Also **Capacitive Dysfunction** might occur if the volume of data with which it is supplied becomes too much or too complex - escalating into a kind of "Overflow".

In dynamic traffic situations which are rich in detail, the first essential moments are captured in the "gist of a scene" unless the decision maker is distracted and irritated by non-physiological over-accentuation and crowding phenomena such as Daytime Running Lights (DRL).

Back to the traffic scenario

The image of the child at the zebra crossing is focussed at retinal level of the truck driver, processed, mapped, then transported via many interconnections to the visual cortex (gray matter located in the occiput - area V1).

The processed signals go through higher visual pathways to secondary and tertiary centres (bottom up - top down), which should - without significant delay - trigger appropriate and adequate reactions - in this case, deceleration or deflection.

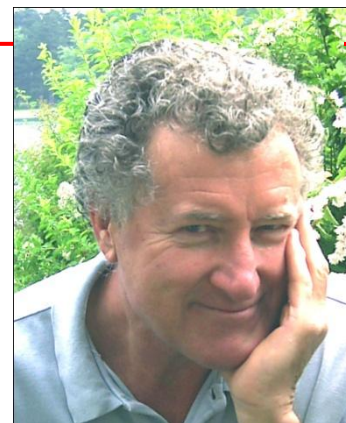
System de-compensation by sensory overload and over stimulation (innumerable traffic signs, advertising signs, blinking and moving lights, etc.) cause the child's 'virtual' disappearance due to **Inattentional Blindness** or similar phenomena.

Impaired cognition and perception: It is hard to imagine such quasi-virtual extinctions of sharply focussed and clearly contoured retinal images.

In brain research - and cognitive psychology experiments "Inattentional Blindness" (and other related forms) have been proven by many objective reproducible methods, such as electrophysiology, magnetic resonance and the like.

A number of convincing and astonishing demonstrations indicate to us the susceptibility of errors in our visual perception systems:

e.g. Michael Bach's Motion Induced Blindness or "Classics": "Gorillas In Our Midst" by Simon.



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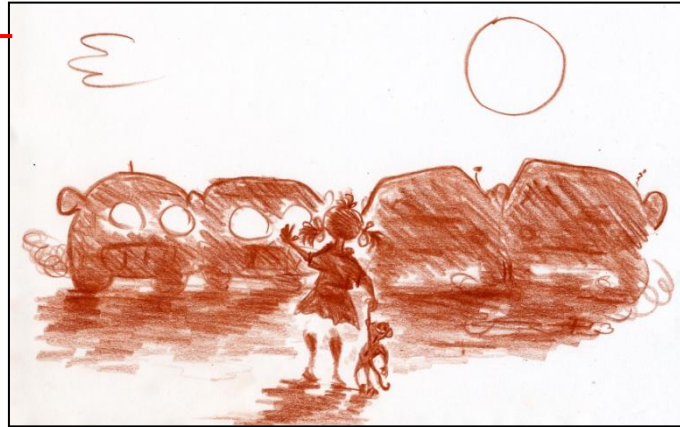
Back to the road

In Burgenland Austria, on a clear morning (unrestricted good visibility, level dry road, no glare, no other road users) a fatal traffic accident occurred:

A pedestrian was run over by a car at the "Schutz'weg" (Zebra crossing).

Clusters and accumulations of advertising signs, posters, community welcome greetings and other distracters lined the street - all of them ahead of the zebra crossing.

These "diversions" (most have been subsequently removed) can be blamed for contributing to the accident.



Dynamic advertising attracts the attention of road users. Further factors in undesired visual irritation would be moving illuminated advertising, flashing and blinking lights, changing colours, glare, etc.

Daytime Running Lights (DRL)

Moving light stimuli, as mentioned above inevitably distract.

When exceeding critical numbers and intensities, DRL cause cognitive and perceptual disturbances.

The daughter of a friend died, fastened by seat belt in her car, which was rammed in a rear end collision. A causal link between distraction (of the driver who caused the accident) by DRL-lights can not be excluded in this tragic case.

Reduced sight (in twilight or fog, under deep shadows, etc.) always requires dipped headlights. The roadway and all "traffic relevant objects" must be clearly seen and perceived under all conditions.

Lately accident victims found lying on the road are driven over several times - horrible as it sounds because they become invisible due to 'DRL distraction.'

On clear days, additional lighting (DRL etc) cannot improve overall traffic safety. On the contrary, moving light stimuli in the peripheral field can cause Inattentional Blindness and similar functional failures together with possible fatal consequences.

Daytime Running Lights violate:

- The Convention Concerning The Power of Authority
- The Law in Respect of the Protection of Infants (1969)
- The bond of Protection
- The Principle of Equality
- Declaration of Human Rights (1948) Article Three
- The Laws of Logic
- Public Ethics and Morals

Attorney-at-Law Dr. Gerald G. Sander, M.A. Mag rer. publ.

DRL increase only the conspicuity of motorised 'stronger' traffic participants, causing eye-catching effects" at the expense of all others, especially "weaker" more vulnerable road users e.g. children (!), pedestrians and cyclists.

Police officers, conducting car inspections at the road side, place themselves at underestimated risk.

To set up a warning triangle has become a deadly adventure since the introduction of DRL.

It was a false hope that approaching "DRL" vehicles would be more conspicuous for pedestrians and could improve overall traffic safety - even desperate attempts to escape with a leap proved to be futile on many occasions (QED) for the victims, children [the most vulnerable group], mothers with prams, the handicapped, pedestrians, wheelchair users etc.).

Reflective materials are ineffective under DRL-conditions, because reflectors have to be caught by the light of headlights in order to fulfil the desired reflecting function.

DRL radiation: in contrast to correctly set headlamps, DRL beams light into all directions (Isotropy), and therefore blind oncoming drivers.

The 'super'-bright brilliant bluish-white glaring DRL designs appear to be designed to 'outshine' competitors.

Over long periods, vigilance, alertness, and attention - despite all allegations, are decreased.

The trend to glaring blue-white headlights and Hi-brightness LED lights is not a sensible invention:

The human retina has no blue cones in the centre, blue light dazzles and scatters harmfully (making the eye 'nearsighted' transitorily) and does not increase contrast vision.

Retinal damage (also retinal light damage) increases in conjunction with the average age of road users - therefore following 'light stress' - (it feel like driving in a "black tunnel") retinal recovery time will be prolonged over the long term.

Glare and distraction (blazing bright, improperly adjusted headlights, DRL (High-Intensity Discharge Xenon and high super-bright LED lights), shining tail lights, over bright traffic lights, flashing blue toll-lighting, etc.) lack of rear lights (a remarkable 'regulation') sometimes contribute to fatal consequences when concentrating on the road.

Concentration when driving a vehicle reduces the blink frequency significantly, the cornea becoming dry, the visual acuity drops dramatically to dangerous low values - all that aggravated by air conditioning, dust, fine dust, diesel exhaust gases, etc.

Dry eyes convey to the brain the feeling of fatigue, causing tiredness (falling asleep after the "Sandman" imprinting from childhood) - a possible unrecognized factor of the 'micro sleep'.

Dry eyes in accidents - an underestimated factor

The moving advertising band at football grounds makes proper referee perception almost impossible - this also concerns players and spectators.

More than 40 diopters (measured at the level of the tear film) require high glossy polish.

Eye-tracking studies have shown that many ski racers (during the race in dry winter air) show significantly reduced eye-blinking rates.

Some of the accidents can be explained by the influence of drying tear film and consequently reduced vision.

Summary

Both on the road as well as in sport, all distracters (DRL, irritating advertising, needless traffic signs etc.) must be avoided.

In planning and design of traffic and sport scenarios expert opinion has to be respected.

This is even more important for traffic legislation and jurisdiction. "Mixed traffic" that is, lit (DRL), unlit vehicles and vulnerable less conspicuous traffic participants, intermixed in a dynamic and chaotic manner overstrain our cognitive systems beyond any reasonable doubt.

No single Ethics Committee on earth would have approved a Daytime Running Light "experiment" 'Two years of Tagfahrlicht (DRL) in Austria'.

Statistical statements about this topic can never be significant, because homogeneous comparison groups are nonexistent: prospective, randomized, placebo controlled studies, etc. will never be possible.

The decision on welfare and concern of people in road transport is to search before and beyond any statistic analysis and scientific research in the field of LAWS, ETHICS and LOGIC - worldwide.

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