'In Vivo' Study on Vision and Driving

The visual health of Spanish drivers and its implication in road safety

8 million Spanish drivers don't see the highway clearly

- *14% of drivers present vision-related difficulties even in optimal lighting conditions. The percentage increases to 38% in low lighting, which means the late detection of important information for the driver, greater effort in reading and understanding traffic signs, or difficulty in estimating distances or speeds of other vehicles.*
- *In case of glare, 44% of drivers take more than 20 seconds to fully recover their central vision. Beyond age 45, the recovery time increases significantly.*
- *This is especially important if we take into account that if you're driving along at 120 km/h, a recovery time of just 5 seconds means traveling 170 m with impaired vision.*
- *The Vision and Driving 'in vivo' study, which included a sample comprising more than 3,200 people from all over Spain, is the biggest of its kind with on-road diagnostic testing of drivers that we know of.*

Madrid, July 3, 2019. 29.5% of Spanish drivers (around 8 million) have deficiencies in ametropia (myopia or hyperopia), which makes it difficult for them to see road signs or markings clearly, as well as to correctly calculate safe distances and the speed of other vehicles. Consequently, reaction times are altered. 14% have vision difficulties in optimal lighting conditions, and this figure rises to 38% in low-light situations. In case of glare, 44% of drivers take more than 20 seconds to fully recover their central vision, and 23.5% of drivers show deficiencies in campimetry (lateral vision). These are some of the results of the 'in vivo' macrostudy conducted by Essilor, the Spanish Foundation for Road Safety (Fundación Española para la Seguridad Vial - Fesvial) and the Traffic and Road Safety Institute (Instituto de Tráfico y Seguridad Vial - INTRAS) of the University of Valencia, with the collaboration of Cepsa, involving more than 3,200 drivers from all over Spain.

This initiative, which is part of the overall agreement between Essilor, the world's leading company in ophthalmic lenses, and the International Automobile Federation (FIA) to raise drivers' awareness under the slogan *"Road Safety Starts with Good Eyesight"* launched last year, consists of an **opinion survey** on habits, beliefs and attitudes about vision and driving and, on the other hand, of research to deepen and know the actual "state of visual health" of Spanish drivers through specific **visual tests** for driving, complementary to the usual visual examination carried out by vision professionals.

Thus, vital driving abilities as important as long-distance binocular visual acuity, contrast sensitivity, ability to recover from glare, chromatic perception and visual field, among other variables, have been measured. All this with the collaboration of Cepsa, which has ceded different spaces in its Service Stations to develop the tests and raise the visibility of the campaign during the summer months. This is the largest known study with diagnostic tests carried out on drivers on the road.

According to **Pedro Cascales, Country VP Essilor España,** *'At Essilor we wanted to give continuity to the awareness campaign started last year, making it coincide with the millions of trips that begin these days, so that all drivers are aware of the importance of good vision at the wheel for the safety of all'*

Ametropia

One of the main conclusions of the tests is that 29.5% of Spanish drivers (around 8 million) have deficiencies in ametropia (myopia or hyperopia), which makes it difficult for them to see road signs or markings clearly, as well as to correctly calculate safe distances and the speed of other vehicles. Consequently, reaction times are altered.

Visual acuity

38% of drivers present difficulties in low-light situations. This affects their ability to adapt and react at dawn or dusk, as well as complicating driving in adverse weather conditions. It is also important to note that night driving with poor vision is a clear risk as it reduces visual acuity by 70% and depth perception can be up to 7 times less.

Professor **Luis Montoro, President of Fesvial and Road Safety Professor at the University of Valencia** notes that *'night-time traffic accidents are those with the highest lethality and 27.5% of road accidents occur in poor lighting conditions. Beyond doubt, night driving with poor vision is a clear risk as it reduces visual acuity by 70% and depth perception can be up to 7 times less'.*

In optimal lighting conditions, 14% would also have difficulties, which means late detection of stimuli, greater effort in the interpretation of traffic signs or difficulty in estimating distances or speeds of other vehicles.

Glare

In case of glare caused by another vehicle, a situation that 32.6% of drivers acknowledge that they face very or fairly frequently, or glare when exiting a tunnel, which is common for 15% of drivers, the ability to recover is key. In this test, it was found that 44.2% of drivers take more than 20 seconds to fully recover their central vision after undergoing glare. Interestingly, professional drivers show a shorter average recovery time than non-professional drivers.

The subject of glare is especially important if we take into account that if you're driving along at 120 km/h, a recovery time of just 5 seconds means traveling 170 m with impaired vision. **Professor Montoro** notes in this regard that: *'driving at dawn or dusk, driving at night on 2-way roads, entering or exiting tunnels, or in general any situation where the change in lighting is abrupt, can temporarily impair our vision, with the attending risk to our safety and that of others.'*

Campimetry

Analyzing campimetry, which is the extension of our field of vision from 45° to 100°, 23.5% of drivers present deficiencies, i.e. difficulties managing traffic situations like intersections, lane changes or overtaking. Campimetry problems have a lot to do with accidents involving pedestrians (most of which occur when a pedestrian enters the field of vision from one side or the other), distorts the view through mirrors, increases blind spots and narrows the field of vision as speed increases.

With regard to this problem, **Professor Montoro** comments that *'the reduction in the width of the field of vision at high speeds, together with that already naturally produced by the tunnel effect, would mean that at 65 km/h the field of vision is 70°; at 100 km/h it is 42°; and at 130 km/h it is only 30°, so the risk of accidents is multiplied if the driver already presents difficulties.'*

About Essilor

Essilor is the world leader in ophthalmic lenses and it aims to offer the best visual solutions through technological innovation to help the 4.500 billion people with eye needs worldwide. Essilor invests more than €200 million a year in R&D+i to develop products that help in its mission to 'Improve lives by improving vision'. According to Forbes' list, is for the seventh consecutive year Essilor was rated among the "100 most innovative companies in the world". Some of the brands that Essilor markets in the Spanish market include: Varilux®, Transitions® and Eyezen®

About Fesvial

The Foundation for Road Safety is a non-profit organization whose main goals include the prevention of traffic accidents, the promotion of sustainable mobility, training in road safety and education and the study of accidents, as well as research into the most appropriate strategies for the prevention of road risks. One of its priority lines of action is to carry out studies to increase knowledge of key traffic issues and to enable rigorous and scientific knowledge of the various key road safety issues.

About the University of Valencia's INTRAS

INTRAS (University Traffic and Road Safety Institute) is the only Road Safety Institute run by a university in Spain. It is a multidisciplinary center that offers its own doctoral program and master's degree in road safety. Its researchers have written numerous books and scientific articles, and have developed a large number of national and international research projects in the field of traffic, mobility and road safety. It has received more than 50 awards for its R&D activity.

About Cepsa

Cepsa is a global energy company, which operates in an integrated manner at all stages of the hydrocarbon value chain, and manufactures products from raw materials of plant origin and operates in the renewable energy sector. It has 90 years of experience and a team of some 10,000 employees, who combine technical excellence with adaptability. It is present on all five continents through its Exploration and Production, Refining, Chemicals, Marketing, Gas and Electricity, and Trading business units.