

# HIGHWAY COMMUNICATION: AN INSIGHT INTO THE SENSE OF SAFETY AND AWARENESS AMONG THE NIGERIAN PUBLIC

Ojinime Ebelechukwu Ojiakor

Department of Mass Communication  
Nnamdi Azikiwe University, Awka  
ojinime@yahoo.com  
08162831637

Charles Chukwuemeka Okika

Department of Mass Communication  
Nnamdi Azikiwe University, Awka  
cc.okika@unizik.edu.ng  
08027332539

Ngozi Marion Emmanuel

Department of Mass Communication  
Nnamdi Azikiwe University, Awka  
marionngozi@yahoo.co.uk  
08068964017

Ikechukwu Jude Offie

Department of Mass Communication  
Nnamdi Azikiwe University, Awka

**Abstract:** *Highway communication is an inevitable part of any society's road transport and movement culture. Expectedly, it is assumed that road signage communication should be taken seriously by all the members of the public. This study assessed the adherence of road users such as drivers, pedestrians, and traffic enforcers to highway communication; with focus on road users' understanding and reaction to road signs and signage communication. The study population was limited to drivers, pedestrians and traffic enforcers in Enugu metropolis. In-depth Interviews were used to gather data from respondents who were purposively chosen. Findings from the research showed that road users in Enugu State rarely obeyed traffic signs. It was also discovered that most road users in Enugu State don't have basic knowledge of signage communication. It is therefore recommended that there should be enlightenment campaigns which help chart a new course for road users nation-wide.*

**Keywords:** Highway communication, road signs, signage communication, road map, road safety, major roads.

## INTRODUCTION

The timelessness of communication exchange cannot be over emphasized. Early *Homo Sapiens* such as cave men sought ways of interacting with their immediate environment, so as to improve the ability of sending, receiving and assimilating information and at the same time increasing the speed, clarity and variety of ways of transmitting information, Okunna and Omenugha (2013).

The highway in today's world usually involves any public road or any public way on land; it may be major roads or public tracks. Highway communication or road signs are means of communication that provides necessary information about road routes and its environment to road users. Signage communication on the other hand includes all forms of communication designed to point the way clearly to important locations. It would appear that their use depend on the user's attention, understanding and actions. This study analyzes some of these signs, and the user's attention, understanding and action towards them.

## BACKGROUND

Yamen and Kirmizioghi (2012), opines that the number of vehicles on the highway has increased due to technological and economic development in recent years. As a result of this increase, roads signs have become important in our lives as people spend most of their time on the highway, taking a higher risk of road accident or congestion.

Report from the World Health Organization in, 2010, shows that more than a million people are killed on the world's road each year. Another report published by the World Health Organization in 2014 estimates that 1.2 million people were killed and about 50 million injured in traffic collisions on the roads around the world each year. This led to the cause of deaths among children aged 10-19 years old. Citing the BBC news in (2008), the report noted that simple preventive measures could halve the number of deaths. In Nigeria alone, the annual fatality on roads reached 6,452 and the number of persons injured amounted to nearly 18,116 in 2003. In 2005, the total number of casualties rose to nearly 20,298 and was about 34,641 in 2008. To be sure, the most significant cause of road crashes usually identified by the Federal Road Safety Corps and the Nigerian Police relates to the driver's errors, his state of arousal and level of experience. The other human factors arise from the errors of other road users such as pedestrians. It is therefore obvious that transport user's behavior is the fundamental cause of road crashes in Nigeria (The Federal Road Safety Commission, 2009).

Coming to Signage Communication, Manton (2008) asserts that the main purpose of signage is to communicate; to convey information such that the receiver may make cognitive decisions based on the information provided. Signage has been documented to have been popularized in 1975 and 1980. For example, the 'welcome to Fabulous

Las Vegas sign', just to the south of Las Vegas strip and the driver location signs used in England to assist drivers when contacting emergency services. Signage vary in form and sizes based on location and intent. From more expensive banners, billboards, and murals, to smaller street signs, sandwich boards and the Lawn signs. Newer signages now use digital and electronic displays. It is therefore important to analyze the attention, understanding and actions of road users to these signs.

## **STATEMENT OF RESEARCH PROBLEM**

In recent years, the world has witnessed a lot of growth and development in technology, which paved the way for the establishment of highway communication (roads signs and signage). As a result of road accidents and loss of lives that have been taking place, it became necessary to mount road signs and signages at strategic points in various cities. But the question still remains: do road users in observe, understand and adhere to these highway communications.

## **PURPOSE AND RATIONALE**

The purpose of this study was to ascertain road users' awareness and adherence to highway communications; as well as ascertain the extent to which they pay attention, understand and take actions on these road communications. Therefore, the specific objectives of this study were:

1. To ascertain the extent to which road users are knowledgeable of road signs and signage communication.
2. To determine how much the road users adhere to road signs and signage communication.
3. To ascertain how road users react to these signs when provoked.
4. To ascertain the extent to which demographic variables are a factor in adherence to road signs and signage communication?
5. To ascertain the roles color and design play in road signs and signage communication

## **RESEARCH QUESTIONS**

In line with the research objectives, the following questions were posed for investigation:

1. To what extent do road users have knowledge of road signs and signage communication?
2. How much do road users obey road signs and signage communication?
3. How do road users react to road signs and signage communication when provoked?
4. To what extent are demographic variables a factor in adherence to road signs and signage communication?

5. What roles do color and design play in road signs and signage communication?

## SCOPE OF STUDY

Globally, in highway communication, there are many road signs and signages mounted to guide road users. The study is limited to road signs and signages in Nigeria, specifically Enugu Metropolis. In the same vein, the focal groups for the study are road users (drivers, pedestrians and traffic enforcers in Enugu Metropolis).

## CONCEPTUAL REVIEW OF HIGHWAY COMMUNICATION (ROAD SIGNS AND SIGNAGE)

Dafydd (2008) suggests that signs are best known in the form of painted or carved advertisements for shops, inns etc. and that they are one of various emblematic methods used for ages to publicly call attention to the place to which they refer.

The ancient Egyptians and Romans were known to use signs. In ancient Rome, signboards were usually made from stone or terracotta, and Greeks were known to have used signs too. Many Roman signages are preserved, among them the widely recognized bush to indicate a tavern, from which is derived the proverb “good wine needs no bush”. In some cases, such as the bush, or the three balls of pawn brokers, certain signage became identified with certain trades and some of these later evolved into trademarks. Other signage was grouped according to their various origins. Thus, at an early period, the cross, crucifix or other signs of a religious character was used to attract and identify Christians, while sign of the sun or the moon would serve the same purpose for pagans.

In 1389, King Richard II of England compelled landlords to erect signs outside their premises. The legislation stated that “whoever shall brew ale in the town with the intention of selling it must hang out a sign; otherwise he shall forfeit his ale. This was in order to make them easily visible to passing inspectors of the quality of the ale they provided; since in those periods, drinking water was not always good to drink and ale was the usual replacement.

Lea (1997), and Dunlap (2013), posit that in the 19th century, some artists specialized in the painting of signboards such as the Austro-Hungarian artist Demeter Laccataris. Pending this development, houses which carried on trade at night e.g. coffee houses, brothels etc. had various specific arrangement of lights, and these still survive to some extent, as in the case of doctor’s dispensaries and chemist shops. Privilege signage was common on retail stores in the 20<sup>th</sup> century, although many of them are no longer present, or have become abandoned ghost signage.

McGuigan 2014 opines that signage is a general term for any sort of graphic display intended to convey information to an audience. She says that there are many different types of signage, and it has existed for thousands of years. According to her, most modern signage relies on words often in tandem with images, but a great deal of

historical signage used only image. Champion (2012) posits that road signs or traffic signs dot the road ways, both minor and major roads of our country. According to him, some signs are informational and directional showing you the way, or what the conditions of the roads are. These signs provide us with specific instructions on how we should drive through a specific area. Some of these signs are temporary and provided to alert road users of dangers that may not normally be present.

Yaman et al (2012) asserts that road signs are commonly used safety tools, mainly developed to provide crucial information in a short time to support safe driving, but the success depends on its' comprehensibility by the drivers and road users.

According to Hawkins (1991), traffic signs or road signs are signs erected at the side of roads or above to give instructions or provide information to road users. He further explained that the earliest signs were simple wooden or stone milestones. Later, signs with directional arms were introduced. For example, the finger posts in the United Kingdom and their wooden counterparts in Saxony. With traffic volumes increasing since the 1930's, many countries have adopted pictorial signs or otherwise simplified or standardized signs to overcome language barriers, and enhance traffic safety. Such pictorial signs use symbols in place of words and are usually based on international protocols. Such signs were first developed in Europe, and have been adopted by most countries to varying degrees, including Nigeria.

According to Manton and Dafydd (2008), signage may be classified according to the following functions:

- **Information:** Signs conveying information about services and facilities, such as maps, directories or instructional signs.
- **Direction:** Signs showing the location of services, facilities, functional spaces and key areas, such as sign posts, or directional arrows.
- **Identification:** Signs indicating services and facilities such as room names and numbers, rest room signs, name tags or name plate.
- **Safety and Regulators:** Signs giving warning or safety instructions, such as warning signs, traffic signs, or signs conveying rules and regulations like 'No go area', etc.



Figure.1: Roundabout sign; 50 km to traffic light; speed limit 40km/h; pedestrian crossing sign (location: parklane hospital road; along parklane hospital; new market; new market road).



Figure.2: Stop Sign; location: Antrim Lane G.R.A Enugu; High Way Map/Travelers' Road Map (Directional Signage); location: Old Park Road; Stop Sign; location: Polo Park, along Shoprite Enugu.

The 'STOP' sign depicts stopping at intersections. This means giving way or stopping to allow pedestrians to cross. Stop signs are also placed at areas where extra care is needed because of limited visibility or where vehicles on the other road have priority.

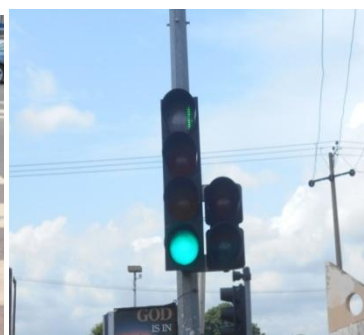


Figure 3: Zebra Crossing Sign; Traffic Light; Location: Polo Park along Shoprite and along Parklane Hospital Road Enugu

The pedestrian crossing or cross walk is a designated point on a road at which some means are employed to assist pedestrians wishing to cross. They are designed to keep pedestrians together where they can be seen by motorists, and where they can cross safely across the flow of vehicles. These signs are often found at intersections, but may also be at other points on busy roads that would otherwise be too unsafe to cross without assistance due to vehicle numbers, speed or road widths. According to Muhammad (2009), pedestrian cross is also commonly installed where large numbers of pedestrians are attempting to cross such as, shopping areas, schools etc. Traffic lights are used to control vehicular traffic. This is done using signaling with different colour lights.



Figure 4: Directional Signage; Location: G.R.A Road; Travelers'road Map: 7km to the Airport; location: Airport Road

The high way map is mostly used by travelers, commuters and all levels of government for identifying, navigating and organizing routes within a country, state, city or town. They are usually placed far above the road for easy visibility; to inform drivers which way to go, with an arrow pointing the way.

Adequate roadsigs, road markings and signage communication must be provided to give the user important information, but not so much to distract the users, thereby negatively affecting safety. These signs require uniformity in design, color, shape, size and location. This will enable drivers and pedestrians to understand quickly the message of road signs and signage communication.

### **EMPIRICAL REVIEWS OF ROAD USER'S SENSE OF SAFETY AND AWARENESS (ATTENTION, BEHAVIORS AND UNDERSTANDING)**

An American researcher, Barjonet, in 2001 looked at the percentage of drivers who engaged in potentially distracting activities during three hours of driving, and the duration of these activities when their vehicles were moving. These activities are seen in the table below:

TOTAL DISTRACTION	% OF SUBJECTS	% OF TOTAL DRIVING TIME
Talking on a mobile phone	30.0	
Answering a mobile phone	15.7	1.30
Dialing on a mobile phone	27.1	
Eating, drinking, spilling	71.4	1.45
Preparing to eat or drink	58.6	3.16
Manipulating music and radio controls	91.4	1.35
Smoking	7.1	1.53
Reading writing	40.0	0.67
Grooming	45.7	0.28
Baby distracting	8.6	0.38
Child distracting	12.9	0.29
Adult distracted	22.9	0.27
Conversing	77.1	15.32
Reaching, leaning	97.1	

Manipulating vehicle control	100.0	3.78
Other internal distractions	67.1	
External distraction	85.7	1.62

For road signs, traffic signs and signage communication to command attention, proper visibility of these road signs should be there and the signs should be placed in such a way that the driver and other road users require no extra effort to see the signs, Kadiyal (1987). Page | 8

McEvoy et al ( 2006), in another study examined film footage of drivers in their vehicles and found that all partook in at least one distracting activity, and that altogether, drivers spent 14.5% of the time that the vehicle was in motion, being involved in a distracting activity. They engaged in a distracting activity once every 6 minutes on the average.

Distracted drivers are often unaware of changes in the road way due to a lack of proper attention to the many caution signs that warns of potential dangers ahead. The remark by David, (2007) says that “a man drives as he lives,” and to add teeth to this remark, Ogwude (1986 p.148) says and: “the level of aggressiveness is high on Nigerian roads and many drivers are prone to anxieties of different kinds, including anger.”

Deffenbacher (2001) suggests that “in various driving situations, drivers with higher traits tendencies are considered more likely to experience frequent and intense emotional states. Mathew (2005), established that the study of driver’s behavior has been approached from three angles namely: the use of transactional model of driver’s stress, the investigation of driver’s perceptions and self-reporting of their response to a range of different driving situations and the behavior of drivers on a specific level.

Lajunen, Parker & Summala (2004) identified lapses involved in drivers’ behavior; these are divided into two types, namely: inattention and inexperience. In order to understand better road user’s behavior toward road signs and signage communication, traffic psychology which is a discipline in psychology that studies the relationship, psychological process and the behavior of road users, aims to apply the theoretical aspect of psychology in order to improve traffic mobility by helping to develop and apply accident countermeasures, as well as guiding desired behavior through education and the motivation of road users (Rothengatters, 1997).

Behavior is studied in conjunction with accidents research in order to assess causes and differences in accident involvement. Stokes, et al (1995) evaluated 43 traffic devices in terms of drivers understanding of the meaning of the information encoded in the signs and pavement markings that were understood by Kansas drivers and proposed a general recommendation for improving drivers understanding of certain Traffic signs; while a research carried out by Al-madani, Al-janahi, (2002) examined the influence of driver’s accident involvement and personal characteristics on understanding of 28 traffic regulatory and warning signs. A sample of 9000 drivers who were residents of Bahrain Kuwait, Oman, Qatar and United Arab Emirates used the result that showed on the average, that drivers really understood 56% of all signs.

The Gulf States, Asian and Arab drivers understood the sign less well and were not much helped by the use of pictograms rather than written instructions. Male drivers score higher than female drivers; age, marital status, experience, accident rates had no obvious bearing on comprehension signs. The overall conclusion was their personal characteristics, rather than accidents involvement rates, which were not clearly associated with comprehension capabilities.

Another study by Shapiro et al, (1987) identified seventeen MUTCD standards as having a significant need for additional research. It was concluded that many control signs and warrants are likely to benefit from further evaluation, improved design, or better understanding of TCD's, was conducted for the American Automobile Association (AAA), Hulbert, Beers, Flower, (1979). And finally, Wolff & Wogulter, (1998) investigated the influence of driver's comprehension of signs on accident involvement, citation received, and seat belt usage. While knowledge of signs was increasing with seat belt usage, no significant association with accident involvement was observed: even when the age was incorporated with accidents. Similarly, no significant difference with any citation received was observed. Furthermore, those with no speed citations or low number of speed citations were not significantly better than those with high number of speed citations.

## **THEORETICAL FRAMEWORK**

The theory used for this study is the 'Theory of Communication of Symbols'. This theory is based on 'Semiosis' i.e. the relationship between an object, a sign and its meaning. It also states that signs represent an object or referent, in the mind of an interpreter. These signs can be verbal (words) or non-verbal. Pierce, (1958). According to Morris (1946), people are interpreters of signs. Signs have three factors that guide interpretation and human actions:

1. The perception stage; at this stage, the person becomes aware of a sign.
2. The manipulative stage; here the person interprets the sign and decides how to respond to it.
3. The consummation stage; this states the person's response to a particular sign.

Therefore, the theory of communication of symbols is relevant to this study because it helps us to understand clearly the different stages the road users, such as the drivers and pedestrians pass through before reacting to road signs or any form of signage communication. As mentioned earlier, these stages range from the perception stage, which denotes the driver's attention, the manipulative stage which denotes the road user's understanding, and the consummation stage, which denotes the road user's reaction to the signs.

## METHODOLOGY

The study was designed as an in-depth interview (IDI). Answers sought from the respondents were with regards to road user's knowledge of road signs and signage communication; their behaviors to these signs; the nature of the signs; and, to determine whether the road user's demographics determine their reaction to road signs and signage communication. The population for the study comprises drivers, pedestrians and traffic enforcers derived from a sample of 6 participants; each making a total of eighteen (18) participants in Enugu City.

## DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

A total of eighteen in-depth interviews were conducted and data from six in-depth interviews (IDI) were presented, analyzed and interpreted in line with the research questions. Six out of the eighteen respondents gave adequate information based on the research questions. The selection of these respondents was based on the idea of theoretical saturation.

**Research Question 1:** To what extent do road users have knowledge of Road Signs and Signage Communication?

In the first IDI, the respondent said "I know that there is a warning sign like stop slow down, curve ahead but don't know about the information and regulatory signs. I don't know of signage communication and I have never heard of it before". And the second IDI said "No", but went on further to say, "I know the zebra crossing sign, the U-turn sign and sign showing a bridge ahead, and even some I cannot remember now". In the third and fourth IDI (pedestrians) the third respondent said "I don't know road signs have categories" but the fourth respondent said "we have the warning signs, the information signs, the direction signs and the regulatory signs, the same goes for signage. The directional Signage has helped me a lot especially in giving directions to important locations here in Enugu." In the fifth and sixth IDI, (Traffic enforcers), the fifth IDI responded "Generally in Enugu, traffic statistics and records show that about 60% of road users don't obey traffic signs and we have been trying to make them do so". The sixth respondent added "Some drivers and pedestrians don't understand the meaning of some road signs, probably they have not been taught or they have not read the meaning of these signs". Responses from the six IDIs show that drivers and pedestrians have a basic knowledge of road signs and signage communication, but they don't have in-depth knowledge of them, and as such do not benefit much from the signs.

**Research Question 2:** How much do road users obey Road Signs and Signage Communication?

In the second IDI, the respondent said "I rarely obey them; but sometimes I do. I don't stop for the traffic light if the car in front of me did not stop". The respondent in the

fourth IDI said, "Yes I do. I must show example and allow others to follow; even when I am late for work or any meeting I do try to obey them". In the third IDI, the respondent said "Yes I do. It makes it easier to use the road and gives me information on certain things I need to know, maybe about a product or direction to places". The respondent in the fifth IDI said "Traffic statistics and records show that about 60% of road users obey traffic signs in Enugu". In sixth IDI, the respondent said "most drivers don't obey road signs, especially the traffic lights". The excerpts from the six IDIs (third IDI and fourth IDI) for this study showed that not all road users adhere strictly to these signs. Therefore, we conclude that road users in Enugu city obey road signs and signages but not so much.

**Research Question 3:** How do road users react to road signs and Signage Communication when provoked?

The first IDI responded "Sometimes I obey road signs if my mind is there, but when it's not there, I don't; second IDIs responded in the same spirit. In response to the above question, the fifth interviewee being a traffic enforcer said, "They don't obey road signs at all; in fact some of them destroy these signs with their vehicles especially when angry." In addition the sixth respondent explained "When angry and tensed, many road users ignore road signs and signages. Some don't even notice it at all because of their state of mind". The first and second IDI responded respectively "Sometimes I obey them if my mind is there, but when it's not there, I don't.

In response to this question, the fifth interviewee said, "They don't obey road signs at all; in fact some of them destroy these signs with their vehicles especially when angry." In addition, the sixth respondent explained "When angry and tensed, some road users ignore road signs and signage communication. Some don't notice it at all because of their state of mind". The three IDIs (first, fifth and sixth) revealed that drivers don't react positively to road signs when provoked, but further response from the second IDI showed that he does when a traffic enforcer is around. This implies that most road users don't obey road signs when provoked to anger.

**Research Question 4:** To what extent are demographic variables a factor in adherence to road signs and signage communication?

Here, the researcher was trying to ascertain if characteristics such as age, sex and educational level determine their adherence to road signs and signages. In his response the fifth IDI (a traffic enforcer) said, "Yes it contributes a lot. Some educated ones will want to obey but sometimes they are negatively influenced by the uneducated. So when the uneducated road users break the law with impunity, the educated ones join them. Also the sixth IDI said "Yes, because one who can read and write will know what the meaning of these signs are. We have discovered that the elderly ones obey road signs more as reflected in their driving, unlike the younger drivers who think they know it all and are always in haste". From their perceptions of the road users, both the fifth and sixth respondents, being traffic enforcers, their responses were along the line of "With close observation, I think the female drivers and

road users obey the road signs. They are mild while driving and they try to obey road signs". "Naturally women are created to be gentle, calm and loving; this is reflected in their driving; they obey road signs more than their male counterparts".

The excerpts from the fifth and sixth IDIs for this study showed that educated and older road users are likely to give heed to road signs. On the other hand, female drivers are taken to observe road signs more than their male counterparts, because of their gentle nature, which also reflects in their driving. Therefore, demographics are determinants in adherence to road signs and signages. Page | 12

**Research Question 5:** What roles do color and design play in road signs and Signage Communication?

In the first IDI (driver) the respondent was emphatic in his response "Of course, the design and pattern is very easy to understand, but road users and drivers need to be enlightened for better understanding and reaction to them". On the other hand, the second IDI said "Yes the pattern and color is very okay, and I take note of them because of the way it was designed and colored". In the third and fourth IDI (pedestrians), the interviewees responded respectively "I believe it will help. Personally it enables me to recognize them quickly. "I can assure you that the color and design is okay and easy to understand, I notice them easily because of their pattern of design. In his response the fifth respondent said "Yes, but even at that, they still don't obey". The sixth IDI said, "yes, I believe it will help a lot, if the color and pattern is consistent especially the warning signs such as 'stop' which is almost everywhere". Results from the six IDIs suggest, generally, that the respondents believe that consistency in the pattern and color of road signs and signages will enable understanding and obedience to road signs and signage communication.

## **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

Findings from the study show that the presence of road signs and signage creates awareness of their usage and is targeted at controlling the psychology and mentality of road users. It was also evident in the research that majority of the road users are not aware of signage communication by name, but make use of them every day of their life. It also points out that distracted road users are often unaware of changes in the road due to lack of proper attention to the many caution signs ahead; this led to the conclusion that there is a likelihood of increased road accidents, traffic congestions, risk of pedestrian lives and a continuous disregard of traffic laws. Though not generalized, the conclusion is meant as lead information which can be subject to change and modification. Therefore, the following recommendations are made:

1. Drivers and Road users must strive to adhere strictly to road signs and signages mounted on the streets to avoid accidents.
2. Traffic enforcers like Federal Road SafetyCorps, Nigeria Police Force, Vehicles Inspection Organization (V.I.O) etc. should ensure that road users and pedestrians adhere, by strictly imposing huge fines, one day detention in their offices, seizing of vehicles, etc
3. The Federal Road Safety Commission is in charge of drivers' license; before collection, road users should be educated on the importance of adherence to road signs and signage communication.
4. Much appears not to have been done on signage communication in sub-saharan Africa. We therefore recommend shops, big and small establishments and other co-operations to make proper use of signage and its advantage, in other to increase sales and customers traffic.
5. Drivers should go for further driving training to build up their driving skills, it is not just enough to know how to drive and put your car on the road. This will enable them re-prioritize events, predict hazards and decide the safest course of action on the road.

## REFERENCES

- AAA foundation for traffic safety, May 2001. *The role of driver distraction in traffic crashes*. Retrieved from <http://www.forcesnl.org/download/distraction.pdf>
- Al-Madani, H. & Al-Janahi, A.R. (2002). *Assessment of driver's comprehension of traffic signs Based on their personal and social characteristics*. Transportation research, Part F,(5): 63-
- BBC News (2008). UN raises child accident alarm. Retrieved 2010-05-02.
- Champion, (2012). Retrieved from <http://www.Champion-America.com>
- Deffenbacher (2001). *The effects of trait driving, anger, anonymity and aggressive Delhi*. Retrieved from <http://www.who.int/9241562609/pdf>.
- Hulbert, S., Beers, J. & Flower, P. (1979). *Motorist Understanding traffic control device: American Automobile Association (AAA) foundation for traffic safety*. Halls Church, VA.
- Kadyali, L. R. (1987). *Traffic engineering and transportation planning*. Khanna publishers. New York
- Kirmizioghi, E. (2010). *Analysis of Comprehension of traffic Signs: A pilot study in Ankara, Turkey. An MSc thesis submitted to the graduate school of National and applied sciences, Civil engineering, Transportation*.

Lajunen, Parker & Summala, (2004). "Self-reported driving behaviors as a function of trait Anxiety". Retrieved from [www.sciencedirect.com/science/article/pii/S0001457568002212](http://www.sciencedirect.com/science/article/pii/S0001457568002212).

Manton & Dafydd (2008). *Ale and Arty in Sheffield: The disappearing Art of Public Signs*. Sheffield, England. Arc Publishing and Print. ISBN 978-1906722005. Page | 14

Matthew, (2005). *Media Violence and Social Neuroscience*. Iowa State University. Retrieved from [www.sciencedirect.com/science/article/pii/](http://www.sciencedirect.com/science/article/pii/)

McEvoy, P., Stevenson, M., & Wooldred, M. (2006). The impact of driver distractions on road Safety. Result from a representative survey in two Australian States. 12:242-247. Retrieved from [www.trifler.com/distracteddrivers](http://www.trifler.com/distracteddrivers).

Muhammed, M., Ishaque, & Robert, B. (2009). Pedestrian Crossing: "Making Road safe for Pedestrians or keeping them out of the way". A historical perspective on pedestrian Policies in Britain. Imperial College London centre for transport studies. Retrieved from <http://mutcd.fhwa.dotgov/know-history-html>

Okunna & Omenugha, (2012). *Introduction to Mass Communication*. 3<sup>rd</sup> Edition. New Generation Books. ISBN 978-2900-60-5.

Pierce, C.S. (1958). "Selected writings"; *semiotic and signifies*. Double day publishers.

Rothengatter, T. (1997). Psychological aspects of road user's behavior. *Applied Psychology: An international review*. 46(3): 223-234.

Shapiro, P.S., Upchurch, J.E., Lewen, J. & Siaurusaitis, V. (1987). Identification of needed Traffic control device research. Journal of Transportation research board (JRR 1114): 11-20 Stimuli on aggressive driving behavior. Wiley Publishers.

Stokes, R.W., Russell, E.R., & Kerbs, J. (1995). Motorist understanding of traffic control devices In Kansas: Final report No KSU 94-7. Department of Civil Engineering, Kansas State University, Manhattan. *The Journal of Philosophy*, Vol. 43, No. 4.

Wolf, J.S. & Wogulter, M.S. (1998). Comprehension of pictorial symbols: Effects of context and Text method, Human Factors. (40), 173-186.

World Health Organization (2010). World report on road traffic injury prevention Genera: WHO

Yeman, H. & Kirmizioghi, E. (2012). Comprehensibility of traffic signs among urban drivers in Turkey, Accident Analysis and Prevention. (45) 131-141.