CHAPTER ONE

INTRODUCTION

Motoring (driving) is western by origin and a universal necessity as a critical aspect of transportation which is a hallmark of human civilization (Brodsky, 2002; Dibben & Williamson 2007).

Music has been an essential aspect of human sociology. It could be described as a "companion" traversing virtually all aspects of human endeavor. This characteristic had prompted some musicians such as Handel, Mozart, Bach and notable scholars such as Kirkpatrick, (1943); Smith, (1961); Fontaine & Schwalm, (1979); Davies, Lang & Shackleton, (1973); Etaugh & Michals, (1975); Parente, (1976); Davenport, (1982); Thompson & Robitaille, (1992); Brodsky, (2002); Cassidy & MacDonald, (2007) and Unal, (2013) to declare that Music is life.

Listening to music via car radio or playable while driving is perhaps the most common auditory stimuli that drivers are exposed to on the road apart from the stimuli of vehicular sounds. This practice (listening to music while driving) could be gratifying on the one hand, and hold some implications on the other hand for driving performance and safety (Stutts, Reinfurt, Staplin, & Rodgman (2001); Dibben & Williamson, (2007), Unal (2013)).

Considering the number of vehicles on the Nigerian roads, which population grows every year (Chidoka, 2012), and the amount of driving this implies, the question is: how common is in-vehicle musical listening among Nigerian drivers – especially, commercial drivers? This issue and the attendant implications were explored in this study from a regional angle.

1.1 BACKGROUND TO THE STUDY

Communication is the sharing of ideas, information, opinion, feelings or experiences between people. Humankind has always found a way to communicate which has evolved from tactile communication to pictographic and then to language (Okunna & Omenugha, 2012). Society's survival and growth depends on a number of things, among them a system of

communication (Bittner 1980 in Okunna & Omenugha, 2012). Shimp (2000) asserts that communication is something you do with another and not to another.

Music is one of the systems of communication as it sends encoded messages to the audience (listener). By way of classification, the communication between a driver and the radio or music player is found under the dyadic form of interpersonal form of communication while the radio or music player is a communication channel. Music is one of the greatest influences of mass communication in modern times as popular music has become a global language that leaves a personal and permanent impression (Okunna & Omenugha, 2012).

Music listening is not just as old as humanity but it has become both a way of life and a part of life. A clapping of the hands and stamping of the feet is enough to produce good music to the admiration of many wherever they may be. This is one unique quality that has perpetuated music through every generation. Bittner (1980), Brodsky, (2002), Gabrielsson, Lindstrom & Wick, (2003), Dibben & Williamson (2007), Okunna & Omenugha (2012), Unal (2013) see music as the salt of life because of how it flavours life. Music defines the mood of all situations from extreme happy mood marked with boisterous out-pouring of feelings and extreme sad mood characterized by melancholic tunes.

The ubiquitous nature of music has made it one of the most enduring and powerful systems of communication. The nature and circumstances of an environment to a large extent determines the type of music played and heard.

In-vehicle musical communication is a practice that has come to be accepted as normal behind-the-wheel behaviour. The functions and effects of in-vehicle music have led to two schools of thought. While one school argues for music and driving, the other argues against driving and music (Brodsky, 2002; Dibben & Williamson, 2007; Unal, 2013).

Figure 1: Car music deck: A platform for In-Vehicle Musical Communication

The automobile is a technology that has changed society dramatically over the last century. But not only society has it changed; the technology of the motorcar itself has changed significantly. The automobile of the 1900's has almost only the concept of four wheels and an engine in common with today's modern cars. The trend has been that vehicles keep evolving to meet the taste and challenges of the modern day consumer. Automobile companies work at improving designs and models to make cars larger, fancier, more powerful or ergonomic. One of the ergonomic features of the car is the radio and the musical deck (Hounshell, 1984).

In-vehicle musical communication comes from car radios or playables from the car musical deck which drivers and other occupants in a vehicle listen to. Listening is the second part of any effective communication interchange and is the part that is frequently taken for granted. There is the assumption that listening is something that just happens. But there is a difference between passive listening and active listening. Whereas passive listening is hearing, active listening is *listening*. Listening is an activity of paying attention to the speaker and subsequent attempt to understand what we hear. Even though listening may be seen as a passive process, it is not true because listeners have to concentrate on the message to be able to decode it (Underwood, 1989).

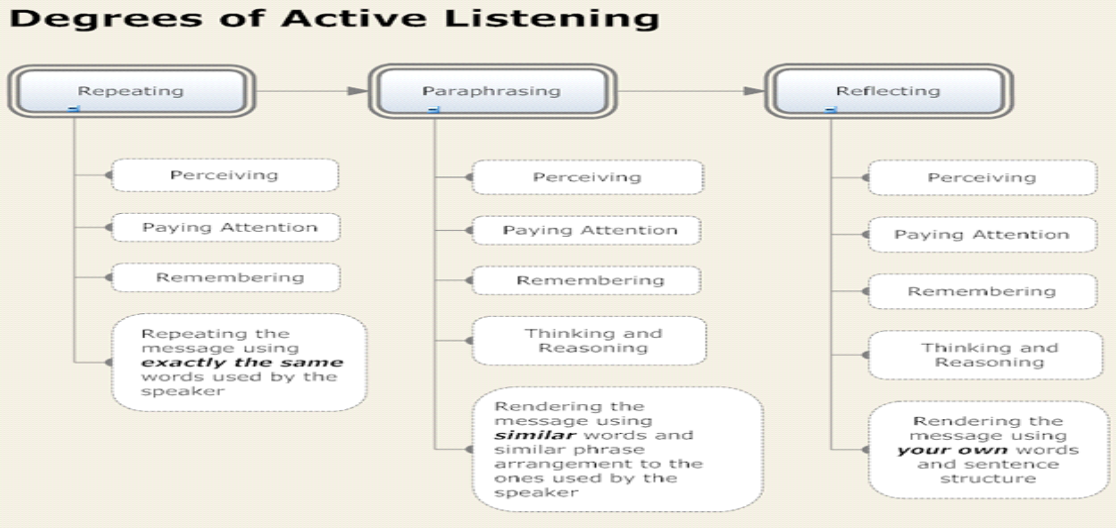

Figure 2: Degrees of Active Listening (www.boundless.com)

If listening is an active process, it can also be considered an activity, how then can it be combined with driving which is also an activity?

Driving is an activity and the controlled operation of a vehicle such as a car, truck, carriage, bus, tricycle etc. It is an activity that engages mental, physical and psychological faculties. According to National Safety Council (2012), driving is a cognitively complex activity. The brain is behind all tasks needed for driving: visual, auditory, manual and cognitive. The implication is that it is an activity that needs to be performed alone. The rationale for this submission can be best understood from the flowchart below:

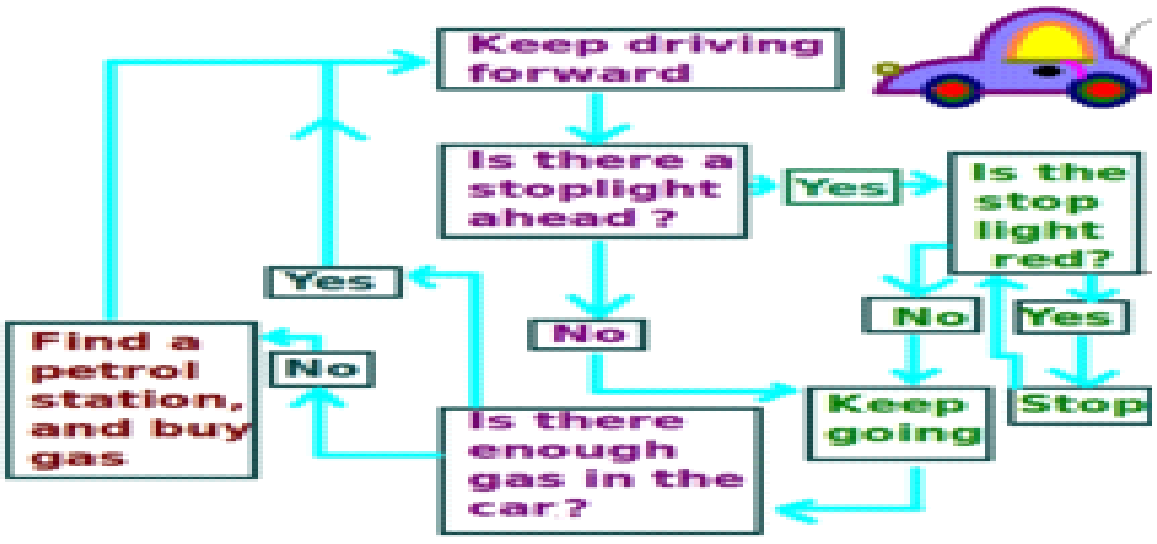

Figure 3: Driving as an activity (www.github.com)

Driving in traffic is more than just knowing how to operate the mechanisms which controls the vehicle; it requires knowing how to apply the rules of the road which govern safe and efficient sharing with other road users. An attempt to combine driving with another activity may lead to distraction as it has the ability to compromise a driver's mental skills. Safe operation of a motor vehicle requires that a driver focuses a substantial portion of his or her attentional resources on driving-related tasks, including monitoring the roadway, anticipating the actions of other drivers, and controlling the vehicle (Eby & Kostyniuk, 2003).

Engaging in multiple activities like listening and driving could lead to divided attention. According to National Safety Council (2012), multi-tasking is a myth. Human brains do not perform two tasks at the same time. Instead, the brain handles tasks sequentially, switching between one task and another. Brains can joggle tasks very rapidly, which leads us to erroneously believe we are doing two tasks at the same time. In reality, the brain is switching attention between tasks – performing, only one task at a time.

Gabrielsson and Lindstrom (2003) list the commonly observed cognitive consequences of listening to music as abandoning of other thoughts, being a whole with music, having imagery of different situations that are reminded by music, and having memories that are associated with music. Therefore, listening to music might alter thoughts, guide attention on specific musical qualities and trigger memory processes as well as suppress processing of thoughts that are not related to music.

The utility of in-vehicle musical communication is the main reasons for its practice for which (Brodsky, 2002), a survey of 1,780 British drivers as reported in (Dibben & Williamson, 2007) found that one often cited reason for listening to music while driving was its benefits for relaxation and concentration. These drivers also held the view that music was less distracting than conversation.

Wiesenthal, Hennessy and Totten (2000) found a relationship between stress reduction and music among drivers grouped as music group and non-music group, thus highlighting the importance of music as a mechanism for coping with driver stress.

Avants, Margolin and Salovey, (1991) hold that drivers in a highly congested vehicular environment, who did not listen to music, displayed significantly greater stress than those

who listened to music, suggesting that music communication and listening helped to reduce stress related to traffic congestion – music seemed to enhance these drivers' energy and arousal, helping to alleviate boredom and uplift their mood.

According to Unal (2013) when complexity is low, driving task might become overly dull, leading to adverse feelings such as boredom or sleepiness. In such situations, the presence of music might help to reduce boredom or sleepiness by arousing drivers and providing them with the necessary stimulation to stay vigilant. This assertion appears to be the major reason for in-vehicular music listening while driving.

Brodsky (2002) investigated the effect of music tempo on driver performance. In this study, the effects of three tempos, ranging from about 60 to 130 beats-per-minute on several measures of driving performance were investigated while music intensity was held constant. The study found that both average driving speed and number of lane crossings significantly increased with tempo, while both the number of missed red-lights and collisions also increased with tempo, but not significantly so. The conclusion from the findings is that music tempo increases driving risks perhaps by competing for attentional space and that the effect of music on driver distraction is a promising line of inquiry.

The argument for the claims against in-vehicle musical communication lies in the observation that the behavioral consequences associated with music-listening are, for example, a need for jumping, moving, tapping fingers, singing, dancing, smiling or freezing and inability to carry out any other activity in parallel to listening to music (Gabrielsson & Lindstrom, 2003 in Unal, 2013). So, music has a direct effect on behavior, and might lead to dropping other tasks at hand if the listener is totally absorbed and this constitutes a distraction.

1.1.1 South-East Nigeria: A Contextualization

South-Eastern Nigeria was one of the initial 12 States created during the Nigerian civil war. South-East became the name of one of the six geo-political zones in the country in the 1990s consisting of Abia State, Anambra State, Ebonyi State, Enugu State and Imo State. The local language in this region is predominantly Igbo. It is worthy to stress that Eastern Nigeria previously included all areas in the old Eastern Province, which later became Eastern Region in 1939 when Southern Nigeria was divided into two - Western and Eastern. The old Eastern

Region was a unified political unit under one government from 1939 up till the creation of twelve states in Nigeria in May 1967.

The first effort made by the colonial government in Nigeria to provide modern transport infrastructure in Eastern Nigeria was noticed in 1903 when the promulgation of the 'Rivers and Creeks Ordinance' was made (Wick, 2005). The Ordinance made it compulsory for all adult males to work free for the government for a specified period in a quarter; although concerted effort was not made by the government to pursue a purposeful road policy before the end of the first decade of the twentieth century. Thus, railway development, which commenced earlier in Western Nigeria during the last decade of the nineteenth century, was approved for Eastern Nigeria in the early 1910s. This approval was as a result of the discovery of coal in commercial quantity at Udi, near Enugu, and as such railway construction for purposes of evacuating the envisaged coal became inevitable.

In modern Nigeria, the old Eastern Region includes five States in the South-East and four in the South- South geo-political zones. These states are - Abia, Anambra, Ebonyi, Enugu, Imo, Akwa-Ibom, Bayelsa, Cross River; and Rivers. Till date, most of these nine old Eastern Region States are geographically contiguous. Some of these States have similar cultures and their peoples had engaged in inter-group relations many centuries before the advent of colonial administration and this singular background is the source and the reason for heightened Inter-State vehicular activities for trade, commerce, tourism etc.

Against this backdrop, it is worthy to note that during the British colonial government, South-Eastern Nigeria was home to many ethnic groups such as the Igbo, Izon, Bokyi, Ikwere, Annang, Ijaw, Ibibo, and Efik. These groups mostly had democratic systems of government and several kingdoms, such as Nir, Akwa Akpa (Calabar), Aro Confederacy and Opobo which were huge influences in terms of trade and commerce in the region. This is one of the reasons behind the high density of vehicular activities in the region as development was very rapid (Olayiwola, 2010). From 1900-1960, some of the ethnic groups in the area became intermingled in exchange necessitating higher volume of inter-regional transportation activities.

1.1.1.1 Description of Road Transportation Infrastructure in South-Eastern Nigeria

The nature of the roads is mostly single lanes. The South-East like every other geopolitical zone in Nigeria has witnessed tremendous growth in road transport infrastructure as a result of several factors namely: improved government accountability as a result of deepened democracy in the country since 1999, emerging presence of multi-national companies in commerce and industry and increasing philanthropic activities of so many corporate organizations and individuals (Wick, 2005). However, it is important to highlight peculiarities of what has deepened the regions road transportation infrastructure.

Anambra – Since after the civil war, no State in Nigeria has evolved more than Anambra State orchestrated by the presence of heavy commercial and industrial locations in Nigeria such as Onitsha Main market– the biggest of its kind in West Africa and Nnewi Motor parts market dubbed the "Japan of Africa". Her strategic position especially as a gateway to the East through the River Niger has made her location a necessary Transit State with lots of travelers trying to connect to the West or vice-versa, having need to traverse the State. Being aligned in the bank and coastal lines of the great River Niger, agricultural activities especially in the northern part of the State have increased the volume of economic relevance of the State in relation to others. The volume of commercial activities flowing in and out of the State due to these commercial cities has more than tripled the road transport infrastructure.

Abia – is more like Anambra State because of the presence of Aba, one of the biggest commercial cities in Nigeria. Its proximity to Rivers State helped to increase the volume of in-land transport activities and hence the high volume of vehicle movement in the area.

Enugu – the coal city is unique in nature being one of the earliest colonial administrative headquarters in Nigeria. Till date, majority of the regional and zonal offices both for multi-nationals and government have remained domiciled here stimulating in essence increased vehicular activities and influx of people to the State. Her agricultural potential as a result of abundant rural hinterland has also increased agro-allied activities in geometric progression.

Ebonyi – Her location in boundary with other States like Akwa-Ibom, Benue and Cross River States has made her a confluence State where transporters converge. Also the heavy presence of solid mineral resources such as salt, gravel, stone etc have made the State a beehive of activities for heavy duty transporters, motorists and road users.

Imo – this State has a number of infrastructures which have made the commercial city of Owerri, a destination for many motorists in South-Eastern Nigeria since the colonial times. The Sam Mbakwe International Cargo Airport at Owerri and the Imo palm vegetation in post colonial days helped to establish Imo as an important State in Nigeria, hence, the heavy vehicular traffic usually associated with the cities in the State.

From the foregoing, it could be deduced that usage of the transportation infrastructure in South-Eastern Nigeria characteristically has the following features:

- Being mainly people with similar socio-cultural background encourages the inter mingling of the people within the region, hence, the expected high traffic volume especially along inter-state axis.
- Being an old region in Nigeria, it is expected that the synergy of growth among other econo-political activities is highly expected.
- The region is marked as the heaviest and busiest zone in terms of commercial activities and the transportation systems involved characteristically increases the volume of motor and other road vehicular traffic in this zone.
- Emerging industrial status of some of the States in the region like Anambra makes the region an expected high volume vehicle traffic zone as movements of production input and output continue round the clock.
- The region's proximity to the important zones and States in Nigeria such as the South-South zone (Niger-Delta region), Rivers, Kogi, Benue and FCT makes the zone a trajectory of inflow and outflow of vehicular traffic.
- The heavy presence of tertiary institutions especially in Anambra, Enugu and Imo has contributed immensely to the level of influx of people to the zone leading to heavy motor traffic.

These highlighted characteristics have consequently conditioned the driving pattern of motorists in the South-Eastern region according to Wick (2005); NBS (2009) and Olayiwola (2010) as follows:

- Most drivers in South-Eastern States especially in Anambra, Abia and Imo are always driving in a haste trying to beat the traffic with several maneuvers and accompanying eventualities.

- With regards to vehicular architecture, most vehicles are fitted with in-built sound or music system especially within the urban areas.
- High literacy level has also characteristically influenced the prevalence of adolescent drivers in these States.
- Poorly maintained roads have changed the driving pattern of the motorists who have acquired “situational skills” in order to navigate through some bad terrain which is a challenge to first time users.
- The people from the region are fun-loving people and as such it is always the habit of drivers to drive and converse with other passengers in the vehicle sometimes at the expense of their security.
- Driving and eating a favorite snack is also a visible habit throughout the zone with constant stoppages along heavy traffic to buy edibles and merchandise.
- It is also an observable trend to witness in-vehicular merchandizing of goods and services and other advertisements as the journey progresses.

These conditions and circumstances highlighted above informed the choice of the South-East as an important context for this study.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Many points stand out in the background of the study and these help paint the picture of the worry that was addressed by the study.

First, listening to music via car radio or playable while driving is, perhaps, the most common auditory stimuli that drivers are exposed to on the road apart from the stimuli of vehicular sounds.

Second, the utility of in-vehicle musical communication is the main reason for its practice; which Brodsky (2002) as reported in (Dibben & Williamson, 2007) found to be relaxation and concentration.

Third, this practice (listening to music while driving) could be gratifying on the one hand and hold some implications on the other hand for driving performance and safety, according to Stutts, Reinfurt, Staplin, & Rodgman (2001); Dibben & Williamson, (2007), Unal (2013).

Against the backdrop of the foregoing points, the following concerns arise: how widespread is the practice of driving and listening to music among Nigerian commercial drivers? How much of a utility element is in-vehicle music to the Nigerian commercial driver? How aware are these drivers of the downside of driving and listening? Do these drivers make any conscious effort to guard against the potential consequence of driving and musical listening, as a behind-the-wheel-behaviour?

1.3 OBJECTIVES OF THE STUDY

Sequel to the concerns raised in the statement of the research problem, the study sought to explore the practice, utility and awareness of the hazards to well-being associated with driving and listening to in-vehicle musical communication among Nigerian commercial motorists, specifically, in South-East Nigeria.

The decision to embark on this study was informed by the observation that most drivers switch on their musical sets while driving their cars. This observation inspired the quest to establish the prevalence of in-vehicle musical communication in Nigeria, especially among commercial motorists, who are obligated not to endanger the lives of their passengers or other road users.

Specifically, the objectives that guided this study are as follows:

1. To determine the prevalence of in-vehicle musical listening among commercial motorists in South-East Nigeria.
2. To determine the preferred in-vehicle musical communication platform among these commercial motorists.
3. To ascertain the utility of in-vehicle music for these motorists.
4. To ascertain the extent to which these commercial motorists are aware of the hazards of the interface in driving and listening to in-vehicle musical communication.
5. To determine whether awareness of the hazards of the interface in driving and listening to in-vehicle communication in any way influences the behind-the-wheel behavioural disposition of these commercial drivers.

1.4 RESEARCH QUESTIONS

Based on the research objectives, the study sought answers to the following questions:

1. To what extent do commercial motorists in South-East Nigeria engage in driving and listening to in-vehicle musical communication?
2. What is the preferred in-vehicle musical communication platform among these commercial motorists?
3. What function does in-vehicle musical communication perform for these motorists?
4. To what extent are these commercial motorists aware of the hazards to well-being associated with driving and listening to in-vehicle musical communication?
5. Does awareness of the hazards in driving and listening to in-vehicle musical communication influence the behind-the-wheel behaviour of these commercial motorists?

1.5 SIGNIFICANCE OF THE STUDY

Studies cited in the background to this study show that the practice of driving and listening to in-vehicle musical communication is thriving because of the need to relax or concentrate while driving. Most of these studies are set outside of Nigeria, suggesting a paucity of such research in developing countries.

This, arguably, leaves a gap and necessitates a study on the Nigerian situation with regards to the practice, utility and awareness of the hazards to well-being associated with driving and listening to in-vehicle musical communication. In other words, this study adds to the empirical evidence on the practice of driving and listening to in-vehicle musical communication among Nigerian commercial motorists.

The data from this study provides the background, context and focus for policymakers in regard to road safety. This empirical data could assist in risk communication about safe driving and the probable inherent dangers in driving and listening to in-vehicle musical communication, which could aid drivers in making informed decisions with regards to safe driving.

1.6 SCOPE OF THE STUDY

This study was limited to measuring three variables: the practice, utility and awareness of hazards to well-being associated with driving and listening to in-vehicular musical communication.

Practice involves ascertaining the prevalence of the activity of listening to music while driving, among commercial drivers. Utility involves establishing the gratifications commercial drivers get from driving and listening to music; and, the hazards implies assessing the safety implications of driving and listening to in-vehicle musical communication.

Again, the scope of drivers was limited to inter-state commercial drivers with the exclusion of organized transport service drivers and private car drivers. The decision to focus on commercial drivers was informed by the finding by Unal (2013) that intervening variables like age, hectic environment, strenuous driving and length of trip determines the effects of music on driving habits.

Any part of Nigeria would have been used for this study but the decision was made to delimit the study to Nigeria's South-East geopolitical zone because of the high trend of commercial motoring in this region. It is the belief that subsequent studies could take up other areas in Nigeria and study along the line of this study to establish what is obtainable in these areas.

1.7 DEFINITION OF TERMS

For the purpose of clarity, some of the terms used in this study were defined. These are as follows:

1. **Behind-the-wheel behaviors**: making calls; playing music, eating etc while driving.
2. **Hazards:** dangers to diving as a result of listening to music while driving. This may include over speeding, low alertness which might lead to collision with vehicular traffic, low reaction time to unforeseen road incidents, missing audio and visual cues necessary for safe driving, misjudgment on use of vehicle controls etc.
3. **In-vehicle musical communication:** organized or agreeable sounds – music – emanating from motor vehicle radio or playables.
4. **Motorists:** inter-state commercial drivers in South-East Nigeria.
5. **Playables**: Cassettes, CDs, DVDs, Mp3s and Mp4s containing recorded songs.

6. **Practice:** procedure involved in tuning and listening to motor vehicle radio music or Playing of music on playables as an accompaniment at the onset of driving and throughout driving.
7. **Utility:** the gratifications from driving and listening to in-vehicle musical communication.

CHAPTER TWO

LITERATURE REVIEW

This chapter dwells on the conceptual, theoretical and empirical review of literature revolving around the focal issue which informed the present inquiry.

2.1 THE CONCEPT OF IN-VEHICULAR MUSIC LISTENING AND DRIVING

The emergence of In-vehicular ICT systems in the 1970s has helped people to listen to recorded music or even listen to audio live streams while driving. These became possible as radios and stereos became fitted as standard features in many cars today. The growth of these features which included radios, stereos, compact discs, tape recorders and MP3 players have greatly revolutionized in-vehicle entertainment systems and the availability of variety of music sources, hence, the opportunity for self-selected music listening while driving has increased. An observational study of American drivers showed that audio (most often the radio) was playing in vehicles 72 percent of the time, with only four of the 70 participants not listening to audio at all (Stutts, Reinfurt, Staplin, and Rodgman, 2003). A small-scale diary study carried out in England and including all modes of transport rather than driving alone revealed that music was present during 91 percent of transport experiences (Sloboda, O'Neill and Ivaldi, 2001). So why are people listening to music while they drive and when they are driven?

Several completed literatures and ongoing studies suggest that people listen to music while driving because it provides an enjoyable experience: it entertains and prevents boredom, provides stimulation and relaxes drivers. Listening to music is commonly mentioned as a counter-measure to driver fatigue: for example, turning up the volume of the radio was the most common technique reported by male college students to avoid drowsiness (Nguyen, 1998). The observational study by Stutts, (2003) revealed that audio was more likely to be on when there was less light, traffic conditions were moderate or heavy, and when no passengers were present in the vehicle, suggesting that music is used to entertain and relax. Using interviews, Bull (2001) has identified a number of recurrent themes in drivers' descriptions of their music-accompanied driving experiences: use of media in vehicles masks random environmental sounds, creating an 'accompanied' form of aural privacy, in which music provides an experience of 'connection' with others. This 'private space' makes possible a

range of other experiences: drivers report that they listen to whatever they like, as loudly as they like, and can even sing along because they feel less observed than at home; they report finding potential frustrations of driving transformed by listening.

Furthermore, Bull (2007) notes that there is the re-appropriation of 'empty' or 'stolen' time which listening to music while traveling allows. One way in which this kind of use of music has been conceptualized is as 'self-therapy'. From this perspective, listening to music while driving can be seen as a means for individuals to alter their environment in a way that is appropriate to their needs. Studies of music in daily life (DeNora, 2000) and music in workplace settings (Lesiuk, 2005) have shown that individuals learn over time how to use music in this way, rather than it simply being an outcome of hearing music. This qualitative research on music listening in vehicles has suggested a number of phenomenological consequences of listening to music while driving, but what evidence is there that music influences driving performance?

Several researches on the effects of music, and particularly the beneficial effects of music, have been thriving especially in the last decade. Through these studies a better understanding of how music can be used to positively manipulate a range of social and psychological symptoms has been gained. Even more recently, research has continued on how music can be used in the workplace especially for drivers (North & Hargreaves, 2008). However, how this will be of benefit or detrimental to the driving can best be understood if the concept of background music at work is mirrored.

In most developed and developing societies, music is nearly everywhere. One reason for music's ubiquity is its beneficial nature in different areas in our society, including medicine, music therapy, education and marketing. In addition, music listening is important for a person's well-being. Individuals reportedly use music to regulate mood, such as for relaxation or decreasing stress level (Bull, 2007; DeNora, 2000; Haake, 2006).

Again, the easy availability of music through the advancement of technology and the ease in obtaining music has practically increased the number of people who take their music with them everywhere they go (Bull, 2007; Davenport, 1972; DeNora, 2000). Several researchers have commented on the omnipresent nature of music being responsible for an increasing number of people listening to music at work (Bull, 2007; Haake, 2006; Prichard, Korczynski,

& Elmes, 2007). Although music has an increasing presence in people's everyday lives, results on the effect of listening to background music while a person is engaged in another task are inconclusive (North & Hargreaves, 1999; Oldham, Cummings, Mischel, Schmidtke, & Zhou, 1995). Moreover, given the potential beneficial effects of music as reported in most literature, the question of whether background music with all its attendant risks in driving and listening could be used to produce beneficial effects in the workstation is in dire need of systematic investigation (North & Hargreaves, 2008).

The effects of background music played during many different tasks have been studied, for instance: driving (Dibben & Williamson, 2007; Slawinski & MacNeil, 2002), reading text (Kalliene, 2002) and solving arithmetic problems (Rauscher, Shaw, & Ky, 1993). On the other hand, some studies have manipulated the characteristics of music to explore their effects on task performance (Sogin, 1988; Thompson, Schellenberg, & Husain, 2001). Other studies have manipulated the complexity of the task being performed by the experimental subjects as well as music preference and personality of the experimental subjects (Furnham & Strabac, 2002; North & Hargreaves, 1999; Rentfrow & Gosling, 2003). However, the results are mixed: some research in this area found background music beneficial while other research revealed that background music is detrimental to task performance (North & Hargreaves, 2008).

There are several reasons for the discrepancy in research findings. First, the complexities of interacting factors (e.g. music preference, task complexity, personality) are challenging to control and manipulate (North & Hargreaves, 2008). Second, there is a lack of guiding theory in this area. Third, due to the lack of agreement on a theoretical framework, research groups are using their own methodologies, manipulating different independent variables, recording a variety of dependent variables, and using different types of music (North & Hargreaves, 2008). While psychologists have developed standardized measures, such as the Wechsler Adult Intelligence Scale, which researchers can use, the field of music at work is still only recently becoming conscious of the variables it needs to investigate. Researchers lack a set of tools that can handle the complexities of measuring and analyzing the effects and benefits of music in the workplace. As a result, there is no coherence and no baseline for comparison across studies, making it difficult to bring knowledge forward in this research area as a whole.

Be that as it may, this study cannot be appreciated without an effort to conceptualize South-Eastern road infrastructure upon which this activity takes place. In line with the assertion of Sheriff (2009) that Nigeria roads were built without reference to standards and a confirmatory assertion by Agbonkhese (2013) that poor design and construction are the main causes of road deterioration in Nigeria, it should be appreciated that the peculiar nature of Nigeria roads in general require conceptualization in order to integrate the unique origin and evolution of the South-East road system network, the nature of the road topography and quality of the roads itself. This will help the current study in understanding the peculiar challenge that exist while driving on these roads and help future researchers capture the actual circumstances that face in-vehicular music listening while driving on these roads.

2.2 CONCEPTUALIZATION OF SOUTH-EASTERN ROAD TRANSPORTATION SYSTEM/INFRASTRUCTURE

In view of the problem of this study, the prevalence of in-vehicular music communication cannot be appreciated without necessarily conceptualizing what roads stand in the lives of the users and its relationship to the research questions of this study. It should be highlighted for the purpose of this study that roads represent the physical infrastructure upon which motor vehicles of all sorts are driven. It will be substantive to connote that this essential infrastructure as foreground to transportation, to a large extent influences directly all vehicular activities on the road and indirectly all in-vehicular activities including in-vehicular music communication. Consequently, the need to conceptualize its role will be central to understanding both the conceptual and theoretical consideration of this study especially with the South-East population and sample.

Road is a path established over land for the passage of vehicles, people and animals. The earliest road in Nigeria evolved from animal paths and human consistent trips to farmlands; sources of water and firewood. Roads which emerged as footpaths developed into trade routes during the trans-Atlantic slave trade (Ostun, 1988). The construction, maintenance and provision of securities for these routes then were the responsibilities of local chiefs who for these services collected tolls. Road traffic during this era was at a nascent stage as trades along routes were periodic. Most movements were pedestrian in nature and limited to settlements. It is important to note that congestion was not an issue during this era. Roads play a key role in the socio-economic development of any nation. Developments in the

industrial, agriculture, service, trade and other major sectors of a country's economy depend to a large extent on the efficiency of the existing road network in that country.

2.3 HISTORICAL BACKGROUND OF ROAD NETWORKS IN NIGERIA

Nigeria covers an area of 923,768 km^2 with a population of over 140 million. The South-East covers roughly 109 km^2 and has a population of 23 million. It lies in the tropics between latitudes 4ºN and 14ºN and longitudes 3º E and 14ºE. Nigeria's economy as elsewhere hinges on good road network. The Nigerian road transport infrastructure comprises 200,000km road network, 3,600 km of narrow gauge Railway (National Bureau of Statistics, 2009).

When Nigeria became a British protectorate and part of British Empire, road construction was given tremendous attention. Trunk roads (Federal highways, usually with multiple carriages) supported by secondary State roads (usually single lane) and feeder roads (usually local unpaved roads) were constructed to facilitate evacuation of agricultural produce to the ports and link-up towns and other settlements for administrative purposes (Falola & Olarewajui, 1986). The road linking Ibadan and Oyo constructed in 1906 is recorded as the first motorable road ever constructed in Nigeria. However, Lord Lugard in 1904 attempted the construction of a mule road linking Zaria to Sokoto, Katsina and Maiduguri. By 1923, lighter, faster and cheaper American cars were imported into Nigeria with more delivery towards the end of 1920's.

The central government of Nigeria in 1925 established a Road Board with a mandate to look into all issues relating to roads. By 1926, trunk road system to link the major administrative centers in the country was proposed by H.E Walker. After a decade of the Board services, the government had 9,453km length of roads maintained by her. The road network is the dominant internal transportation mode for the haulage of people, goods and services, accounting for 95% of the domestic traffic and providing the only access to the rural communities where majority of the economically active population live. The network of roads comprise 33,000km of Federal Highways, 50,000km of State Highways and 117,000km of Local Government feeder roads; with the South-East geopolitical zone accounting for 4,200km, 7000km and 16,000km for Federal, State and Local government roads, respectively. The demand for good road network is growing with the rapid rise in the volume of traffic and hence increased motor vehicular activities (National Population Commission (NPC), 2013; National Bureau of Statistics, 2009 & Tugbodo, 2009).

2.4 DRIVING AND MUSIC LISTENING: A GLOBAL PERSPECTIVE

Inquiry into the use of music in everyday life documents how real people employ music in particular spaces and settings. Apparently, not only do we do things to music, but most of the time we do things with music; we ride, eat, fall asleep, dance, romance, daydream, exercise, celebrate, protest, purchase, worship, meditate, and procreate– with music playing in the background (DeNora, 2001). Sloboda (1999) demonstrates that activities accompanied by music are predominantly domestic or solitary, and most frequently include transportation or housework. In a follow-up study (Sloboda, O'Neill, & Ivaldi, 2000, 2001) diary-type journals were written subsequent to hearing a random pager signal 7-times per day for one week; music experienced was twice as frequent for episodes involving transportation (91%) than home (46%) or workplace (5%). It is somewhat surprising that the popular location where individuals seem to be found when they listen to music is not in the comfort of their living room, nor is it shared with social agents such as intimate partners, extended family, or friends but in their vehicles.

As it is, the circumstance most frequently reported while listening to music involves unaccompanied vehicular driving. It should not, then, be surprising that automobile consumers outfit their vehicle as an audio-environment. For some time, drivers have further customized their cars with audio-components including changers, amplifiers, equalizers, and speakers of various configurations and frequency ranges. Moreover, the once-upon-a-time standard AM/FM car-radio receiver, long ago replaced by the cassette tape player and compact-disk CD player, has today become a vehicular entertainment center; a central media-driver for a host of auxiliary input devices such as USB flash memory sticks, portable disk drives, MP3 players, iPods, iPhones – as well as dash-mounted palms, DVD-players, and mobile internet work-stations. It should be pointed out that these devices have already been found to have the same or worse effects as cell phone use (Brumby, Salvucci, Manowski, & Howes, 2007; Salvucci, Markley, Zuber, & Brumby, 2007).

The association of music, driver, and the automobile was studied by Oblad (2000) which presumed that more than just attraction, individuals have specific expectations when they play music in the car. Oblad (2000) further holds that it is not necessarily the music drivers want to listen to, but rather, they simply want to spend time in the car with accompanying music. Oblad's participants reported being aware of choosing music pieces differentially; they described the effects of music as influencing both their rhythms of driving and

concentration, as well as charging their perceptions of relaxation and stimulation. Oblad (2000) notes that when a driver liked the music the sound level could never be high enough, always causing accelerated cruising speeds. The drivers reported to feel 'near' or inside' the music, and perceived the experience as 'impenetrable'.

2.5 IN-VEHICULAR MUSIC LISTENING: A STANDARD FEATURE IN NIGERIA'S DRIVING

Music makes people generally happy. In Nigeria, this noted happiness revolves around many econo-socio-cultural backgrounds and the general life optimism of Nigerians which no doubt thrives with music. Diverse socio-cultural ethnics and tribes in Nigeria have made various forms and manner of music available for the listening and entertaining pleasure of the people of Nigeria. Throughout all facets of life in Nigeria, music abounds such as in traditional festivals, markets, social and religious gathering, office, in commercial and private vehicles and at all corners of the streets. Moreover, the type and choice of a particular music in Nigeria largely depends on the nature of the location, the event and manner of people gathered there. This without doubt has given people some edge in predicting the kind of people that has gathered in a particular location whenever the music playing there is heard and vice-versa.

However, in-vehicular music listening has become more of a problem than other sources of music listening. This is as a result of several concerns that lately emanated from antecedent problems of in-vehicular music listening and frequent changing of music channel of choice by drivers. It is not news to witness drivers of different types of automobile vehicles racing down the road at higher speed above the traffic recommended range with different types of music puffing out from their windows and blasting all through their way to their destinations. Some motorists at the incitement of such music have also attempted to impress in the driving skills in what is locally termed "James-Bond driving". Some others also have in a politics-campaign manner attempted to cheer up the passers-by and all that is visible on sight. Either way, it has resulted in fatally recorded automobile accidents.

In line with the global anthem on the inherent dangers of in-vehicular music listening, Nigeria has equally taken more than her fair share of road crashes (Chidoka, 2012). This is as a direct result of several other non-music related factors present within the reality of the Nigerian setting. These include but are not limited to the following factors; high illiteracy

level among driver-population in the country, existing sharp practices in the award of driving license, poor road network, nonexistence of traffic regulations in 90% of the roads, non-implementation of the traffic code where they exist, poor prosecution of traffic offenders, poor regulation of vehicle license, poor policing of alcohol driving offenders, general lack of certified driver training, poor policy on automobile safety features and general corruption inherent in the country. No doubt, with the presence of all these deficiencies enumerated above, in-vehicular music listening while driving poses dangers to driving performance and safety.

Furthermore, the mishap that has resulted from in-vehicular music listening has left a lot of scars both on the government and individual citizens such that calls for urgent action has been gaining momentum, (Sheriff, 2009; Agbokhese et al 2013). Nigeria like every other global community has began to mobilize and direct resources both human and material to rapid sensitization against the dangers inherent in the practice although arguments abounds that music aside from being a distraction serves therapeutic purposes.

2.6 MUSIC IN SOUTH-EASTERN NIGERIA

Music in South-East Nigeria like every other African music is characteristically complex; it is often polyrhythmic, heterophonic, and polyphonic. Most Nigerian musicians do not actively conceptualize the abstract principles of their music; however, it is apparent from the unhesitating participation of all members of the rural community in musical performance that there are complex yet un-verbalized principles underlying music making (Emielu, 2006). One of the characteristics that gives South-Eastern music its distinctiveness is the large number of colorful instruments used both individually (as accompaniment to singing) and in large and small ensembles. Two or more events tend to occur simultaneously within a musical context. Even players of simple solo instruments (such as the musical bow or the flute) manage to manipulate the instrument in such a way to produce simultaneous sounds by playing overtones with the bow, by humming while bowing, and the like. A percussive quality of sound is always desirable (even on wind instruments). This particular preference is evident from the predominance of plucked string instruments (as opposed to bowed strings).

Cultural background of South-Eastern origin suggests that melodies often consist of two balanced phases. There is often a leader/chorus relationship in performance, and polyphonic performances are generally structured so that two parts or two groups of vocalists or

instrumentalists often perform in antiphony. This binary musical form often occurs with variations or improvisations on short melodic motifs.

In South-Eastern Nigeria, much of the traditional music is associated with dance, which adds to the multidimensional effect of the presentation. Density and motion are broad characteristics of performance style in most Sub-Saharan Africa. Dense orchestral timbres combined with staccato articulation and high degrees of amplitude. High degrees of amplitude observed in most native music may be due to the fact that African music is generally performed outdoors. Musical and kinetic motion is constant, hurried, and complex; dancers and musicians attempt to create as much action as possible in a short time. There are exceptions though; an evening story-singer in a performance on the musical bow, for instance, may be quite different. The range of musical approaches in South-Eastern Nigeria has always been extremely broad. Overlapping choral antiphony and responsorial singing are principal types of African polyphony. Ostinato and drone-ostinato, polymelody (mainly two-part), and parallel intervals are additional polyphonic techniques frequently employed. Several types may intermingle within one vocal or instrumental piece, with the resulting choral or orchestral tendency being the stacking of parts or voices (Emielu 2006).

Consequently three or four-part density is not an uncommon African musical feature. Such densities are constantly fluctuating so that continuous triads throughout an entire piece are uncommon. Canonic imitation may occur in responsorial or antiphonal sections of African music as a result of the repetition of the first phrase or the introduction of new melodic material in the form of a refrain. The latter may involve a contrasting section or a completion of the original melody (Hester 2004). African ostinato is generally restricted to a relatively small pitch range and is usually short in length. It can occur intermittently or form a continuous pattern situated either above or below the principle melodic line. Accompanying dance styles can often include broad, outflowing (often convulsive) motion usually presented within an abstract or symbolic context. In comparison, chordal relationships in African music that result from polyphonic combinations are not consonant with the major-minor Western harmonic system. Though these vertical concepts cannot be gauged precisely with Western musical tools, their functions include tension-release, dissonance, consonance, formal balance, varieties of chord combinations and clusters, as well as levels of harmonic patterning.

In South-Eastern Nigeria, traditional/cultural music rhythm is the most important factor in music. Even melodic patterns generally serve rhythmic functions as well. An inclination towards ensemble playing lends itself to a wide assortment of vertical rhythmic relationships popular with Black African music. This results in a stylistic predisposition to the use of hemiola and polyrhythms. At least two independent rhythms are maintained even in solo performances (as previously noted in regard to performers on the musical bow, flutes, etc.) Additionally, each line may contain its own beat pattern, which may not coincide with the pattern of the other complimentary lines. The resulting effect should not be confused with syncopation, where lines are also offset to form a regular (single) underlying pulse. Polyrhythms have rhythmic points of reference, which mark broader rhythmic phrases for each independent pattern. Hand clapping or other percussive accompaniment might accentuate the underlying basic pulse (www.artistes.ucsc.edu).

Through the shifting of accents, the changing of orchestral timbre and density, and various other techniques, a wide spectrum of orchestral color is achieved. Master drummers and conductors often indicate the tempo, style, dance steps, and other factors, which vary within the course of a single piece of music throughout the South-Eastern music artistry. There is also need to conceptualize the instruments used in providing African music as this will help explain the true mood provided by the sounds from those instruments.

Most of the instruments used in South-Eastern Nigeria are quite similar to African instruments which may be classified as chordophones (stringed instruments), idiophones (instruments that are struck or shaken), membranophones (instruments covered with skin), aerophones (wind instruments), and electrophones (electrical instruments). The latter category includes amplified instruments (such as the electric guitar) found in urban cafes, night clubs, ballrooms, and other places or entertainment where the “highlife” of West Africa, the *kwella* of South Africa, and the popular music of the Congo use Western musical concepts and instrumentation to create new forms of art music. These musical instruments can also be classified as instruments with melodic functions and instruments with rhythmic functions. Chordophones are used both as a melodic and an accompanying instrument (Hester, 2004).

2.7 THEORETICAL BASIS OF MUSIC THERAPY IN AFRICA

All over the world, the Christian Bible as well as other great books of history and revealed religious knowledge portrays general agreement on the efficacious use of musical sounds in healings. According to Twichell (1992), one time Eckankar living master, the Hu sound pronounced (Hiu) rules the entire universe. In his view, a moving engine, the overall sound from transactions in the market, sounds of waterfalls and oceans have that Hu sound of life. Thus Hu sound heals, rejuvenates and enlivens whoever sings it. In a similar style, Swami Rama (1978) talks of Hindu Swamis as being able to discard their bodies (Soul/Astral traveling) and even performing healings by chanting Aum. Supporting the above view, Prabhupada (1991) says in Krishna consciousness, chanting can be done – two ways: real chanting or singing the mantra called Kirtana and that the mantras if devotedly sung makes the singer achieve physical and spiritual purity. Rama (1978) and Prabhupada (1991) are not alone in this opinion. Vonkrasinki in Mitchell & Elsie, (1980) declare that music is considered a vital source of spiritual transformation, and vibrations are recognized as cosmic manifestations of a spiritual principle. The Lamas (of Tibet) have developed a science as well as an art of sound. They carefully cultivate sensitivity to musical pitch and tone and the moods thereby created, they believe, have the power to heal or if misused, can cause illness, according to the vibrations involved (Mitchell & Elsie, 1980).

The Christian Holy Bible also gives a vivid account of how David played the lyre to cure King Saul of his mental problem. In 1Samuel 16:14-23, it was said that God sent evil spirits upon him. This statement is further corroborated when on this issue Sendry (1974: 24) said "… in the Old Testament, King Saul's insanity was cured over night by the power of David's harp". The curative properties of music are not just known in the religious circles alone. In the ordinary social lives of the Africans this belief is held and explored but what would amaze the research-minded is the rarity of documented facts to rely upon. This present paucity of materials is obviously hinged on the fact that until very recently, records in African societies were orally kept. However, discussing music of Ancient Egypt, Farmer (1957) says the Egyptians performed music for its aesthetic beauty and its spiritual meanings. While Theophrastus (370- 288BC) observed that "the sound of a flute will cure epilepsy and a sciatic gut", Coelius Antipater (121BC) said "pain is relieved by causing a vibration in the fibers of the afflicted part". Examining the situation in Nigeria, Lateef (1987; 1999) posits that long before the mid 1940's, when for the first time in the USA music therapy began to be

used as a specialty, music therapy was one of the major aspects of the Bori religion in Nigeria.

In African societies there are many pointers which indicate their firm belief in and practice of music therapy. A major one of such is that music can be used to revive a dying person or animal. In African States, there is this notion that a dying person needs absolute silence (perfectly peaceful atmosphere) to expire. The belief is that the process through which the soul detaches from the body is cumbersome and requires quiet moments. To resuscitate a dying person, a single tone of wind instrument is sounded into the person's ears. For little chicks and other birds, a bowl is turned upside down encircling the animal while a healing song with intense drumming on the bowl is carried out. This practice has quite often yielded results which by implication means that Africans are certain about the healing nature of musical sound and this idea has been in existence long before now because in their belief the mind rules the body, hence Gotlib (1988: 134) opines: "Only in the 1970s and 1980s did it become widely accepted that illness results from a combination of both physical and psychological causes (in America)".

2.8 WHO IS A MUSIC THERAPIST IN THE AFRICAN TRADITIONAL SOCIETY?

The commonality of traditional African music remains the primary reason for its collective ownership; this is of cause why there is no distinction between audience and performers in Africa. This art is of many shades and so the practitioners of this kind of therapy are also of different types and they are:

a) *Herbalists:* These are traditional people who are skilled in the use of herbs and animal parts to treat human ailments. In Nigeria these herbalists are purely traditional healers and not native or witch doctors. They do not consult oracle. They are simply known as herbalists. As consultant healers, they know when music can curatively be applied to patients' situation. Other forms of therapy used by such practitioners include, bloodletting, Heat therapy, Hydro-therapy, Massage etc.

b) *Native/Witch Doctors:* These are people of super physical powers who can read the oracle and also understand the mysteries of the coven and necromantic assembly. The native doctors in Nigeria have special drums made of the hide of Indian pythons. These drums are usually consecrated before use. The native doctors believe that wicked deeds such as taking part in the spiritual attack of relations, having evil hands in relations' business can make one develop guilty conscience that can manifest in

emotional sickness. When the drum is played for them to dance to, they are moved to confess their misdeeds and are therefore relieved of their burden and completely healed. Music therapy in the nationalities of Nigeria has remained efficacious till date because music has been identified to work on the emotional and spiritual levels in a man's mind. In this vein, Sufi, Inayat & Khan in McClellan (1988) posits that the existence of illness in the body may be called a shadow of the true illness which is held by man in his mind.

c) *Faith Healers:* Mume (1973) talks of faith healing in Nigeria as being a medico religious practice. He gives an example of such as "Igbeuku" – a sect found in Delta Nigeria. Its parallel is the "Iyayi Cult" of the Esan in Edo state, Nigeria. He posits further that in the practice of religious Igbeuku, patients are persuaded to confess their sins which torture them, and once this is done, such patients feel emotionally relieved after the priest has pronounced them clean and subjected them to rigorous dancing exercise (Mume, 1973). From Mume's book, confession of sins was done amidst singing, drumming and dancing.

d) *Soothing Music:* In the course of this research, it was discovered that not much has been written about what goes on during male and female circumcision, bone setting, traditional surgery and bloodletting exercises. In Nigeria, during the above mentioned events, music is copiously made to reduce the pains associated with the surgical treatment being administered. The text of the music in this realm is usually perseverance and endurance to enable good result to be achieved.

In all, all the music therapists mentioned in this segment go through one prescribed course of training or the other. The training techniques can be summarized under apprenticeship system with role imitation, rhythmic memorization, dramatic sketches, voice training and care giving as core courses.

2.9 IN-VEHICULAR MUSIC AS AN ENTERTAINMENT AND THERAPEUTIC EXERCISE RELATIONSHIP-BASED THEORY OF MUSIC THERAPY.

Brian Abrams has proposed a relational theory that considers music therapy a discipline that "promotes human health both as and *through* music, in which music is understood as a *temporal-aesthetic way of being* transcending the concrete medium of sound, that manifests across all of the domains targeted in clinical music therapy goals" (Abrams, 2011). For

Abrams, music exists beyond the sound phenomenon and is located within humanity itself, a philosophical notion described in medieval concept of *musica humana* (Boethius, 1989). Like Jaaniste (2007), Abrams calls upon Heidegger's work to understand that the essence of human therapy is a being-in-relationship. In music therapy, these relational and therapeutic dynamics can manifest (health-related goals, interventions, and clinical need) within the temporal-aesthetic dimensions of inter-musical processes (within the medium of sound). Abrams also suggests that humans can express their humanity and health in a way that is musical but not located within the medium of sound.

Abram's model (2011) consists of four primary components: Sound, therapy, Being-in-Relationship, Art (within the sphere of Being-in-Relationship), and Music (within the sphere of Art). The elements intersect to represent various domains of practice such as those that are sound-based, arts-based, music-based, relationship-based, and a combination of each. Abrams notes that implications for his model include understanding what is unique and indigenous about music therapy, its professional boundaries (what is and what is not music therapy), and how musical process can relate to health-related processes. The ambient mode of being would locate itself within the pervasive ambience of being-in-relationship, suggesting that the therapist and/or client can nomadically traverse the various elements of Abram's model depending upon the context and developmental processes unfolding within the therapeutic relationship.

The ambient mode of being shares many philosophical assumptions with Abram's proposed theory, especially related to the idea that sound created relationally within the context of health promotion can transmit the essence of human experience and our shared humanity. In addition, this metaphor can extend to the various internal and external health-related environments, where a therapist and/or client can be musical without the presence of sound. The ambient mode of being looks to extend Abrams's model into a more applied and practical realm for music therapists, especially in relation to working with technology and creating music within music styles such as electronic dance music, hip-hop, ambient music, noise rock, and other forms of popular music that are created with the focus of texture, layering, sound scape, and creating a mood.

For instance, in a study relating to music usage and well-being at the workplace, Haake (2006) found that self-selected music inspired, relaxed and improved the mood of her

participants. Furthermore, music is used to regulate a person's surrounding environment and social context. For example Bronzaft (2002) and Bull (2007) reported that people listen to music on their portable music player (e.g. iPod) to block out noise and avoid interruptions from their colleagues at work.

The field of music therapy provides testament to the importance of music in some non-musical behaviours. A study by Bernatzky (2004) demonstrated how music could improve the accuracy of arm and finger movements of patients with Parkinson's disease. Music could also help students who are emotionally challenged or have behavioural problems (Savan, 1999). Not only can music be beneficial to patients, but medical practitioners have also taken advantage of the effects of music on their work. A questionnaire investigating the use of music in the operating room found that background music calms surgeons and improves communication between the surgical team (Ullmann et al., 2008). Such studies demonstrate the beneficial effects of music not only in medicine and therapy, but also in the workplace in general.

Music has also been used to influence consumers in many different ways. Early studies found that when slow tempo music was played, consumers would spend more time at the premises, such as restaurants, bars or retail stores, and consequently spend more money (Milliman, 1982, 1986). In addition, other marketing studies have shown that background music can alter buying intention (North, Hargreaves, & McKendrick, 1999).

2.10 EFFECTS OF IN-VEHICULAR MUSIC ON VEHICLE CONTROL

In-vehicular music has positive and negative consequences but whatever consequence it poses will depend on a number of things like:

Intensity: In-cabin driver-adjusted acoustic outputs were measured by Ramsey and Simmons (1993) in ranges between 83-130dBA and found out that higher volumes affects driving performance. Obviously, one must question if music presented at these intensity levels impede driving performance placing the driver at increased risk, or facilitate driving performance reducing actual everyday hazards. For example, Ayres and Hughes (1986) found that while visual search and pursuit tracking tasks remained unaffected, visual acuity was impaired by loud music (107dBA). This seems to suggest that momentary peak levels in loud music play a role in disrupting vestibular-ocular control. Such findings perpetuate general

beliefs that soft music facilitates driving while loud music impairs vehicular control. Although there have been some studies (e.g. Spinney, 1997; Turner, Fernandez, & Nelson, 1996) which challenged such speculations by demonstrating that music exposure during driving actually increased performance ability with improved reaction times, others found interaction effects between music intensity and focus of attention. For example, Beh and Hirst (1999) explored low-demand single-task driving versus high-demand multi-task driving under soft (55dBA) and loud (85dBA) background music conditions.

These findings indicate that while simple tracking tasks were not affected by music at either intensity, and that response times to centrally located visual signals improved with both intensities (i.e., shorter stopping times to critical signals in the driving environment), louder music significantly increased reaction times to peripheral signals during high-demand driving. In summary, while it could be argued that moderately-loud music may be beneficial to driving under increased intentional demand for signals located within central vision, the trade-off of an increase in response time to peripheral signals essentially nullifies any advantage.

Tempo: For some time, researchers have been aware that background music variegated by tempo affects drivers; Konz and McDougal (1968) reported accelerated driving speeds with rapid music, and Iwamiya (1997; Iwamiya & Sugimoto, 1996) reported differentiated perception of windshield-view scenic landscapes based on musical pace. In contexts where the visual field is a constantly changing stream (such as during vehicular driving), the perception of *time* seems to overlap with perception of *velocity*. Apparently, when confounded with background music, such inconsistencies relate to the fact that music itself is a temporal stimulus, and that sensory input of a temporal nature interferes with other temporal perceptual impressions (such as internal timing mechanisms). Clearly, temporal perception relates to the number of events processed within a given period, and therefore impressions can be baffled by both the amount of memory taken up by an event, as well as with the number of changes that occur during a specific period (Zakay, 1989).

Hence, music which moves at higher levels of perceived activity or faster tempos will cause differential perceptual effects versus music which moves at lower levels or slower tempos. Brodsky (2002) investigated the effects of music tempo on simulated driving acceleration and virtual traffic violations under conditions with no background music, slow-paced background

music (40-70bpm), medium-paced background music (85-110bpm), and fast-paced background music (120-140bpm) – while controlling for intensity (at a standard 85dBA). The results indicated that as the tempo of background music increased, so too did both simulated driving speed and the frequency of virtual traffic violations (including: vehicular accidents and collisions, lane crossings or increased vehicular shifting of lateral position referred to as 'weaving,' and disregarded red traffic-lights).

Finally, confirming outcomes by Gregersn and Berg (1994), the study found that faster drivers demonstrated significantly more at-risk simulated driving behaviors with fast-paced background music than did slower drivers. Brodsky concluded that music tempo was accountable for distraction effects, and suggested differentiating between 'music intensity evoked arousal' and 'music tempo generated distraction'.

2.11 DISTRACTIBILITY OF IN-VEHICULAR MUSIC AND THE IMPLICATION TO WELL-BEING

Before one can ascertain what constitutes distraction for safety driving, it is important to establish the focus tasks of driving and things that may affect this focus and its consequent implications. This will help understand whether in-vehicular music will affect driver's performance of these tasks. This is what has been adjudged as the primary and secondary tasks while driving.

2.11.1 Primary and Secondary Task While Driving

For a more comprehensive review of driver distraction, two types of driving tasks can be classified: the *primary task* and the *secondary task*. The primary task is defined as the actual driving task, keeping the vehicle on the road while obeying traffic regulations and being thoughtful towards other traffic participants. The primary task includes physical actions such as braking, depressing the accelerator, operating the transmission, controlling the speed, and steering the vehicle. Primary tasks are often performed out of a habit due to the experience of driving.

Secondary tasks are tasks which are not part of the natural driving response, but function to please the comfort- and entertainment needs in a car like selecting music from a hand-held or hands-free music player, receiving and indicating a call, entering some data to the navigation system, or regulating the air conditioning. Secondary tasks might divert the driver's attention

away from the driving or primary task. Some researchers (Olson, Hanowski, Hickman & Bocanegra 2009; and Kern & Schmidt, 2009) define also *tertiary tasks* whereby the tertiary tasks are non-driving related tasks, and secondary tasks are defined as driving related tasks, but not required tasks for controlling the vehicle. In line with most published studies, this study will distinguish between primary and secondary tasks, without considering tertiary tasks.

Attention, especially attention bottlenecks play an important role for the concept of driver distraction, as we have seen in the definitions above. While driving, the driver's attention will be split up between the primary task of driving and other secondary tasks, such as talking, listening to the radio, or interacting with entertainment or driver assistance systems. Wickens and Hollands (2000) describe three categories of attention problems:

- **Selective attention:** Attention is focused towards one aspect in the environment whereas other aspects are not attended to. (Cognitive tunneling)
- **Focused attention:** The tendency to be distracted by irrelevant information
- **Divided attention:** Limited ability of attending to two or more concurrent tasks

All these attention bottlenecks can apply to driving situations, e.g. cognitive tunneling applies when a driver concentrates on entering an address into the navigation system and loses control of the primary task of driving.

In general, whenever people are involved in more than one complex or cognitively demanding task in parallel, the human brain is in danger of missing critical information. Gopher and Donchin's Multiple Resource Model (Gopher & Donchin, 1985) provides an explanation for different levels of interferences between tasks which are performed in parallel. The Multiple Resource Model describes three different pools of attention resources and information processing capacities:

1. Input and output modalities (visual vs. auditory),
2. Stages of information processing (perception vs. working memory) and
3. Codes of information processing (spatial/manual codes vs. verbal/vocal codes).

2.11.2 Causes of Driver Distraction

Related to the use of ICT systems while driving, three questions frequently arise:

- How does interaction with ICT systems (including in-car music systems and mobile devices) influence driver's attention and performance?
- Which factors of a user interaction task cause driver distraction?
- Are there different types and levels of driver distraction depending upon specific task characteristics?

2.11.3 What Drives Distraction?

Often drivers do not realize that they are distracted and that they switch their focus away from the road. Driver distraction can be interpreted differently. The following three definitions clarify the danger of being distracted while driving: Driver Distraction can be defined as the diversion of attention away from activities critical for safe driving toward a competing activity (Regan, Lee & Young, 2009). The International Standards Organization defined distraction as attention given to a non-driving-related activity, typically to the detriment of driving performance. (ISOTC22/SC13/WG8 CD 16673). The AAA Foundation for Traffic Safety describes distraction as when a driver is delayed in the recognition of information needed to safely accomplish the driving task because some event, activity, object, or person within or outside the vehicle compelled or tended to induce the driver's shifting attention away from the driving task (AAA Foundation for Traffic Safety, 2001).

Regan et al. (2009), states that the human brain is limited and is not able to do several tasks at the same time. Especially, when tasks are similar, highly demanding, and when they require continuous attention, the performance will inevitably suffer. There are many potential sources of distraction in a vehicle: Talking to passengers, reaching for objects, listening to the radio, smoking, eating, daydreaming, applying cosmetics or grooming, and attending to potential sources of distraction outside the vehicle cockpit (e.g. advertising).

2.12 THE INFLUENCE OF COMMUNICATION TECHNOLOGIES ON DRIVER ATTENTION AND PERFORMANCE

According to Mattes (2003); Harbluk, Noy and Eizenman (2002), we can conclude that interacting with ICT systems significantly decreases driver attention and performance. In order to understand how and why interacting with modern ICT systems influence driver's attention; we first reconsider cognitive tunneling or selective attention. Using a cell phone leads to inattention and narrows the driver's scope – even if a hands-free device is used. This

is also called “inattention blindness”. Drivers are looking out the windshield, but do not process everything in the roadway environment, they miss critical information on potential hazard in their surroundings and thus, they are not able to respond to unexpected situations. Their field of view narrows. In order to explore how the use of a cell phone may affect a driver’s visual scanning. Harbluk, Noy and Eizenman (2002) tracked the eye movements of drivers while using hands-free phones, and while not using a phone. The findings revealed that the driver’s field of view is significantly scaled down while being distracted by using a hands-free device.

The influences of using ICT systems on driving performance can clearly be demonstrated by measuring longer reaction and response times, and by detecting problems with lane keeping and variations in following distances. Often large variances in lane position are considered as the most serious sign of influences on driving performance when using an ICT system while driving. Therefore, Kun, Peak and Medenica (2007) recorded three measures of driving performance when investigating the effect of different accuracy levels of speech recognition: the lane position, the steering wheel angle, and the velocity of the participants when operating with different systems. They found significantly reduced driving performance for lower speech recognition accuracy levels. They used a high fidelity driving simulator with a 180° field of view. 20 participants needed to follow a leading vehicle at a constant distance without departing from the lane. A very well established experimental paradigm for assessing driver distraction is the Lane Change Task (LCT) as described by Mattes (Mattes, 2003).

In a LCT simulation, a driver has to follow a straight three-lane road for about three minutes at a constant maximum speed of 60 km/h. During one trial, 18 signs along the track indicate that the driver has to change the lane as soon as possible. On the basis of measuring the longitudinal and lateral position, the speed, and the steering angle, the deviation of the actual driving performance from a normative ideal model is calculated and serves as an indicator for the distraction caused by a secondary task.

2.12.1 The Main Factors of Driver Distraction

The main factors of driving distraction are *Head-up*, *Hand-off* and *Mind-off* operations, which can be mapped to visual, manual and cognitive attention bottlenecks. They are:

Visual: Visual tasks require eyes-off-the-road

Manual: Manual tasks require hands-off-the-wheel

Cognitive: Cognitive tasks require mind-off-the-road

Modern in-vehicle entertainment systems encompass diverse user interactions including map interactions, text entry, item selection, and reading while driving. While all these interactions can endanger the drivers' safety, Virginia Tech Transportation Institute found that texting is the most serious one because it involves all three above types of distraction. Firstly, the driver is looking away from the road and the glance is bestowed on the display of the cell phone. Secondly, the driver uses at least one hand to write and send the text message. And thirdly reading or writing is likely to involve emotional feelings or cognitive operations. Thus, it is not surprising that texting is associated with most frequent and longest lasting looking away from the road (Olson, Hanowski, Hickman & Bocanegra, 2009 and Box, 2009).

2.13 DIFFERENT TYPES AND LEVELS OF DRIVER DISTRACTION

In order to analyze different types and levels of driver distraction, quite a number of observational studies have been conducted (Jensen, Skov, & Thiruravichandran, 2010; Barón & Green, 2006; Chang, Lien, Lathrop, & Hess, 2009). Maciej and Vollrath (2009) show a comparison of manual and speech-based interfaces while driving and operating different In-Vehicle Information Systems (IVIS). A driving simulator was used to investigate 30 drivers doing the Lane Change Task. Different secondary tasks such as selecting an audio artist, album or title, placing a phone call and entering points-of-interests (POI) or a specific address into the navigation system were performed either manually or by voice interaction. The address entry tasks were performed in two different conditions: stepwise affirmation of the entered address information (multiple) and collected affirmation of all entered address information at the end of the dialogue within one single step (single). The single entry navigation system was used with the speech dialogue only and with subjective distraction (means – bars, standard deviations – whiskers) of different IVIS tasks comparing manual and speech control (Source: Maciej & Vollrath, 2009). The results indicate two main findings: Firstly, manual control resulted in a substantial increase of perceived distraction in comparison with voice interaction during all tasks. Secondly, the level of decrease in subjective distraction differs a lot between the different tasks. With regards to the driving performance measures, there was even one task (POI entry) for which speech interaction did not yield a significant improvement compared to the manual control conditions. These results demonstrate that there are different types and levels of driver distraction depending upon specific characteristics of the secondary task and the user interaction mode.

2.13.1 Visual Distraction

Frequency and duration of in-vehicle glances to infotainment systems are important influences with regards to visual distraction. The higher the frequency of glances off the road, the bigger the threat to be involved in a danger situation while driving.

Several authors point out that visual distraction of more than two seconds is considered to be a critical time of visual absence (Zhang, Smith & Witt, 2006; Klauer, Dingus, Neale, Sudweeks & Ramsey, 2006; and Olson, Hanowski, Hickman & Bocanegra, 2009). Hosking, Young and Regan (2009) examined the impact of text messaging on the mean frequency of in-vehicle glances as well as on the mean duration of in-vehicle glances. In this experiment, 20 young novice drivers were tested in an advanced driving simulator and the result shows that text messaging results in more and longer in-vehicle glances than driving in respective control conditions without text messaging. Both, retrieving and sending text messages, negatively affect the driving performance. The driver's eyes were focusing significantly less on the road during the activity of messaging compared to the control condition (no text messaging). In their literature review, Barón and Green (2006) state that speech recognition interfaces reduce driver distraction compared to traditional manual interfaces. The drivers do not need to attend to a graphical interface in order to select any functions. Rather, voice interaction allows the driver to visually concentrate on the driving task.

2.13.2 Cognitive Distraction

Cognition refers to the mental functions of human understanding and information processing such as perception, learning, thinking, and remembering. With regard to the cognitive workload, Green (2000) found out that tasks that are not visually demanding, such as daydreaming or listening to a long complex auditory message from a phone call can increase the probability of crashes. McCallum, Campbell, Richman, Brown and Wiese (2004) investigated the cognitive workload when using a personal digital assistant (PDA) while driving. Two different conditions (Speech PDA, and Manual PDA) and a control condition (No PDA) were compared. Twenty-four participants were tested in a stationary vehicle including a display with the driving environment, simulation control and data collection modules. For subjective ratings a modified NASA TLX rating scale was used. The results indicate that while driving, manual PDA operations produce a significantly higher cognitive workload than speech-based operations.

When considering the advantages of voice interaction, one has to distinguish different types: voice interaction between a human and a computer and human-to human voice interaction. In the latter, a further distinction between speaking on the phone and talking to a passenger in the car is essential. A passenger in a car is very likely to estimate how much talk in various traffic situations will be suitable. However, a person on the phone has no knowledge about the current situation, and thus, cannot respond appropriately to different traffic situations. Commonly, passengers avoid conversations about complex matters, which could lead to driver distraction whereas people on the phone do not mind (Green, 2000).

2.14 EFFECTS OF DISTRACTION ON DRIVER PERFORMANCE AND ACCIDENT HAZARD

Different types and levels of driver distraction will influence driver performance and accident hazard in different manners. The effect on driving performance depends on several interrelated factors: the nature of the activity, the ability and experience of the user, the complexity of the driving task and the design, location, and activities with in-vehicle technologies. Therefore, not only certain task characteristics but also the design of an in-vehicle information system can have a considerable effect on driver performance and crash risk. Driving performance is usually defined in terms of the following three measures:

Longitudinal control: Speed and following distance

Lateral control: Lane keeping and steering measures

Reaction Time: Duration within which one is expected to respond to an unexpected eventuality while driving.

2.14.1 Longitudinal and lateral control

Longitudinal control measures are commonly examined in distraction research. Two of the most commonly used longitudinal control measures are speed and following distance. Lateral control is usually measured by lane keeping and steering. Hosking, Young & Regan (2009) investigated the impact of text messaging on driving performance by taking longitudinal control measures. The driver's ability to control the longitudinal vehicle position was significantly impaired during text messaging activities. The speed of the distracted driver did not differ from the driving speed in the control condition, however, the following distance increased. Hosking et al (2009) interpreted the increased following distance as the drivers attempting to compensate for being distracted during driving by reducing the speed. A study on the effects of naturalistic cell phone conversations on driving performance published by

Rakauskas, Gugerty and Ward (2003) yields similar results on distracted driver behaviour. In a driving simulator experiment, they found out that cell phone use causes drivers to have higher variation in accelerator pedal position, drive more slowly with more variation in speed, and report a higher level of workload.

Gärtner, König and Wittig (2002) investigated the influence of manual and speech input on different driving performance indicators. Fifteen subjects were tested in a real traffic situation when performing different tasks using a Driver Information System (DIS). The driving errors were classified into eight classes from A to H. All types of driving errors occurred significantly more frequently in the manual input condition than with speech input. The effects on longitudinal and lateral control performance were also investigated by Jensen, Skov, and Thiruravichandran (2010). They inspected lateral control errors of three different output configurations (only audio, only visual and audio-visual) of a navigation system in real traffic driving. The measured variables include primary task performance (longitudinal control, lateral control and traffic violations) and secondary task performance (navigation errors and task completion time). The experiment was conducted in real traffic with 30 participants. The results showed that the participants had many more longitudinal control errors (i.e. speeding violations) in the visual and audio-visual condition than with the audio configuration.

2.14.2 Lateral control

With regards to lateral control errors, the participants performed significantly better with the audio configuration than with visual or audio-visual output. The visual and audio-visual configurations collectively constituted 95% of all lateral control errors, whereas participants had only four out of a total of 77 lateral control errors. In their 2003 literature review, Young, Regan and Hammer (2003) report that visually distracted drivers steer their car in a different way than attentive drivers do. Steering wheel movements are considered to be an indicator of secondary task load.

Under normal conditions, when not performing secondary tasks, drivers usually do a number of small corrective steering wheel movements to keep the lateral position. When they perform a visually or manually demanding secondary task, drivers often make a number of large and abrupt steering wheel movements to correct heading errors (Regan, Lee, & Young, 2009). Liang and Lee (2010) compared the effects of different types of distraction on driving

performance in a medium-fidelity simulator study: visual distraction, cognitive distraction and a combination of both. They found out that visual distraction interferes with driving performance more than cognitive distraction, and visual distraction dominates the performance decrements during combined distraction. They conclude that minimizing visual demand is particularly important in the design of in-vehicle systems and in the development of distraction countermeasures.

2.14.3 Reaction time

Reaction time measures have become increasingly popular in in-vehicle system research, particularly when the devices involved are complex (Regan, Lee, & Young, 2009). Reaction time is regarded as an essential driving performance indicator as increases in reaction time can decisively raise the accident risk in unexpected and hazardous driving situations. In a driving simulator study, Maciej and Vollrath (2009) found out that both manual and speech control in secondary IVIS interaction tasks led to significant increases in reaction times. Even in the least demanding experimental condition which resulted in the shortest response (music selection via speech control as a secondary task), the average reaction time was still significantly longer than in the baseline condition (driving without performing a secondary task). Maciej and Vollrath (2009) point to similar results from Chisholm, Caird and Lockhart (2008) who found that selecting music from an MP3 player significantly increased the reaction time to unexpected hazards in the traffic. Studies with speech controlled in-car systems indicate that also voice interaction can lead to increased reaction times (Lee, Caven, Haake & Brown, 2001; Jameson, Westerman, Hockey, & Carsten, 2004).

2.15 DRIVERS' RESPONSE TO THE DANGERS OF IN-VEHICULAR MUSIC LISTENING

In-vehicle-systems are becoming increasingly popular and extensively used. Functionalities such as navigation, air-conditioning, electric windows and seat adjustment, mobile telecommunication, DVD and multimedia content, etc. are becoming part of the daily driving experience. The increased complexity of control panels and menu structures of today's in-car information systems diverts the driver's attention away from his primary driving task and puts driving safety at risk. Recent achievements in the field of automatic speech recognition seem to promise significant advances for driving safety. Together with acoustic system output, voice interaction might help to keep the driver's full visual attention on the road and

manual attention at the steering wheel while using modern information and communication services.

In Engstroem, Johansson and Oetslund (2005) an apparent difference was a higher result in the physiological workload and steering activity during the field study. The authors interpret this difference, as an indication of increased effort, which seems reasonable given the higher actual risk in real traffic.

2.15.1 Voice Interaction

On the basis of the foregoing study, voice interaction can be considered as a safer means to perform secondary tasks while driving. The results on distraction, driver performance and accident hazard clearly indicate that voice interaction provides many advantages for in-car interaction when compared to other currently available control methods. The section summarizes the most important findings on voice interaction in the car from the reviewed literature. It focuses on the following two main questions:

- How does voice interaction compare to other interaction modes in terms of driver distraction, driver performance, driver attention and performance?
- Can voice interaction help to reduce the level of distraction and prevent accidents?

2.15.2 Voice interaction in comparison with other interaction modes

Attention theory suggests that voice interaction is less distracting than interactions with a visual display because the driving task is primarily visual (Wickens, 1984). This means that drivers can better divide attention across the visual and acoustic modalities than intra-modally. Numerous empirical studies confirm this assumption: Jensen, Skov, and Thiruravichandran (2010) provide strong evidence for the advantage of speech output compared with visual output. In a real traffic driving study, they report significantly better driving performance when the participants receive audio instructions from a navigation system than with visual instructions. The substantial increase in longitudinal (speed violations) and lateral control errors (lane excursions) in the visual display condition can be explained by an increased frequency and duration of eyes-off-the-road glances for the visual and the audio-visual experimental conditions.

2.16 BACKGROUND MUSIC AND DRIVING PERFORMANCE

Music tempo has an effect on driving performance. Higher tempos are symbolic of today's popular hard rock music. Yet, there is little research on tempo of music and driving tasks. Several studies discovered that faster music in respect to beats per minute increases both simulated driving speed and one's perceived driving speed. Brodsky (2002) found that subjects not only drove faster with a faster music tempo, but they also perceived themselves to be driving faster. Additionally, participants underestimated their faster recorded driving speeds by approximately 45 kilometers per hour less during the faster tempo condition. Therefore, drivers partake in more at risk behaviors when listening to higher tempo music. Drivers also had greater incidences of collisions, lateral weaving, and disregarded red lights, which indicates that tempo of the music causes rhythmic contagion or even entrainment. It is safe to state that music tempo plays a role in the stimulation (Brodsky 2002). Faster-paced background music affects drivers' performance, but there have been conflicting results on whether or not music facilitates or distracts a driver's ability to perform vehicular controlling tasks.

Music has been shown to facilitate performance during driving related activities. Comfortable or moderate intensities of background musical stimuli improve one's performance when partaking in driving-related tasks. As reported by Spinney (2010), quiet music played at 55 DBA provides for optimal driving conditions when compared to silence and loud music of 85 DBA. Listening to the quieter music condition will improve reaction time and awareness to avoid hazards. Improved performance and alertness is related to music exposure matching one's comfort level.

2.16.1 Success criteria for effective voice interaction solutions

Most above cited authors point out that the quality of the design and implementation of the voice user interface which have a substantial influence on the potentials for increasing the driver's safety by using voice interaction instead of visual manual interaction methods. A first crucial quality factor of speech-based in-vehicle systems is the performance of the automatic speech recognition (ASR). Kun, Peak and Medenica (2007) compared the effects of high and low ASR accuracy levels on driving performance in a high fidelity driving simulator. They measured the steering wheel angle variance of their 20 participants as a main indicator for lateral control performance. They found highly significant effects of the recognition accuracy.

Zhang and Wei (2010) also emphasized the importance of the voice user interface design for keeping the complexity of today's in-vehicle applications at a manageable level in order to reduce the cognitive workload and contribute to safer driving. On the basis of a literature review and a case study with an existing speech recognition application, they propose guidelines for the design of ergonomic in-vehicle speech recognition interfaces.

2.16.2 Future applications for in-vehicle voice interaction

Visions like the one presented by Alvarez, Martin, Dunbar, Taiber, Wilson & Gilbert, (2010) build on a permanent internet access in cars. In 2008, Mercedes-Benz presented a fully internet-based infotainment system, which is called "my Command". It runs on a 4G wireless high speed Long Term Evolution (LTE) network. In Germany, a LTE network test-ground has been built up including an eight times greater bandwidth than today's telecommunication networks to test the system functionalities. The functions included map load, audio and video stream, street views satellite images, world radio, internet telephony via VoIP, up-to-the-minute information to find the cheapest gas station also as make a hotel or restaurant reservation. (Fischer & Nürnberger, 2010).

The Continental Cooperation predicted to release a network-based vehicle in 2012. The communication system called Auto-LinQ will combine navigation functions, internet and online-applications with safe driving. The system will allow drivers access to vehicle centric information from almost everywhere and at any time. Also receiving and processing emails without distracting the driver will be possible due to speech interaction. Permanent in-vehicle internet access will bring also social networks and other extremely fast communication services like twitter into the car. Even without having any well-founded studies on safety issues of using these services in the car, one can expect that they pose big challenges on the interaction design and driver attention. Voice interaction might play a major role in integrating new functionalities into a safe and comfortable driving environment of the future.

2.16.3 Music on Traffic Violations and Accidents

The number of music-related automobile accidents and highway fatalities is not known. The car radio, first introduced to American motorists by scientist Paul Gavin in 1929, blares from the windows of automobiles passing by; the last thing drivers think about is how unsafe it might be to tune and listen to music during driving. Yet, many studies have looked at changing a radio channel, cassette tape, or CD as a form of mental distraction attributed to

fatalities (Stevens & Minton 2001). More specifically, the 2000 Quicken Insurance Survey was the first to find a more specific and alarming picture: almost all drivers insured by Quicken (91%) reported daily driving with music playing in the background, and almost all (95%) of those with one or more traffic violations during the prior year had been driving at the time with music - 33% reporting to have been listening to fast-paced loud music.

Statistical data on road safety indicate that, at least for Israel, drivers between ages 16-24 account for the highest level of accidents and fatalities (Shinar, 2004). It seems, then, that two essential predictors of traffic-related accidents and fatalities are 'age' and 'license date' with roughly 25% severe accidents and 5% fatalities occurring during the first two years of driving. Based on a 10-year analysis of the US National Highway Traffic Safety Administration's Fatality Analysis Reporting System data on fatal motor vehicle crashes between 1998 and 2007, the AAA (2009) reported that 24,655 young drivers were involved in 24,198 fatal crashes that killed 28,138 people. Of the 28,138 people who died in crashes involving young drivers, 10,388 (36.9%) were the young drivers themselves, whereby another 8,829 (31.4%) were passengers of young drivers, and 6,858 (24.4%) were occupants of other vehicles operated by drivers at least 18 years old. Ironically, Shinar (2004) reported that the most common traffic violations of this group were speeding (37%) and lane weaving (20%), both of which have been reported to correlate with in-cabin music behavior (Brodsky, 2002). Such a situation is especially distressing when considering that current lifestyles place youngsters aged 16-24 years old behind the steering wheel more often than in the past. Young drivers regularly choose to travel with music playing in the vehicle, and plan in advance which tracks to take along for the ride. Unfortunately, the music they seem to be listening to while driving is not only highly energetic aggressive fast-paced music, but is reproduced at high volume levels.

Hence, alternative music backgrounds could, in principle, modify driving behavior and therefore assist in the war against traffic accidents. With this goal in mind, Brodsky & Kizner (2012) developed a functional music background referred to as *In-Car Music: An Alternative Music Background Designed For Driver Safety*.

There appears to be little research investigating the use of background music at the workplace. Though early studies dealing with background music at work and productivity, Oldham, Cummings, Mischel, Schmidtke, & Zhou (1995) was considered the most

comprehensive study by North & Hargreaves (2008). Over a period of four weeks a selection was made from 256 full-time office employees who were provided with a personal stereo headset. The participating employees had one of 32 job titles, and carried out their job tasks which required varying levels of complexity. To consider job complexity in the study of background music and productivity was rare at the time of this study and was an important contribution. The job performance data of all participants were also monitored for four weeks before the beginning of the study. These data were used as a baseline for comparison. The participants were asked to listen to music as often as they would like during their work and were asked to record the amount of time they listened to music and the type of music they listened to. The job performance data of all participants were also collected during the four weeks of music intervention, and for four weeks after the intervention. Hargreaves (2008) found that employees given the personal headset performed significantly better at their job compared to those without the personal headset during the music intervention weeks. Adding to the importance of considering task complexity in music listening research, Hargreaves (2008) found an interaction effect with task complexity and music listening, namely, employees with the simplest jobs benefited most from the music whereas employees with more complex jobs did not benefit from the music and performed worse than the group without the stereo headset. Although the study is influential in the area of music listening at work, their technology is outdated for today's workplace.

Earlier, another study was conducted by Lesiuk (2005). In a five-week music listening and productivity study with IT professionals, Lesiuk (2005) measured worker's affect, quality of work, time on-task, and also took a daily music listening log. She found that music listening increased workers' positive affect and improved their mood. The finding that workers' moods did improve would have helped their cognitive and creative processes, supporting the mood-arousal hypothesis discussed above. Even though Lesiuk's study is timelier and has more relevance to the contemporary workplace compared to the Oldham study, her research was restricted to the field of software engineering. Further, to ask her participants to work without music for part of the study could be unnatural for some individuals and consequently affect their performance.

As to the main studies cited that explicitly address the question in the workplace, the Oldham (1995) and Lesiuk (2005) papers provide some interesting propositions about how music can benefit people in the workplace. Both the mood-arousal hypothesis and the distraction

hypothesis received some initial support. Music can place the listener in a good mood, possibly leading to better performance, but for some tasks, particularly complex ones, work performance appears to be negatively affected (distraction theory).

Later, Barón and Green (2006) provided a review of fifteen experiments to investigate the use of speech interfaces for typical in-vehicle tasks like music selection, email processing and dialing and destination entry. They summarize that speech interaction leads to better driving performance, decreased workload and less time with eyes off the road as opposed to manual interfaces. Most tasks can usually be performed better with speech. An exception is dialing which is usually better in manual control mode. A crucial factor is the design and implementation of the user interface - especially the speech recognition accuracy. Finally, the current driving situation and also driver characteristics (especially driver's age) play an important role for the suitability of speech vs. manual interaction modes.

As described above, Maciej and Vollrath (2009) found substantial safety improvements for speech interaction in their comparison of manual and speech based in-vehicle interfaces. Speech interaction led to significant improvements of the driving performance (measured via lane-keeping and reaction times) and in the visual attention (measured via gaze time towards the driving task) as well as to a significant reduction of the subjective distraction (rating scales) in their 30 participants' lane change experiment. Given the great potentials for increased driver safety, the authors conclude that speech control is a must in the car of the future.

McCallum, Campbell, Richman, Brown, & Wiese (2004) found significantly decreased cognitive workload levels when their participants interacted with a speech-based PDA compared to a manual PDA. Gärtner, König, & Wittig (2002) report significantly less driving errors for the speech input condition than for manual interaction with a driver information system in realistic driving situations. Similar results from realistic driving situations were found by Jensen (2010) who compared audio vs. visual vs. audio-visual output modality conditions for a navigation system. Castronovo, Mahr, Pentcheva and Müller (2010) examined the primary driving task performance with three different systems including manual, speech-only and multi-modal interaction. 24 participants carried out the lane change task. Although the drivers were able to perform more of the experimental tasks in the manual

condition, their driving was significantly safer with using the speech-only or multimodal dialogue.

Castronovo, Mahr, Pentcheva & Mueller, (2010) concluded that driving performance measured by mean deviation in meters between a normative model and the actual driving: Distraction in the manual condition was significantly higher than both in speech-only and multimodal. The Virginia Tech Transportation Institute (Ford Motor Company, 2009) studied the use of a speech based system "SYNC" developed by the Ford Motor Company. This study shows that speech-based interaction enables a quicker task completion and less eyes-off-road time as compared to using a hand-held device. VTTI's real-world study tracked 109 drivers collecting over 2 million miles driven within one year. The "100-Car-Study" concluded that manually dialing, a task that requires a person to have the eyes off the road, was almost 2.8 times riskier than normal driving. VTTI also explains that 'Headset' cell phone use is not substantially safer than 'handheld' use because the primary risk is associated with both tasks is answering, dialing, and other tasks that require your eyes to be off the road. In contrast, 'true hands-free' phone use, such as voice activated systems, are less risky if they are designed well enough so the driver does not have to take their eyes off the road often or for long periods (Box 2009).
It might be concluded that the type and content of an application heavily influences the suitability of using voice interaction. The nature of voice interaction is different from graphical user interfaces. For example, voice user interfaces are restricted to sequential input and output whereas graphical displays can convey a lot of information in parallel on one screen. On the other hand, voice input can avoid tedious menu trees or interaction processes which require a number of subsequent steps if the speech based system can process more complex user utterances or if the user can just say what he wants. Although voice interaction will therefore not be the best modality for all tasks (Castronovo, 2010), it provides rich opportunities for innovative services in the car – also for the sake of driving safety.

Alvarez, Martin, Dunbar, Taiber, Wilson and Gilbert (2010) presented a voice interfaced driver manual which allows users to pose naturally spoken questions on the usage and maintenance of the vehicle and returns the most relevant answer from the manual database. On the basis of previous studies, the authors anticipate high recognition accuracy and expect the system to help in reducing driver distraction and increasing driver satisfaction and manual usability. In the future, Alvarez and his colleagues want to make the user more aware of the

vehicle and the vehicle more aware of the surroundings. This might lead to providing the driver with information about the route conditions (traffic and weather), warnings about his physical state (fatigue) or similar information.

2.17 REVIEW OF EMPIRICAL STUDIES

Recently and precisely six years ago, a study was conducted in the city of Ibadan in Nigeria to investigate factors that influence driving behaviour in the city of Ibadan, ascertain some of the psychosocial factors that influence road crashes in Ibadan, and attempt proffering suggestions about dealing with the identified driving problems.

The study by Shenge (2010) employed a correlational design to review self-regulation of driving as a viable means of achieving safe and efficient driving among drivers. Three hundred and sixty two randomly or purposely sampled drivers participated in the study that employed thematic analyses and correlations as analysis tools. However, 64 participants were selected from among the 362 participants through personal solicitation to participate in focus group discussion; 12 focused group sessions were held, with 4-6 participants featuring in each group; 362 copies of the questionnaire were also distributed.

The principal finding of the study was that psychosocial factors such as drunken driving, road rage, and engaging in distractive activities while driving correlated significantly with road crashes. This study was quite insightful on the ground that it was conducted in Nigeria and also focused on driving. However, the present study will focus on not just drivers but inter-state commercial drivers who spend most of their time on the road. The variable of time and duration of driving will add credibility to the responses of Inter-State drivers.

Another study in 2012 was by Oluyemisi, Opeyemi and Giwa on *Understanding of Traffic Signs by Drivers–A Case of Akure City, Ondo State, Nigeria*. This study investigated the understanding of traffic signs by drivers in the city of Akure with respect to their personal characteristics such as age, marital status, gender, and educational background. A total of 20 symbolic warning and regulatory-prohibitory signs were investigated. Two hundred copies of the questionnaire were prepared and distributed within the various motor parks in Akure; 185 copies of the questionnaire were returned. The analysis showed that there was a low understanding of traffic signs by drivers. The average percentages of drivers who correctly understood the warning and prohibitory signs were 67% and 58%, respectively. Age,

Education and years of driving experience played prominent roles in drivers' understanding of signs, however marital status and gender had no effect.

This study is relevant to the present study in the area of shedding more light or insight on the nature of Nigerian drivers. From the study, 67% and 58% understood traffic warning and prohibitory signs. If that is the case, how do drivers combine driving and in-vehicle music when almost half of the drivers do not understand traffic signs? By this development, will in-vehicle music make drivers in Nigeria more dangerous to themselves and other road users? More so, the study samples intra-city drivers while the present study will sample inter-city commercial drivers.

Having agreed on the ubiquitous nature of music while driving, Dibben and Williamson (2007) in *an exploratory survey of in-vehicle music listening* explored the habit of in vehicle music listening. Their study was to discover the extent to which people listen to music while driving, what they are listening to and why and whether there is any association with driving safety, measured by possession of four or more years' no-claims on motor insurance. Using the survey method on 1,780 British drivers, the study reveals that approximately two-thirds listen to recorded music and music radio while driving, with music reported to be less distracting than conversation. The most commonly cited reasons for listening to music while driving were its benefits for relaxation and concentration. The survey indicates associations between possession of 'no claims' on motor insurance and a preference for silence. However, the genre of music playing also appears to influence driving performance: there was an association between possession of no-claims, genre of music, and a difference in the frequency with which certain genres were playing at the time of the last accident, relative to the expected norm for that genre.

Their findings support evidence for music as a source of in-vehicle distraction, which can have both positive and negative effects on driving performance. The data for the study was collected online which this study sees as a limitation and which the researcher hopes to address by being physically present during the actual driving so as to note the variables that positively or negatively affect the effect of music on drivers.

In 2005, Lesuik in a five-week music listening and productivity study with IT professionals, measured worker's affect, quality of work, time on-task, and also took a daily music listening

log. She found that music listening increased workers' positive affect and improved their mood. The finding that workers' moods did improve would have helped their cognitive and creative processes, supporting the mood-arousal hypothesis discussed above. Even though Lesiuk's study is more recent and has more relevance to the contemporary workplace, her research was restricted to the field of software engineering. Further, to ask her participants to work without music for part of the study could be unnatural for some individuals and consequently affect their performance.

In the same vein, Cunningham, Nichol, Bainbridge and Ali (2014) investigated social music in cars. This study looked at effect of music in the car on a group and not as an individual. Specifically, it focused on how songs are chosen for playing, how music both reflects and influences the group's mood and social interaction, who supplies the music, the hardware/software that supports song selection and presentation. 22 student investigators collected data from a third year university Human Computer Interaction (HCI) course in which students design and prototype a system for the set application, where their designs are informed by an ethnographic investigation into behavior associated with the application domain. The data comprises 19 participant observations, two self-interviews, and four interviews (approximately 45 printed pages). Of the 19 participant observations, four were of short drives (10 to 30 minutes), 14 were lengthier trips (50 minutes to 2 hours), and one was a classic 'road trip' (7 hours). They found that music was seen as integral to the group experience on a trip; Music can contribute to driving safety; by playing songs that will reduce driver drowsiness and keep the driver focused; music can provide a background to conversation; listening to music can be the main source of entertainment during a trip, as the driver and passengers focus on the songs played etc.

For Wiesenthal, Hennessy & Totten (2000), in order to examine the efficacy of music in dealing with daily stressors, 40 automobile drivers were randomly assigned to either a music or non music group. Half of the participants were males and half were females; their ages ranged from 21 to 50 years of age, with an average age of 26.2 years. The music group listened to their favorite music, while the non music group abstained from music or talk radio during their entire commute to or from school or work. Nokia cellular telephones (model number LX 12/C IS) were equipped with a cigarette-lighter power adapter for continuous in-automobile power access and a stationary antenna to measure the State Driver Stress Inventory. Using a cellular telephone, state measures of driver stress were obtained during a

single commute in low- and high congestion conditions. Driver stress was greater in high congestion than in low congestion, but the non music group demonstrated extreme levels of stress within high congestion. Listening to self-selected music appeared to limit driver stress only within highly frustrating and irritating traffic congestion. The difference between this study and the present study lies in the methodology.

Also, since it has been found out that music has an effect on stress, Schwartz; Ingre; Fors (2012), then investigated the effects of two very commonly used countermeasures against driver sleepiness, opening the window and listening to music, on subjective and physiological sleepiness measures during real road driving. In total, 24 individuals participated in the study.16 subjects in the countermeasure group and eight subjects served as control group Sixteen participants received intermittent 10-min intervals of: (i) open window (2 cm opened); and (ii) listening to music, during both day and night driving on an open motorway. Both subjective sleepiness and physiological sleepiness (blink duration) was estimated to be significantly reduced when subjects listened to music, but the effect was only minor compared with the pronounced effects of night driving and driving duration. Open window had no attenuating effect on either sleepiness measure. No significant long-term effects beyond the actual countermeasure application intervals occurred, as shown by comparison to the control group (n = 8). Thus, despite their popularity, opening the window and listening to music cannot be recommended as sole countermeasures against driver sleepiness.

If music has no effect against sleepiness, why do drivers in Nigeria still engage in the practice? The similarity of this study and the present study lies in the presence of the experiment leader in the vehicle. However, while the participants in the study under review were aware of being observed, the participants in the present study will be unaware of being observed.

Furthermore, to study music's influence on driving performance, Unal (2013) enlisted 47 university students between 19 and 25 years old to engage in a series of simulated road tests. Participants had more than two and a half years' driving experience on average. First, they were asked to create their own playlist, to make sure the music they listened to was familiar and well-liked. Computerized driving simulations then surrounded the motorists with four large screens to create a 240-degree view of traffic. Conditions included driving with loud music, driving with moderate-volume music and driving with no music. No sound

adjustments were allowed while the tests were under way. Participants took the virtual wheel for about a half-hour twice in two weeks along a monotonous, non-threatening and predictable drive in two-way traffic. The researcher monitored heart rate changes at five-minute intervals and assessed the drivers' car-following behavior as they adjusted to the changing speed of vehicles ahead of them. Drivers also were asked to report levels of arousal (feeling energized, bored, fatigued or sleepy) while on the road. From the result, neither the presence of music nor its volume had any ill effect on the drivers' ability to properly follow the car ahead of them. Also, those who drove with music responded faster to changes in the speed of the car ahead than those driving without music even when it appeared that the louder the music, the faster the response. That notwithstanding, the researcher cautioned that music may have a different impact under more strenuous driving conditions and might even be distracting in a hectic environment and that trips longer than 30 minutes might elicit different responses. It was this observation that played a major role in the decision to sample inter-State drivers whose trips are longer and more strenuous than inter-city drivers.

2.18 THEORETICAL FRAMEWORK

Two guiding theoretical models may explain the motivation behind driving and listening to music. They are: (1) Uses and Gratification Theory which explains utility; and (2) the Distraction Theory which explains consequence.

2.18.1 Uses and Gratification Theory

Wimmer and Dominick (1994) proposed that U&G began in the 1940s when researchers became interested in why audiences engaged in various forms of media behavior, such as listening to the radio or reading the newspaper. Still others credit the U&G perspective with Schramm's (1949) immediate reward and delayed reward model of media gratifications (Dozier & Rice, 1984 in Ruggiero (2000).

Most of the communication theories on media effect (Hypodermic Needle Theory, Limited Effects Theory, Bullet Theory, Agenda Setting Theory, Framing Theory etc) focus on the effect media have on people. What stands uses and gratification theory apart from the rest is that it is the theory which explains how people use media for their need and gratifications. In other words, this theory states what people do with media rather than what media do to people. The theory was based on the premise that there are many different responses to media

messages and that people are able to determine by themselves what they are willing to accept or reject.

Specifically, this theory may explain what commercial drivers do with music while driving. According to Konkwo (2003), Uses and Gratification is when the media do not do things to people rather people do things with the media. In other words, the influence of the media is limited to what people allow it to be because the uses and gratification approach emphasizes audience members' motives for making specific consumption choices.

This theory posits that

- The decision to practice selective exposure depends primarily on the uses which members of the mass media audience want to make of media messages and the benefits which they hope to derive from the media. (Okunna &Omenugha, 2012; Cantril 1942 in Ruggiero, 2000)
- The functional use of mass communication is what the uses and gratification theory explains.
- U & G sees the audience as active in choosing the messages that is most gratifying.
- This theory can be said to have a user/audience-centered approach. According to Ndolo 2005: 33) "it is a theory that is audience centered, asking what people do with media rather than what the media do to people"

Despite the principles of this theory, it is not without criticism. What is considered a weakness of the theory is that it confers so much power on the audience because of the assumption that not only do people know why they make media content choices but can also clearly articulate those reasons; or that it relied heavily on self-reports. For (Elliot, 1974 in Ruggiero, 2000), by focusing on audience consumption, U&G is often too individualistic. It makes it difficult to explain or predict beyond the people studied or to consider societal implications of media use.

Also, this theory is sometimes seen as being too apologetic for the media industries. By implication, this theory exonerates media houses or absolves media houses of some responsibility for their media contents.

Another criticism is that this theory ignores the fact that much media consumption is unintentional when we use the media. For instance, you may want to read a news story on a national daily but may be distracted by adverts. According to Katz, 1987 in Ruggiero 2000, the theory was too captivated by the inventive diversity of audiences to pay attention to the constraints of the text.

Again, the theory ignores media's cultural role in shaping peoples media choices and use. The theory takes out the possibility that media can have an unconscious influence on our lives and how we view the world. The idea that we simply use media to satisfy a given need does not seem to fully recognize the power of media in today's society (West & Tumer 2000).

Besides lack of clarity among central concepts such as social and psychological backgrounds, needs, motives, behavior, and consequences, the cornerstones of U&G theory, the notion of an active audience and the validity of self-report data to determine motives, are assumed by researchers, and that assumption may be "a little simplistic or naive" (Severin &Tankard, 1997, in Ruggiero 2000).

From the work of Ruggiero (2000), it was gathered that the Bureau of Applied Social Research of Columbia University, examined the effects of the mass media on political behavior. They studied voters in Erie County, Ohio, during the 1940 election between Roosevelt and Wilkie (Lazarsfeld et al., 1948 in Ruggiero 2000) and voters in Elmira, New York, during the 1948 Truman–Dewey election (Berelson et al., 1954 in Ruggiero 2000). Both studies suggested that the mass media played a weak role in election decisions compared with personal influence and influence of other people. This goes to prove that the audience is not as weak or passive as proposed by advocates of all powerful effects power of the media.

Despite these criticisms, Uses and Gratification theory serve an important function by stressing the reciprocal nature of the mass communication process. In relation to this study, this theory will explain the practice and possible utility for engaging in in-vehicle musical communication. Specifically, it will help in the analysis of the first, second and third research objectives.

2.18.2 Distraction Theory

The second model is that music acts as a distraction and the presence of any music will, in effect, decrease productivity. Even though distraction may appear to have a negative meaning, in reality, distraction can either be positive or negative. This model stems from pain research where a beneficial effect of music is to emotionally engage the patient and take the mind of the patient off the painful condition or treatment (Mitchell & MacDonald, 2006). The main advantage music will have under such circumstances is in masking the 'other', possibly more distracting auditory stimuli. On the side of music as a distraction, some studies have concluded that music is distracting for task performance. In a study by Furnham and Strabac (2002), participants' performance in a reading comprehension and prose recall task was equally poor when background music or office noise was played compared to their performance in silence. The studies concluded that background music is as distracting as office noise. In the course of normal working tasks, this hypothesis therefore would predict a worsening in task performance. This prediction is further supported by the multiple resource theory.

Multi-tasking is prevalent in our society. Issues such as listening to music and the dangers of using cell phones while driving call for understanding of the extent to which such dual-task performance will lead to decreases in attention and time-sharing ability. Multiple resource theory is one approach towards understanding this phenomenon.

The concept of multiple resources in attention was spawned from two seeds. First, Kahneman's (1973) influential book on attention inspired a concise theory-based writing and model in which human performance is supported by a general pool of mental "effort" or undifferentiated resources (although this model has actually been proposed earlier by Moray, 1967; see also Kalsbeek & Sykes, 1967). The concept of graduated effort stood in marked contrast to the then existing all-or-none single channel bottleneck view of attention (Broadbent, 1971; Welford, 1967). Kahneman's model emphasized the demand of task for these limited resources, the lack of availability of resources for concurrent tasks, and the suffering of performance of the latter as a consequence.

However, Kahneman makes note of the other sources of "structural interference," which could not be accounted for by a pure resource demand or "undifferentiated capacity" model.

Second, there was by this time a growing body of multi-tasking studies, some in the experimental literature (Bahrick, Noble, & Fitts, 1954; Bahrick & Shelly, 1958; Briggs, Peters, & Fisher, 1972) and during the 1960s. These contributed to the creation of the study of "divided attention" in performance as a discipline. Two such studies explicitly cast their results within a framework of multiple resources, postulating that all tasks did not compete for a single undifferentiated "pool" of demand-sensitive resources (Kantowitz & Knight, 1976; Wickens, 1976). Shortly after this, and stimulated by the parallel work of North and Gopher (1976; North, 1977), a series of studies to examine the costs and benefits of the newly emerging technology of voice recognition and synthesis, particularly as applied within the multi-task environment of the aircraft cockpit began to emerge.

In interpreting the results of studies in this area, along with the collective implications of the growing body of multi task studies referred to earlier, *Attention & Performance VIII*, a sort of meta-analysis was conceived. In this analysis, account for the variance in time-sharing efficiency revealed across over 50 different studies by two characteristics was attempted: (a) the extent to which time-shared tasks used the same versus different processing structures and (b) the extent to which "difficulty insensitivity" was expressed when the two tasks used different structures. Difficulty insensitivity occurs when an increase in the difficulty of one task fails to degrade the performance of a concurrent one. Out of these two analyses emerged a fairly coherent picture that "defined" separate resources in terms of a set of three dichotomies of information processing, now quite familiar to many readers and expressed (because of their three dimensions) below:

- The *stages of processing* dimension indicate that perceptual and cognitive (working memory) tasks use different resources from those underlying the selection and execution of action (Israel, Chesney, Wickens, & Donchin, 1980).
- The *codes of processing* dimension indicates that spatial activity uses different resources from verbal/linguistic activity, a dichotomy expressed in perception, working memory (Baddeley, 1986), and action (speech vs. manual control; Liu & Wickens, 1992; Wickens & Liu, 1988).
- The *modalities* dimension (nested within perception and not manifest within cognition or response) indicates that auditory perception uses different resources than does visual perception. Thus, to the extent that two tasks use different levels along each of the three dimensions, time sharing will be better. Note that this assertion does not imply that perfect time-sharing will emerge whenever different resources are used for two tasks. For example,

time-sharing an auditory and visual task will still compete for common perceptual resources (and may also compete for common code-defined resources if, say, both are linguistic, involving speech perception and reading).

- To these three dimensions was later added a fourth: *visual channels*, distinguishing between focal and ambient vision (Leibowitz & Post, 1982; Previc, 1998), a nested dimension within visual resources. Focal vision, primarily (but not exclusively) fovea, supports object recognition and, in particular, high acuity perception such as that involved in reading text and recognizing symbols. Ambient vision, distributed across the entire visual field and (unlike focal vision) preserving its competency in peripheral vision, is responsible for perception of orientation and movement, for tasks such as those supporting walking upright in targeted directions or lane keeping on the highway (Horrey, Wickens, & Consalus, 2006).

The distraction theory may explain how in-vehicle musical communication distracts the drivers and poses hazards to well-being to the driver and other road users or acts as a beneficial stimulus to driving process.

2.19 SUMMARY OF REVIEWED LITERATURE

Conceptual framework of this study helped understand that historically, in-vehicular music listening had been alien to driving until the evolution of vehicle features which incorporated ICT systems which commercially started in the 1970s; though primitive customized ICT features did start to appear around 1930’s for the well-off alone. Thus it was the growth of these features which eventually gave rise to in-vehicular music listening in this modern day.

Globally, music is used everywhere and in-vehicular music is not an exception. Several studies have established the use of background music in workplaces (Devon, 2001).

Earlier Slobada (1999) identified the use of music for domestic and solitary life which included transportation. Oblad (2000) studied music, driver and Automobile Association and concluded that there is specific expectation while in-vehicular music is played. Ramsey and Simmons (1993) have earlier highlighted that in-vehicular music affects vehicular control depending on intensity, tempo and velocity and was concurred latter by Brodsky (2002).

Okon, Hanowski, Hicknam and Bocanegra (2009) and Kern and Schmidt (2009) noted that two consequences of in-vehicular music listening causes primarily two things: distraction and arousal which impacts the driving tasks which they opined to be of two kinds. The two kinds are primary and secondary driving tasks for core physical driving activities and in-vehicular relationship with the environment, for example, adjusting the seat or seat belt respectively.

Earlier, Wickena and Hollands (2000) have described these as attention problems and classified them into three: selective attention; focused attention and divided attention. Regan, Lee and Young (2009), concluded that anything that affects the driver from the completion or poor execution of primary, secondary and tertiary task can result to distraction and risk behavior. This view had been supported by AAA Foundation for traffic safety (2001). Olson, Hanowski, Hicknam, Bocanegra (2009) and Box (2009) concluded that driver distraction could be categorized under visual, manual and cognitive bottlenecks. Jensen, Skov and Thiruravichandran (2010) also conducted an observational study on the types and levels of driver distraction and concluded that visual, manual and cognitive impairments to driving amount to tangible risk and threat to driving safety. Young, Regan and Hammer (2010) also associated the problems of driving safety to longitudinal, lateral and reaction time problems.
Theoretically, several scholars have aligned many theories mainly to aid understanding of what motivates in-vehicular music listening. One of such theories is the Uses and Gratification Theory or the Functional Theory which is based on the premise that there are many different uses and responses to media messages and that people are able to determine by themselves what they are willing to accept or reject. Despite the criticisms of this theory, it may explain the practice and possible utility for engaging in in-vehicle musical communication in relation to the first, second and third research objectives of this study.

However, Mitchell and MacDonald (2006) later theorized that distraction is also the motivation behind in-vehicular music listening in what they called Distraction Theory**.** They emphasized that drivers often want their souls to wander off while driving especially to keep them away from the hassles of the day-to-day thoughts which occupy the mind when it is solitary; hence, they keep company with music to be distracted away from their problems. Earlier, Furnham and Strabac (2002) have established with their experiments that background music reduced reading comprehension and recall task was also poor when background music played. Their findings also established music as a distraction hence supporting the Distraction Theory.

The empirical findings of Eagle 2002; Monsell 2003; Horrey and Wickens 2004; Wickens, Dixion and Seppelt 2005;Tsang 2006; Strayer and Drews 2007; Krammer and Parasuramman 2007; Wickens and Colcombe 2007 and Wickens and Mcllarley 2008 emphasized the prevalence of multitasking, attention division, time sharing and the struggle to maximize resources to cope with multiple tasks. Hence their assertion at various times helped validate multi-resource as one of the factors that might explain the danger in driving and listening to in-vehicular music.

From the literature, there appears to be a dearth of literature on in-vehicular musical communication in Nigeria. A study (Shenge, 2010) which zeroed in on Nigeria focused on psychosocial factors that influence driving behaviour in Ibadan. The study did not consider musical communication as one of the psychosocial factors that negatively influence driving in Nigeria.

Also, Oluyemi (2012) investigated the understanding of traffic signs by drivers in the city of Akure and found out that 58% understood traffic warnings. Again, this study did not cover in-vehicle musical communication.

Furthermore, it was observed that most of the literature reviewed focused on what music does to the driver without ascertaining what drivers do with music. An exception was the study by Oblad (2000) who found a relationship existing among drivers, music and the automobile. She found that drivers use in-vehicular music as accompanying music. The study, even though it was audience centered, did not probe further as to the gratification from in-vehicle musical communication.
These noted gaps in literature are what the present study hopes to fill.

2.20 STATEMENT OF RESEARCH HYPOTHESIS

Based on the literature review and the import of the theoretical framework, the following hypotheses were formulated for test:

Hypothesis 1

The use of in-vehicular music communication will significantly be high among commercial drivers in South East Nigeria.

Hypothesis 2

Recorded playable will be the preferred in-vehicular music communication channel source among commercial drivers in South East Nigeria than radio channel sources.

Hypothesis 3

In-vehicular music communication will serve South East commercial drivers more of relaxation/therapeutic needs than concentration/alertness needs while driving.

Hypothesis 4

Commercial drivers in South East Nigeria that are more experienced are more likely to be aware of the hazards of in-vehicular music communication than less experienced ones.

Hypothesis 5

South East Nigeria commercial drivers will still practice in-vehicular music communication despite being aware of the hazards.

CHAPTER THREE

METHODOLOGY

This chapter dwells on the methodology for the study. This runs the gamut from the research design, area of study, study population, sample and sampling procedure, instruments for data collection, measurable variables, validity of research instruments, data gathering procedure, data collection to method of data analysis.

3.1 RESEARCH DESIGN

For the research design, which is the approach for conducting a scientific inquiry, this study adopted a mixed method approach. According to Creswell (2003) in Wimmer and Dominick (2014), the mixed method is one in which the researcher collects, analyses and integrates both quantitative and qualitative data in a single study or multiple studies in a sustained program of inquiry. The choice of the mixed method was informed by the views of Denzin and Lincoln (2003:8) that the "use of a combination of research methods reflects an attempt to secure an in-depth understanding of the phenomenon in question". Similarly, the mixed method was chosen because it is a strategy that adds rigour, richness and depth to an inquiry. In addition, Creswell (2002; in Ukwueze 2014:52) opines that "the purpose of triangulation or mixed method is to simultaneously collect both quantitative and qualitative data, merge them and use the result to best understand a research problem". Specifically, the mixed methods used were survey, observation and in-depth interview.

According to Owuamalam (2012:103), "survey enables the researcher to deal with the characteristics of a chosen set of people whose opinion, behavior and attitudes are essential for the collection of information required for the study". Nwodu (2006) corroborates that survey probes directly and indirectly, attitudes, feelings, opinions and dispositions of a select group of people towards a given population and by extension use the outcome to generalize on the entire population. Also, for Wimmer and Dominick (2014:192), "survey allows researchers to examine many variables (demographics and life style information, attitudes, motives, intentions, and so on) and to use a variety of statistics to analyze the data". It is for these justifications that the researcher chose to use survey in order to sample the opinions of inter-state commercial motorists regarding practice, utility and knowledge of hazards to well-being associated with in-vehicular musical communication.

The decision to include observation was for the supplementary purpose of collecting data and generating hypothesis. Wimmer and Dominick (2014) hold that field observation is concerned more with description and explanation than with measurement and quantification. Furthermore, observation may also provide access to groups that would otherwise be difficult to observe or examine. In this study, the researcher observed the drivers and monitored behind-the-wheel behaviors against a checklist or a schedule. The type of observation method employed here was unobtrusive method of observation whereby the participants (drivers) were unaware that they were being observed while the researcher's role was limited to that of an observer. The advantage and justification of this method was that it enabled the study to take place in the natural setting of the activity being observed and thus provided data rich in detail and subtlety.

The choice of in-depth interview was based on the researcher's quest to understand, from the views of head drivers and road traffic officials, issues that arose from survey and observation. According to Wimmer and Dominick (2014: 142), the most important advantage of in-depth interview is the wealth of detail that it provides and when compared to other more traditional survey methods, it provides more accurate responses on sensitive issues. For this study, In-depth interview gave the research a balanced view to answer and understand the 'how' and '*why'* behind the practice of in-vehicle musical communication.

Overall, the justification for the choice of triangulation owes largely to the nature of the study. For instance, to measure practice and utility of in-vehicle musical communication (IMC), the researcher decided to use survey while for knowledge of hazards to well-being, observation helped to generate relevant data. In-depth interview came in handy to add flesh to the quantitative data collected. Therefore, it was assumed that the use of mixed method for this study would produce stronger evidence for a conclusion through a convergence of findings because the research is not confined to a single method and can provide information and insight that might be missed if only a single method was used.

3.2 AREA OF THE STUDY

The area of the study as seen in the title was limited to the five States (Anambra, Imo, Enugu, Abia, and Ebonyi States of Nigeria) in the South-East geopolitical zone. However, it must be pointed out that the States were further delimited to the public motor parks in the South-East

state capitals alone, which means that, specifically, the area of study is Awka, Owerri, Umuahia, Enugu and Abakaliki towns.

3.3 STUDY POPULATION

The title of this study suggests that it examined inter-state commercial motorists' population in Nigeria, using the South-East geo-political zone as a case in point. Data from the various state emblem units put the estimated population of inter-state commercial motorists at 1,617. The data was sought from the emblem units because a visit to Federal Road Safety Corps and State Ministry of Transport revealed that there was no up-to-date record of inter-state commercial drivers. The Federal Road Safety Corps had the records for organized transport drivers but none for inter-state commercial drivers. This number, 1,617, was for private inter-state commercial drivers, excluding registered organized transport drivers. Within the South-East geo political zone, there are two types of commercial drivers, namely: inter-state and intra-state. Intra-state commercial drivers ply within the state while the inter-state commercial drivers have their routes outside their state. The exclusion of organized transport drivers was on the basis of corporate policy. Organizational policy of registered organized transport services place restriction on their drivers which may interfere with the data if they were chosen as part of the study sample. The States covered included, Anambra, Imo, Enugu, Abia and Ebonyi States of South-Eastern Nigeria with an estimated population of 187,406.53 (National Population Commission, 2013). A contextualization of the States in the Southeast geopolitical zone had been addressed earlier in chapter one.

3.4 SAMPLE AND SAMPLING PROCEDURE

With the adoption of the mixed method, this study had three different sample sizes for survey, observation and In-depth Interview (IDI). The sample size for survey was 321 based on calculations using Taro Yamane's formula $n=N/1+N(e)^2$; the sample size for observation was 81 based on the principle of theoretical saturation while the sample size for In-depth Interview was 15, also based on the principle of theoretical saturation. In all, 416 participants were used in this study.

For survey, having arrived at the study population, the researcher drew up a table to aid in projecting the population as well as calculating the sample size.

Table 1*: The population of Southeast States vis-à-vis commercial motorists in the zone*

State	Male	Female	Total	Estimate of inter-state commercial motorists and Year
Abia	1,430,298	1,451,082	2,881,380	218 (2012)
Anambra	2,117,984	2,059,844	4,177,828	522 (2011)
Ebonyi	1,064,156	1,112,791	2,176,947	162 (2013)
Enugu	1,596,042	1,671,795	3,267,837	368 (2014)
Imo	1,976,471	1,951,092	3,927,563	262 (2014)
Grand total	8,184,951	8,246,604	16, 431,555	1,617(projected population)

Source: 2013 demographics by National Population Commission and South-East inter- State Emblem unit

If the total population in the South-East zone is 16, 431,555, as at 2013, the estimated population in 2015 was 17,187,406.53. With the estimated figure, there was then need to calculate the number of motorists. For that, the researcher used the World Bank development indicator (2013 at www.indexmundi.com) that for every 1000 persons in Nigeria, 34.1% owns a car**.** Against that index, to determine the number of car owners so as to draw our sample, the formula is

Population divided by 1000 and multiplied by 34.1
=17,187,406.53/1000
=17,187,406.53 X 34.1
=586,090.5627

Having calculated the number of motorists, the next stage was to get the number of commercial inter-state drivers. From table 1 and since the recent figure was not available, the researcher made use of a formula provided by Owuamalam (2012) thus
Pp = Gp X Pi XT
Where Pp = projected population
Gp= given population (as of year of estimate)
Pi= population increase index (given as 2.28% or 0.023)
T= period between the given population and year of study

Therefore the projected population of inter-state commercial drivers in the Southeast geo-political zone was calculated thus:

Enugu= 368 x 0.023 x 1 = 8.464

= 386+ 8.464

= 376.464

Anambra = 522 x 0.023 x 4 = 48.024

=522 + 48.024

=570.024

Imo = 262 x 0.023 x1 = 6.026

=262+ 6.026

=268.026

Abia = 218 x 0.023 x 3 = 15.042

= 218+ 15.042

= 233.042

Ebonyi= 162 x 0.023 x 2 =7.452

= 162 +7.452

= 169.452

Total of inter-state commercial motorists = 1,617

From the calculation, it became clear that a census was impossible within the time frame for this study and then there arose the need to reduce the sample size to a manageable number; and to arrive at that number, the Taro Yamane's formula was used; which is:

$$n = \frac{N}{(1+ N \{e\}^2)}$$

$$\frac{1,617.008}{(1+ 1,617.008 \{0.05\}^2)}$$

$$=\frac{1,617.008}{(1+1,617.008\ (0.0025)}$$

$$=\frac{1,617.008}{1+\ 1,617.008\ X\ 0.0025}$$

$$=\frac{1,617.008}{1+4.04252}$$

$$=\frac{1,617.008}{5.04252}$$

$$=320.6745833$$

$$=321 \text{ (approximate value)}$$

With the sample size at hand, it had to be split among the 5 States using the formula of State population / Total population x sample size, 321 (calculated sample size). Calculated proportional allocation for the States was as follows:

$$\text{Abia} = \frac{233.042}{1,617.008} \times 321$$

$$= 46.26888318 = 46$$

$$\text{Anambra} = \frac{570.024}{1,617.008} \times 321$$

$$= 113.1581934 = 113$$

$$\text{Ebonyi} = \frac{169.452}{1,617.008} \times 321$$

$$= 33.63872782 = 34 \text{ (approximately)}$$

$$\text{Enugu} = \frac{376.464}{1,617.008} \times 321$$

$$= 74.733671088 = 75 \text{ (approximately)}$$

$$\text{Imo} = \frac{268.026}{1,617.008} \times 321$$

$$= 53.20712452 = 53$$

Summary of the distribution list is:

Abia	46
Anambra	113
Enugu	75
Ebonyi	34
Imo	53
TOTAL	321

Having arrived at the sample size of 321 using the projected population from the States' emblem units, multi-stage sampling came in. First, purposive sampling method was used to situate the study in public motor parks with the exclusion of private parks. Afterwards, simple random sampling technique was used to collect the names of the parks across the state capitals in the Southeast zone. After the compilation, each park per state was randomly selected from the box using the ballot method.

The next stage after the random selection of the parks was the method of instrument distribution. For the distribution, convenience sampling using the street intercept model was adopted. Street intercept is a sampling technique that involves approaching likely interview prospects at a specified time and location, asking several screening questions to establish the respondents' eligibility, and then asking for permission to complete a questionnaire (DJSresearch at www.marketresearchworld.net). The researcher chose to adopt this method because it allows for the probability of equal group representativeness.

For sample size in observation, there was the problem of sample size. According to Wimmer and Dominick (2014), there is always the problem of how many individuals or groups to observe. However, there was an estimated observation of 25% (81 of 321) of survey sample size based on theoretical saturation. The observation was carried out by the researcher with aid of research assistants. It should be noted that the observation schedule was converted into 15-item schedule questions measuring index: In-vehicular Music Listening Distraction Scale (IMLD) so as to be analyzed with SPSS.

The sampling technique for observation was purposive sampling according to the observation by Wimmer and Dominick (2014:131) that "most field observations use purposive sampling

where observers draw on their knowledge of the subject(s) under study and sample only from the relevant behaviours or events".

For IDI, a purposive decision was made to interview the first two drivers on the hierarchy scale in the selected motor parks. In addition, the sector commander of the State Road Safety Command or their representatives per State was selected for interview.

3.5 INSTRUMENTS FOR DATA COLLECTION

From the triangulation design, three instruments for data collection stood out and they were questionnaire, observation schedule and interview guide.

Survey: The questionnaire was the instrument used to gather quantitative data for this study. It was designed to have four sections with 39 close-ended questions. The first sub-section covered demographics which consist of age, marital status, educational qualification, driving experience in terms of years and number of children. Sections B, C and D covered Practice, Utility and Knowledge of the hazards that attend the practice of in-vehicle musical communication. The responses were rated using the five-point Likert scale ranging from Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D) to Undecided (U).

Observation: The observation schedule encompassed 15 items with the first three on demographics consisting of type of vehicle, gender of driver and age category of driver. The remaining twelve items or guide provided insights to behind-the-wheel behavior ranging from the presence of a functional musical set, type of music played, frequency of music change and the responses to driving situations while the music was on.

In-depth Interview: The interview was for two different groups namely drivers and traffic officials. Two drivers and one official were picked per State putting the total number of interviewees at 15. The session was guided by an interview guide which had 14 main questions with a mixture of English and indigenous language (Igbo) as the interview language. The interview usually lasted between 35-40 minutes. The drivers were readily available than the traffic officials who needed appointments booked for the interviews. The researcher used tape recorder to record and later transcribed the responses for thematic analysis. The data and analysis provided insights to behind-the-wheel behaviors of most commercial drivers in Nigeria, and specifically, within the South-East zone.

3.6 MEASURABLE VARIABLES

The measurable variables for this study included the independent and dependent variables. The independent variables included age, marital status, number of children, educational qualification and years of experience. They were measured by asking questions that generated demographic data. On the questionnaire, the demographic section was from question number 1-5.

The dependent variables included the practice of in-vehicle music communication; preference of in-vehicle music source; utility of in-vehicle musical communication and awareness of hazards to well-being associated with in-vehicle musical communication. The dependent variables were measured as follows:

- **Practice of in-vehicle music communication:** This was measured by probing for presence of functional musical set in the vehicle, frequency of practice and when respondents initiate in-vehicle musical communication. Items 1-6 and 9-11 measured "Prevalence" (see appendix 1).
- **Preference of in-vehicle music source:** This was measured by asking for preferred in-vehicle communication source, music type and choice of artistes. Items 7 and 8 measured "Source" choice.
- **Utility of in-vehicle musical communication:** Utility was divided into two for this study. While items 12, 15, 16 and 19 measured concentration utility, items 13, 14, 17 and18 was on relaxation utility.
- **Awareness of hazards** to well-being associated with in-vehicle musical communication was measured by items 21-32 while item 33 was to measure "Behaviour Change" upon "Awareness".

3.7 VALIDITY OF RESEARCH INSTRUMENTS

The instruments for data collection were subjected to content, construct and face validity to ensure that they captured the variables they were structured to measure. Face validity became necessary when a draft of the questionnaire, interview and observation schedule was submitted to the supervisor and a statistician for necessary corrections and validations, as suggested by Asika (2008). The essence of the test for validity was to ensure that the items in the questionnaire and observation schedule are suitable and consistent with the research objectives and were capable of eliciting the right responses from respondents. In essence, the instruments were validated by experts in social science research and the research supervisor.

3.8 DATA GATHERING PROCEDURE

The researcher sought and got the title of this study approved by the Supervisor and the department. Consequently, this approval marked the beginning of the study. Also, approval from the Federal Road Safety Corps (FRSC) and the Nigerian Police Force (NPF) were sought. This was to forestall any kind of eventuality that might come up as a result of the research, bearing in mind the sensitive nature of the study as observation will happen in real life. Copies of the permits were attached as appendices. Having secured the necessary permits/approval to embark on the research, the researcher proceeded with the development and validation of the instruments needed for the study which are the questionnaire, interview guide and the observation schedule.

To develop and validate these instruments, pilot studies became a necessity mainly to formulate items for factor scaling, validation and adoption. During the pilot study, the researcher formulated statements which were deemed appropriate to represent the construct "in-vehicular musical communication" which needed to be measured. These statements served as the initial items of the scale which were entered or removed as being subjected to both face and content validity. Lecturers from Imo state University and Nnamdi Azikiwe University served as raters and inter raters in both the content and face validity stage of the instrument validation. Through the use of theoretical mean point of r+1/2 on a 5-point Likert response format of Strongly Disagree (1) to Strongly Agree (5), items that loaded positively and significantly at 3.50 or above were transferred for adoption and further validation analyses. Bivariate correlation was also adopted for inter item correlation and consistence using the crombach alpha method. Items that loaded significantly above the theoretical mean point were further subjected to scaling using factor analysis. The result was expected to show the percentage or degree of relationship and internal consistency explained by the variables and the variables which loaded significantly.

After the validation of the scale, the pilot studies continued with test-retest reliability analyses for all measures. After the reliability measures, a two-week interval was allowed between the first and the second tests. Reliability results of the scales and schedule showed internal consistence between the first test and the second tests using correlation coefficient decision rule of r = .00 to .09 where coefficients above .045 were accepted as strong indication for consistence (Roundtree, 1989).

All studies in the pilot stage were done using 50 participants (10 inter raters and 40 for reliability studies). It should be noted that the success of the pilot studies were as a result of scrutinized observation of the inherent and prevalence rate of the subject matter. The assistance of hired research assistants (Youth Corps members) also proved relevant and so were consultations from experienced professionals via research gallery, research gate and acadamia.edu. All statistical analyses in the pilot studies were done using Statistical Package for Social Sciences (SPSS) version 20.0.

Having finished with the development and validation of the instrument and ascertained that their psychometric properties were adequate to be used in the study, the researcher proceeded to the main study. Participants (inter-state commercial motorists) from five (5) States in the South-East were sampled using mixed/multi-stage sampling technique. To select the parks, simple random sampling was used. Here names of parks in each State capital were labeled with alphabets in paper ballot across the five (5) States. Thereafter, for the selection of the parks, the researcher picked one ballot for each State and the corresponding park was chosen as the selected park in that state. Eventually, parks selected across the five states include: Unizik Temporary site Park Awka (Anambra), Old Market Road Park Enugu (Enugu), Spero in Deo Park Abakaliki (Ebonyi), Central Park Owerri (Imo) and Okigwe Park Umuahia (Abia). Having chosen the parks, the researcher proceeded to sample the participants (inter-state commercial motorists). Street intercept sampling was used. The commercial drivers who were waiting patiently for their passengers were gently approached and were asked if they were willing to participate in an academic exercise. Only those who affirmed that they were willing and would be able to respond to the items were selected. Oral instruction on how to respond to the instrument was repeated to them although it was also written clearly on the top of each questionnaire. It took the motorists (drivers) an average of 23 minutes to respond fully to the 39 items which covers questions regarding in vehicular music communication which covers: presence of musical gadgets, prevalence of practice, its utility and awareness of the hazards. At the completion of the filling, the researcher thanked each of the respondents for their time and collected back the filled questionnaire. Only correctly filled copies of the questionnaire were coded for analysis and interpretation.

3.9 DATA COLLECTION

The period of data collection for survey was between 25th October 2015 and 30th November 2015. Survey data were collected by administering a 39-item questionnaire to respondents across the five State capitals in the South-Eastern zone. Five research assistants were recruited and briefed for data collection.

For the Observation, it ran concurrently with survey time table. However, it ended on 18th December 2015. Armed with the observation schedule, each research assistant monitored behind-the-wheel behaviour of respondents especially in the presence of in-vehicle musical communication and marked accordingly on the schedule. The vehicles observed were mini buses, luxury buses and taxis.

In-depth interviews were done in batches. Owing to the rush during the yuletide season, interviews with drivers were pushed to the period 18th - 25th January 2016; while the interviews with the officials were during the period 18th-23rd December, 2015. As explained earlier, the data collection for all the methods were aided by research assistants.

3.10 METHOD OF DATA ANALYSIS

Quantitative data generated in this study were analyzed using Statistical Package for Social Sciences SPSS version 20.0. The results were presented using frequency tables and simple percentage; correlation was applied to test relationships.

Data from observation was initially converted into a quantitative scale which allowed the use of SPSS for its analysis and correlation was also applied to test relationships between variables.

Qualitative data were analyzed using thematic analysis and then the dominant themes were presented to support or dispute data from the quantitative method.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

In this chapter, data collected from the field was analyzed and presented in line with the research questions and hypotheses. There are three main set of data presentation from this section; Result I presents the result of data analyzed from the field survey. Result II presents data obtained from the Observational schedule while Result III presents the result of qualitative data analyzed from the in-depth interview (IDI).

The researcher analyzed a total of 321 copies of the questionnaire from commercial motor parks across the South East zone; data from observation of 81 drivers was also analyzed using descriptive statistics in addition to the transcription of 15 in-depth interviews.

4.1 PRESENTATION OF QUANTITATIVE DATA (FIELD SURVEY)

The presentation began with details on the response rate followed by demographics and the research objectives/questions; with the attendant hypothesis in their numerical order. Thereafter, interpretation and discussion of the data concluded the chapter.

4.1.1 Response Rate

A total of 371 copies of the questionnaire were distributed. The sample size for this study was 321 but a purposive decision was made to share 10 extra copies of the questionnaire per State to ensure 100 percent return rate. This followed the suggestion of Wimmer and Dominick (2014) that, to compensate for invalid numbers, it is best to develop more numbers than needed. As expected, the return rate was 339 and during the process of screening, the copies that were not correctly filled (13) were removed with 326 as the remaining number of copies. However, the first 321 copies of the questionnaire of the correctly filled copies were then chosen and sampled. A breakdown of the distribution revealed that in Anambra State, 123 was distributed while 119 was returned; 56 was shared in Abia with 50 returned; 85 in Enugu and 78 returned; 44 in Ebonyi and 37 returned; 63 in Imo and 55 returned; making a total number of 339 returned copies of the questionnaire.

For the observation, 81 vehicles ranging from taxis to luxury buses were observed across the selected towns within the Southeastern zone. The selected towns were Awka, Enugu, Abakaliki, Owerri and Umuahia.

4.2 RESULT I: FIELD SURVEY (USE OF QUESTIONNAIRE)

Table 1: ***Demographic Statistics for Age Range, Driving Experience in Years, Educational Qualification, Marital Status, Number of Children, Preferred Music Type and Preferred Artiste***

		Age Range of the commercial drivers	Driving Experience in years	Educational qualification	Marital Status	Number of Children	Preferred Music type	Preferred Music Artiste
N	Valid	321	321	321	321	321	321	321
	Missing	0	0	0	0	0	0	0
Mean		2.0187	1.7227	1.3396	2.0872	1.7508	4.8536	1.2835
Median		2.0000	2.0000	1.0000	2.0000	2.0000	5.0000	1.0000
Mode		3.00	2.00	1.00	2.00	1.00	8.00	1.00
Std. Deviation		.85857	.57642	.47430	1.22673	.84421	2.39539	.45140
Variance		.737	.332	.225	1.505	.713	5.738	.204
Minimum		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum		3.00	3.00	2.00	6.00	4.00	8.00	2.00
Percentiles	25	1.0000	1.0000	1.0000	1.0000	1.0000	3.0000	1.0000
	50	2.0000	2.0000	1.0000	2.0000	2.0000	5.0000	1.0000
	75	3.0000	2.0000	2.0000	2.0000	2.0000	7.0000	2.0000

Table 2a: ***Age Range of the Respondents***

Variable	Frequency	Percent
20 - 30yrs	115	35.8
41yrs & Above	85	26.5
31 - 40yrs	121	37.7
Total	321	100

As shown in table 2a, the respondents within the age bracket of 31-40 were the highest with 37.7%; totaling 121 out of 321. They were followed closely by the 20-30 age brackets at 35.8% (115) while those within 41years and above were least with a total of 85 (26.55%).

The data above suggest that drivers in the 31-40 age brackets constituted the highest population sampled.

Table 2b*: Respondents' Years of Driving Experience*

Variable	Frequency	Percent
6 - 9yrs	110	34.3
10yrs & Above	190	59.2
1 - 5yrs	21	6.5
Total	321	100

Out of 321 responses, the least experienced drivers fell between 1-5 years with a percentage of 6.5 (21) while 34.3% (110) had between 6-9 years of experience. The majority of the respondents were those with a minimum of 10 years experience and they were 190, amounting to 59.2%. From the data, it can be deduced that the respondents were experienced, considering that more than half of the respondents (59.2%) had been drivers for 10 years and above. Therefore, their responses could be considered valid.

Table 2c: *Respondents' Marital Status*

Variable	Frequency	Percent
Single	116	36.1
Married	132	41.1
Divorced	33	10.3
Widowed	19	5.9
Separated	11	3.4
Co-habiting	10	3.1
Total	321	100

In table 2c, an attempt was made to establish respondents' marital status. As can be deduced from the table, 132 (41.1%) respondents are married; 116 (36.1%) are single followed by 33 (10.3%) who are divorcees while 19 (5.9%) are widowers. Further down the table are the respondents who are separated and the number is 11 (3.4%) and those co-habiting at 10 (3.1%). The data suggest that a majority of the respondents are married.

Table 2d: ***Respondents' Educational Qualification***

Variable	Frequency	Percent
First Leaving Certificate	132	41.12
O' Level (SSCE)	109	33.96
First degree	11	3.43
None	69	21.50
Master's	0.0	0
Doctorate	0.0	0
Total	321	100

From Table 2d, none of the respondents had a master's or doctorate degree. Data in the table indicate that while a total number of 132 (41.12%) had First School Leaving Certificate, 109 (33.96%) possess SSCE; 11 (3.43%) are graduates while the remaining 80 (24.92%) had no form of formal education. Details in this table show that many of the respondents had a First School Leaving Certificate.

Table 2e: ***Respondents' Number of Children***

Variable	Frequency	Percent
1 - 3 Children	39	12.15
4 - 6 Children	118	36.76
7 & Above	15	4.67
None	149	46.42
Total	321	100

The data in Table 2e reveal that 149 (46.42%) of the respondents have no child. Another 118 (36.76) have 4-6 children while 39 (12.15%) have from 1 to 3 children. The least number 15 (4.67) have at least 7 children.

Table 2f: ***Respondents' Preferred Music Type***

Variable	Frequency	Percent
Disco	31	9.7
Blues	32	10
Gospel	51	15.9
Rap	33	10.3
Hip hop	47	14.6
Dance hall	22	6.9
Reggae	29	9
Afro-beat	76	23.7
Total	321	100

Table 2f represents the respondents' preferred music type and 76 (23.7%) chose afro beat; following at 51 (15.9%) is gospel song and hip hop at 47(14.65) while rap, blues and discos followed closely at 33 (10.3%), 31 (9.7%) and 32 (10%), respectively. The lowest frequency goes to reggae and dance hall with a total of 29 (9%) and 22 (6.9%). Thus, it can be drawn from the table that the respondents' preferred music type was afro beat.

Table 2g: ***Respondents' Preferred Music Artiste***

Variable	Frequency	Percent
Local Artiste	230	71.7
Foreign Artiste	91	28.3
Total	321	100

Table 2g reveals that 230 (71.7%) which is a majority of the commercial drivers prefer local artistes while the remaining 91 (28.3%) prefer foreign artistes.

Research question I: To what extent do commercial motorists in South-East Nigeria engage in driving and listening to in-vehicle musical communication?

Hypothesis 1

The use of in-vehicular musical communication will significantly be high among commercial drivers in South East Nigeria.

Table 3: D*escriptive Statistics Showing Participants Mean and Standard Deviation to the Question on the Use of In-Vehicular Music Communication in Nigeria*

		Functional music sets	Regularity of music playing	Regularity of radio listening	Take off with music	Play music halfway into the journey	Play music on the request of the passengers	Passengers determine the music choice & volume	There are other types of music sources in my car	Can drive without playing music
N	Valid	321	321	321	321	321	321	321	321	321
	Missing	0	0	0	0	0	0	0	0	0
Mean		**4.0031**	**3.8287**	**3.8660**	**3.9346**	**4.1745**	**3.7944**	**4.0249**	**3.9564**	**4.1869**
Median		4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
Mode		4.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation		.89965	.93136	.98304	.89027	.75463	1.05539	.87286	.85035	.81161
Variance		.809	.867	.966	.793	.569	1.114	.762	.723	.659
Range		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Minimum		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Percentiles	25	4.0000	3.0000	3.0000	3.0000	4.0000	3.0000	3.0000	3.0000	4.0000
	50	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
	75	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000

*Means scores as highlighted above are either accepted or rejected based on Roundtree, (1989) theoretical mean point of P > scale point + 1/2 (5+1 = 6/2 = 3). Decision Rule = Significant mean points must be greater than 3 since a 5-point Likert scale was adopted for the study

In Table 3 above, mean scores as highlighted, show that the prevalent rate of the use of in-vehicular musical communication by commercial drivers in Nigeria is significantly high as shown by mean points to all the items above the theoretical mean point of 3. Consequently, hypothesis I which stated that the use of in-vehicular musical communication will significantly be high among commercial drivers in South East Nigeria and research question 1 which sought to determine to what extent commercial motorists in South-East Nigeria engaged in driving and listening to in-vehicle musical communication was accepted and answered respectively.

Table 4a: ***Ownership of Functional Musical Sets Among the Respondents***

Response	Frequency	Percent
YES	246	76.64
NO	75	23.36
Total	321	100

YES = Drivers that have functional musical set in their cars
NO = Drivers that do not have functional musical set in their cars

In-vehicular musical communication scale was developed to measure the responses to the research questions. From the scale measuring functionality of musical sets and as reflected in Table 4a, majority of the respondents or driver-participants representing 246 (76.64%) affirmed that they have a functional music set in their cars while 75 representing 23.36% of the driver-participants did not affirm having functional musical sets in their cars.

Table 4b: ***Regularity of Music Playing and Radio Listening Among the Respondents***

Variable	Regularity of music playing among the respondents	Regularity of radio listening among the respondents
All the time (5)	25.5	33.6
Most of the time (4)	42.4	28.1
Some of the time (3)	21.5	29.6
Undecided (2)	0	0
Not at all (1)	10.6	8.7
Total	100% (n= 321)	100% (n= 321)

KEY: 5 = All the time, 4 = Most of the time, 3 = some of the time, 2 = Undecided & 1= Not at all.

The data in this table represents the regularity of music playing and radio listening by the respondents. When it comes to the music playing pattern of the respondents, 82 (25.5%) of the participants opined that they regularly play music all the time while 136 (42.4%) agree that they play music most of the time and another 69 (21.5%) affirmed that they play music some of the time. Only 34 participants, representing 10.6% of the driver-participants, did not

play music at all while none of the participants was undecided.

For radio listening on the other hand, 108 (33.6%) respondents indicated that they drive with the radio on all the time. Following is 90 (28.1%) for those drivers who most of the time drive with the radio set on. Also, 95 representing 29.6% of the driver-participants opined that they sometimes drive with the radio set on. Only 28 drivers (8.7%) indicated that they do not drive with the radio set on. None of the participants was undecided on the use of radio set while driving.

A comparison of the music listening and radio playing patterns of the respondents reveal that while a majority of the respondents play music 'most of the time' (42.2%), a significant number among them (33.6%) listen to the radio 'all the time'. However, according to this table, it can be established that respondents within the South East region of Nigeria engaged in some form of in-vehicular musical communication. This invariably reflects the first objective of the study which sought to ascertain the practice of in-vehicle musical communication among commercial drivers in South-East Nigeria.

Table 4c: ***Respondents Who Take-Off With Music, Initiate Music Halfway and Play Music on the Request of the Passengers.***

Variable	Drivers who take-off driving with music	Drivers who play music halfway into the journey	Drivers who play music on the request of the passengers
All the time (5)	*28.3*	*36.8*	*29.3*
Most of the time (4)	*44.9*	*45.8*	*38.9*
Some of the time (3)	*18.7*	*15.6*	*13.7*
Undecided (2)	*0*	*0*	*0*
Not at all (1)	*8.1*	*1.9*	*18.1*
Total	**100% (n= 321)**	**100% (n= 321)**	***100% (n=321)***

KEY: 5 = All the time, 4 = Most of the time, 3 = some of the time, 2 = Undecided & 1= Not at all.

In attempt to understand when the respondents initiate in-vehicular musical communication, they were asked whether they take off with music or whether they engage in-vehicle music halfway into the journey. Item 4 in the questionnaire (refer to the appendix) and from the frequency table above shows that 91 (28.3%) take off with music all the time whereas 144 (44.9%) which is almost half of the respondents agree that they take off with music most of the time. From the table, 60 (18.7%) opined that they take off with music some of the time whereas only 26 (8.1%) disagree.

Item 5 in the instrument on whether they engage in in-vehicle musical communication midway reveals that 118 (36.8%) participants initiate in-vehicular music communication midway into the journey all the time, 147 (45.8%) said it is most of the time while 50 (15.6%) engage in in-vehicle musical communication some of the time. There was no response for undecided while only 6 (1.9%) ticked ‘not at all’.

Table 4c was also used to ascertain if passengers influence in-vehicular musical communication. Here, the data reveal that 94 (29.3%) driver-participants agree that

passengers influence in-vehicular music communication all the time, while for 125(38.9%), passengers influence the practice of in-vehicle musical communication most of the time; 44 (13.7%) affirmed it is only sometimes and 58 (18.1%) responded 'not at all' to the question. The relationship in this table is that whether respondents either play music or listen to the radio, they are influenced most of the time by the choices of their passengers.

Table 4d: ***Drivers with Other Types of Music Sources in Their Vehicle***

Response	*Frequency*	*Percent*
YES	*236*	*73.52*
NO	*85*	*26.48*
Total	*321*	*100*

YES = Drivers with other types of music sources in their cars
NO = Drivers with no other type of music sources in their cars

The responses to the question of availability of other music sources besides the radio according to this table reveals that 236 (73.52%) agree that they have other music players while 85 (26.48%) do not have other types of music sources in-vehicle. Therefore; the predominant source of in-vehicle musical communication is playables.

Table 4e: ***Influence of Passengers on Drivers' Music Choice & Volume***

Response	*Frequency*	*Percentage*
All the time (5)	*111*	*34.6*
Most of the time (4)	*122*	*38.1*
Some of the time (3)	*73*	*22.7*
Undecided (2)	*15*	*4.7*
Not at all (1)	*0*	*0*
Total	*321*	*100*

KEY: 5 = All the time, 4 = Most of the time, 3 = some of the time, 2 = Undecided & 1= Not at all.

Table 4e was used to measure the extent passengers influence respondents' choice of music and volume. From the data, it can be deduced that passengers play an active role in choice and volume of music. From the data, 122 (38%) are influenced by the passengers 'most of the time', while 111 (34.6%) are always influenced by respondents choice of music and volume. Also, 73 (22.7%) are sometimes influenced while the remaining 15 (4.7%) are never influenced by passengers choice of music and volume of music set.

Table 4f*: Respondents' Who Drive Without Playing Music*

Response	*Frequency*	*Percentage*
All the time (5)	*130*	*40.5*
Most of the time (4)	*132*	*41.1*
Some of the time (3)	*48*	*15.0*
Undecided (2)	*0*	*0*
Not at all (1)	*11*	*3.4*
Total	*321*	*100*

KEY: 5 = All the time, 4 = Most of the time, 3 = some of the time, 2 = Undecided & 1= Not at all.

The researcher asked the respondents if they could drive without music and from table 4f, more than two third of the sampled population agree that they can drive without music. Specifically, 132 (41.1%) can drive without 'music most of the time; 130 (40.5%) drive without music all the time while 48 (15%) sometimes drive without engaging in in-vehicle musical communication. The remaining 11(3.4%) cannot drive without music.

Research Question II: What is the preferred in-vehicle musical communication platform among these commercial motorists?

Hypothesis 2

Recorded playable will be more preferred in-vehicular music communication channel source among Nigeria commercial drivers than radio channel sources.

Table 5: ***Respondents' Choice of In-vehicular Music Communication Source between Radio and Recorded Playables***

		Radio as source of IMC	Recorded Playables as source of IMC
N	Valid	321	321
	Missing	0	0
Mean		**3.2710**	**3.8349**
Median		3.0000	4.0000
Mode		3.00	4.00
Std. Deviation		1.14212	1.07565
Variance		1.304	1.157
Range		4.00	4.00
Minimum		1.00	1.00
Maximum		5.00	5.00
Percentiles	25	3.0000	3.0000
	50	3.0000	4.0000
	75	4.0000	5.0000

From table 5 above, significant differences were observed as highlighted with preference for recorded playables having significant higher mean above preference for radio channel source. Consider radio channel source at M = 3.2710, SD = 1.1421 and recorded playables channel source at M = 3.8349, SD = 1.07565. The statistics above shows that there is higher preference rate for recorded playables for in-vehicular music communication by commercial drivers in Nigeria than its radio channel source counterpart. Hypothesis II that Recorded playable will be the preferred in-vehicular music communication channel source among commercial drivers in South East Nigeria than radio channel sources is therefore accepted and research question II on the preferred in-vehicle musical communication platform among these commercial motorists is also answered.

Table 6: Respondents' Choice of In-vehicular Music Communication Source between Radio and Recorded Playables

Variable	Radio as source of IMC	Playable as source of IMC
1	6.9	3.4
2	17.1	10.3
3	35.5	15.9
4	23.1	40.2
5	17.4	30.2
Total	**100% (n= 321)**	**100% (n= 321)**

KEY: 5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree & 1= Strongly Disagree

Following the statistics in table 6, the variable of age was used to test whether older commercial drivers will differ from younger ones on preference of radio channel as source of dialogic in-vehicular music communication channel. The result of the test is presented in table 7.

Table 7: R*espondents' Choice of In-Vehicular Music Communication Source between Radio and Recorded Playables In Relation To the Three Age Groups in the Study*

	Age Range of the commercial drivers	Mean	Std. Deviation	N
Radio as Source of IMC	20 - 30yrs	3.3652	1.17227	115
	41yrs & Above	3.1176	1.13821	85
	31 - 40yrs	3.2893	1.11384	121
	Total	3.2710	1.14212	321
Recorded Playables as source of IMC	20 - 30yrs	3.8087	1.13087	115
	41yrs & Above	3.8824	1.01667	85
	31 - 40yrs	3.8264	1.06987	121
	Total	3.8349	1.07565	321

Between-Subjects Factors

Variable	Value Label	N
Age Range of the commercial drivers 1	20 - 30yrs	115
2	41yrs & Above	85
3	31 - 40yrs	121

Table 7b: ***Tests of Between Subjects Effects on Respondents' Choice of In-vehicular Music Communication Source Preference between Radio and Recorded Playable in Relation to the Three Age Groups in the Study***

Source	Dependent Variable	Type I Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	Radio as source of IMC	3.060(a)	2	1.530	1.174	.310
	Recorded playables as source of IMC	.279(b)	2	.140	.120	.887
Intercept	Radio as source of IMC	3434.579	1	3434.579	2635.860	.000
	Recorded playables as source of IMC	4720.751	1	4720.751	4057.621	.000
AGE Groups	Radio as source of IMC	3.060	2	1.530	1.174	.031*
	Recorded playables as source of IMC	.279	2	.140	.120	.887
Error	Radio as source of IMC	414.360	318	1.303		
	Recorded playables as source of IMC	369.970	318	1.163		
Total	Radio as source of IMC	3852.000	321			
	Recorded playables as source of IMC	5091.000	321			
Corrected Total	Radio as source of IMC	417.421	320			
	Recorded playable as source of IMC	370.249	320			

*Significant at F (1, 321) = .031, P < .05 (2- tailed) a R Squared = .007 (Adjusted R Squared = .001) b R Squared = .001 (Adjusted R Squared = -.006)

Multiple analyses of variance (MANOVA) above showed that age significantly affected the choice of either radio or recorded playables as in-vehicular music communication source channel. Though it was observed above that younger age groups did not differ from the older age group on preference of recorded playables as a channel source of in-vehicular music communication, however, younger age group (20-30yrs) significantly differed from older age

groups (41 & Above) on preference of radio as preferred channel source. Younger age groups significantly scored higher mean than the older age groups on preference of radio as in-vehicular music communication music channel source. Hence, research question II on the preference of in-vehicle communication source is also answered.

Research Question 3: What function does in-vehicle musical communication perform for these motorists?

Hypothesis 3

In-vehicular music communication will serve Nigerian commercial drivers more of relaxation/therapeutic needs than concentration/alertness needs while driving.

Table 8: ***Descriptive Statistics on Participants' Utility Preference of In-Vehicular Music Communication for either Relaxation or Concentration***

		Concentration Utility of IMC	Relaxation Utility of IMC
N	Valid	321	321
	Missing	0	0
Mean		**12.3863**	**15.1402**
Median		12.0000	16.0000
Mode		15.00	16.00
Std. Deviation		2.04641	1.78771
Variance		4.188	3.196
Range		7.00	6.00
Minimum		8.00	12.00
Maximum		15.00	18.00
Percentiles	25	11.0000	14.0000
	50	12.0000	16.0000
	75	14.0000	16.0000

From descriptive statistics in table 8 above, it could be observed that higher preference was shown for relaxation utility of in-vehicular music communication than its concentration utility as evidenced in the higher mean recorded for relaxation utility more than concentration utility. Consider M = 15.1402, SD = 1.7877 as against 12.3863, SD = 2.0464 of concentration utility. Consequently, hypothesis III is accepted and research question III answered.

Table 8b: ***Concentration Utility of In-vehicle Musical Communication (Sum of questions 12, 15, 16 & 19)***

Sum of CUD	Frequency	Percent
8	23	7.2
10	32	10
11	57	17.8
12	58	18.1
13	28	8.7
14	60	18.7
15	63	19.6
Total	321	100

KEY: 5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree & 1= Strongly Disagree

Table 8c: ***Relaxation Utility of IMC (Sum of question items 13, 14, 17 & 18)***

Sum of RUD	Frequency	Percent
12	50	15.6
13	16	5.0
14	24	7.5
15	64	19.9
16	119	37.1
17	12	3.7
18	36	11.2
Total	321	100

The table above labeled 8b and 8c shows participants' response to their utility preference of in-vehicle music communication for concentration utility and relaxation utility.

However, there arose the need to test if younger Nigerian commercial drivers will significantly differ from older ones on the use of in-vehicular music communication for relaxation. The result is presented below:

Table 9: ***Descriptive Statistics of Participants' Age Group Response to the Relaxation Utility of In-Vehicle Music Communication***

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	
20 - 30yrs	115	15.4783	1.49471	.13938	15.2021	15.7544	12.00	18.00	
41yrs & Above	85	14.5529	2.10162	.22795	14.0996	15.0063	12.00	18.00	
31 - 40yrs	121	15.2314	1.71639	.15604	14.9225	15.5403	12.00	18.00	
Total	321	15.1402	1.78771	.09978	14.9439	15.3365	12.00	18.00	
Model Fixed Effects			1.75480	.09794	14.9475	15.3329			
Random Effects				.26383	14.0050	16.2754			.17623

Table 9b: ANOVA of Relaxation Utility of IMC

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	43.464	2	21.732	7.057	.001*
Within Groups	979.228	319	3.079		
Total	1022.692	321			

**Significant at P < .05 (2-tailed)*

Type I analysis of variance as shown above indicated that there is positive and significant differences between age groups (20-30yrs, 31-40yrs and 41 & above) on the relaxation utility function of in-vehicle music communication F(1,321) = .001* P < .05 (2-tailed). Consider also mean and standard deviation; M = 14.55, SD = 2.10, M = 15.23, SD = 1.7, M = 15.14, SD = 1.78 for 20-30yrs, 41yrs & above and 31-40yrs respectively. From the above, younger Nigerian commercial drivers significantly differed from older ones on the use of in-vehicular music communication for relaxation. This also helps to answer research question III which is

on the utility of in-vehicle musical communication by inter-state commercial drivers in Nigeria.

Research Question 4: To what extent are these commercial motorists aware of the hazards to well-being associated with driving and listening to in-vehicle musical communication?

Hypothesis 4

Commercial drivers in Nigeria that are more experienced are more likely to be more aware of the hazards of in-vehicular music communication than less experienced ones.

Table 10: ***Between-Subjects Factors of Respondents' Group Response to the Awareness of the Hazards of Interface in IMC***

		Value Label	N
Experience in driving in years	1	6 - 9yrs	110
	2	10yrs & Above	190
	3	1 - 5yrs	21
Educational qualification	1	First Leaving Certificate	212
	2	O' Level (SSCE)	109
Age Range of the commercial drivers	1	20 - 30yrs	115
	2	41yrs & Above	85
	3	31 - 40yrs	121

Dependent Variable: Hazards of IMC

Experience in driving in years	Educational qualification	Age Range of the commercial drivers	Mean	Std. Deviation	N
6 - 9yrs	First Leaving Certificate	20 - 30yrs	51.0000	.00000	5
		31 - 40yrs	46.0893	3.45505	56
		Total	46.4918	3.57595	61
	O' Level (SSCE)	20 - 30yrs	46.0000	.00000	5
		31 - 40yrs	46.6591	1.47763	44
		Total	46.5918	1.41301	49
	Total	20 - 30yrs	48.5000	2.63523	10
		31 - 40yrs	46.3400	2.76785	100
		Total	46.5364	2.81437	110
10yrs & Above	First Leaving Certificate	20 - 30yrs	45.1048	3.27262	105
		41yrs & Above	44.6667	2.90220	42
		Total	44.9796	3.16762	147
	O' Level (SSCE)	41yrs & Above	47.1163	4.24942	43
		Total	47.1163	4.24942	43
	Total	20 - 30yrs	45.1048	3.27262	105
		41yrs & Above	45.9059	3.82854	85
		Total	45.4632	3.54506	190
1 - 5yrs	First Leaving Certificate	31 - 40yrs	44.0000	3.46410	4
		Total	44.0000	3.46410	4
	O' Level (SSCE)	31 - 40yrs	45.4706	6.12492	17
		Total	45.4706	6.12492	17
	Total	31 - 40yrs	45.1905	5.67115	21
		Total	45.1905	5.67115	21
Total	First Leaving Certificate	20 - 30yrs	45.3727	3.42645	110
		41yrs & Above	44.6667	2.90220	42
		31 - 40yrs	45.9500	3.46618	60
		Total	45.3962	3.35479	212
	O' Level (SSCE)	20 - 30yrs	46.0000	.00000	5
		41yrs & Above	47.1163	4.24942	43
		31 - 40yrs	46.3279	3.44345	61
		Total	46.6239	3.71132	109
	Total	20 - 30yrs	45.4000	3.35292	115
		41yrs & Above	45.9059	3.82854	85
		31 - 40yrs	46.1405	3.44554	121
		Total	45.8131	3.52260	321

Table 10b: ***Tests of Between-Subjects Effects on Participants' Group Response to the Awareness of the Hazards of Interface in IMC***

Dependent Variable: Hazards of IMC

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	366.510(a)	8	45.814	3.966	.000
Intercept	193867.309	1	193867.309	16781.906	.000
EXPERIENCE	199.484	2	99.742	8.634	.000*
EDUCATION	.191	1	.191	.017	.898
AGE	42.761	2	21.381	1.851	.159
EXPRIENCE * EDUCATION	2.322	1	2.322	.201	.654
EXPRIENCE * AGE	.000	0	.	.	.
EDUCATION * AGE	70.413	1	70.413	6.095	.014*
EXPRIENCE * EDUCATION * AGE	.000	0	.	.	.
Error	3604.275	312	11.552		
Total	677698.000	321			
Corrected Total	3970.785	320			

**Significant at P < .05 (2-tailed) a R Squared = .092 (Adjusted R Squared = .069) Tests the null hypothesis that the error variance of the dependent variable is equal across groups.*

*Design: Intercept+EXPERIENCE+EDUCATION+AGE+EXPERIENCE * EDUCATION+EXPRIENCE * AGE+EDUCATION * AGE+EXPRIENCE * EDUCATION * AGE*

From the ANOVA table above, it could be observed that there is significant group difference among those that have 1-5yrs, 6-9yrs and 10yrs & above driving experiences on the awareness of the hazards of interface and the use of in-vehicle music communication while driving, F(1, 321) = .000* at P < .05 (2-tailed). Consider also the Mean and the Standard Deviation: M = 46.53, SD = 2.81, 45.46, SD = 3.54, 45.19, SD = 5.67 for 6-9yrs, 10yrs & above and 1-5yrs respectively.

Furthermore, will Nigerian commercial drivers with SSCE (O' Level) educational qualification be more aware of the hazards of in-vehicular music communication than those with only Primary (First School Leaving) education qualification? This was also answered by question items 20 -32.

As highlighted in table 10b above, the observed effects test of between subject effects showed that there was no significant group difference between commercial drivers with SSCE (O' Level) Certificate and those with Primary School Certificate (First School Leaving Certificate) on the awareness of the hazards of interface and the use of in-vehicle music communication while driving: $F(1, 321) = .898$ at $P < .05$ (2-tailed). Consider also the Mean and the Standard Deviation $M = 46.62$, $SD = 3.71$ and 45.39, $SD = 3.35$ for SSCE holders and First School Leaving Certificate respectively.

Also, will older Nigerian commercial drivers be more aware of the hazards of in-vehicular music communication than their younger counterpart? This was also answered by question items 20 -32. ANOVA in table 10b above showed that the observed effects in the test of between subjects did not reach significant proportions as group difference between commercial drivers between the ages of 20-30yrs, 31-40yrs and 41yrs & above on the awareness of the hazards of interface and the use of in-vehicle music communication while driving did not significantly differ $F(1, 321) = .159$ at $P < .05$ (2-tailed).

Research Question 5: Does awareness of the hazards in driving and listening to in-vehicle musical communication influence the behind-the-wheel behaviour of these commercial motorists?

Hypothesis 5

Nigeria commercial drivers will still practice in-vehicular music communication despite being aware of its hazards.

Table 11: ***Descriptive Statistics of Participants' Behavioral Change upon Awareness of the Hazards of Interface in IMC***

N	Valid	321
	Missing	0
Mean		**3.8474**
Median		4.0000
Mode		4.00
Std. Deviation		1.09761
Variance		1.205
Range		4.00
Minimum		1.00
Maximum		5.00
Percentiles	25	3.0000
	50	4.0000
	75	5.0000

From the result in the descriptive table above, hypothesis 5 which states that Nigeria commercial drivers will still practice in-vehicular music communication despite being aware of its hazards was accepted. This is because the total respondents' mean point to item 33 which answers research question 5 is significantly above the theoretical mean point as highlighted in table 11 above: M(1, 321) = 3.847, SD = 1.097; consider theoretical mean point at 3.00 (5+1/2 = 3). This shows that although the respondents are aware of the hazards, they will continue to indulge in the practice.

Variable	Frequency	Percent
1	13	4.0
2	37	11.5
3	32	10.0
4	143	44.5
5	96	29.9
Total	321	100

4.3 RESULT II: FIELD SURVEY (OBSERVATIONAL SCHEDULE)

The results of the field observations were quantified and presented in tabular format

Table 12a: ***Frequency Table for Type of Commercial Vehicle***

Variable	Frequency	Percent
Taxi	4	4.9
Bus	43	53.1
Sienna	22	27.2
Long Bus	12	14.8
Total	81	100

From descriptive statistics in table 12a above, it can be seen that observed cases for type of Commercial vehicle showed that Bus is the major means of transport of the cases observed. Observed frequency showed that out of 81 cases, 43 (53.1%) were buses whereas 4 (4.9%) were Taxis, Sienna = 22(27.2%) and Long buses =12 (14.8%). This observation shows that at the point of loading, the most used vehicle in transportation within South-East is preferably buses.

Table 12b: ***Frequency Table for Drivers' Age in Category***

Variable	Frequency	Percent
20 - 30yrs	10	12.3
31 - 40yrs	51	63.0
41yrs & Above	20	24.7
Total	81	100

From observed cases for Drivers' Age in Category, it could be deduced that the prevailing age categories of commercial drivers in South-East Nigeria fall within middle life age of 31-40yrs. Observed is 31 – 40yrs accounting for 63% (51) of 81 observed cases, 20 – 30yrs is 10 (12.3%) while 41yrs & above is 20 or 24.7%.

Table 12c*: Availability of In-vehicle Musical Set*

Variable	Frequency	Percent
YES	58	71.6
NO	23	28.4
Total	81	100

From descriptive statistics in table 12c above, it could be seen that observed cases for availability of Musical Set in vehicle showed that 71.6% (58) of observed cases have musical sets in their vehicles against 28.4% (23) that do not have. This supports the high prevalence rate of in-vehicle music communication among commercial drivers in South-East Nigeria.

Table 12d: *Frequency Table for Functional Musical Sets and In-Vehicle Music Playing*

Variable	*Functional musical sets*	*In-vehicle music playing*
Yes	63	66.7
No	37	33.3
Total	**100% (n= 81)**	**100% (n= 81)**

From table 12d above, it could be seen that observed cases for functional in-vehicle musical set showed that 51 (63%) drivers have functional musical set while it was observed that 30 drivers (37%) do not have a functional musical set. It could be deduced from the above statistics that more Nigeria drivers have functional musical sets against those that have faulty music sets. This also supports the prevalence rate of in-vehicle music communication among Nigerian Drivers.

Furthermore, it could be seen that observed cases for in-vehicle music playing showed that 54 (66.7%) drivers were observed engaging in some form of in-vehicular musical communication while on the road while 27 (33.3%) were not. It could be harnessed that significantly, the prevalence of in-vehicular music communication is significantly high among commercial drivers in South East.

Table 12e: ***Frequency Table for Preferred Type of Music Played***

Variable	Frequency	Percent
Disco	8	9.9
Blues	10	12.3
Gospel	10	12.3
Rap	8	9.9
Hip hop	12	14.8
Dance hall	8	9.9
Reggae	7	8.6
Afro-beat	18	22.2
Total	81	100

From descriptive statistics in table 12e, it could be seen that observed cases for type of music played showed that only 9.9% (8) drivers preferred Disco music, 12.3% (10) went for Blues, another 12.3% (10) preferred Gospel, 9.9% (8) went for Rap music, while 14.8% (12) preferred Hip hop. Another 9.9% (8) chose Dance hall, 8.6% (7) went for Reggae and 22.2% (18) preferred Afro-beat music. From this statistics, it could be seen that Afro-beat music is most preferred music type played by Nigerian drivers as observed in 81 cases.

Table 12f: ***Frequency Table for Respondents Taking Off With Music***

Variable	Frequency	Percent
YES	34	42
NO	47	58
Total	81	100

Nigerian drivers who do not take off with music as evidenced from table 12f is 47 (58%) as against 34 (42%) that do take off the journey with music.

Table 12g: ***Frequency Table for Driver's Response to Music***

Variable	Frequency	Percent
Sings	13	16.0
Hums	23	28.4
Nods	24	29.6
Reflex Movement	10	12.3
Claps	4	4.9
Sit-Dance	4	4.9
All	3	3.7
Total	81	100

From descriptive statistics in table 12g above, it could be seen that observed cases for respondents' response to music showed that only 16% (13) of drivers preferred singing along with the music, 28.4% (23) hum the song, another 29.6% (24) nods to the music, 12.3% (10) perform other reflex actions in response to the playing music, while 4.9% (4) prefers to clap. Also, 4.9% (4) chose sit-dance as their response while 3.7% (3) were observed to do all of the above in response to the music. From these observational analyses, it could be deduced that nodding is the most common response to in-vehicular music communication among Nigeria drivers.

Table 12h: Frequency Table for Glancing and Adjustment of Music Sets

Variable	*Frequency of glancing at music sets*	*Adjustment of music channels & volume*
Always	44.4	32.1
Sometimes	34.6	46.9
Never	21	21
Total	**100% (n= 81)**	**100% (n= 81)**

From table 12h above, it could be seen that observed cases for frequency of glancing at music sets showed that 44.4% (36) drivers were observed always glancing at their musical sets, 34.6% (28) sometimes glance at their music sets and 17 (21%) never glanced at their music sets.

Also, it could be seen that 26 (32.1%) were observed almost always adjusting their

communication set, 38 (46.9%) sometimes adjusted their set while 17 (21%) never adjusted their music sets. The implication of this data is that the number of times respondents always glanced at their musical set did not always translate into adjustment of channels and/or volume of the set. Again, the frequency of intermittent adjustment (46.9) is higher than the frequency of glances (34.6).

Table 12i: ***Frequency Table for Preferred Music Source***

Variable	Frequency	Percent
Radio	28	34.6
Playables	53	65.4
Total	81	100

From descriptive statistics in table 12i above, it could be seen that observed cases for preferred music source showed that 34.6% (28) drivers preferred Radio as their source of in-vehicle music communication platform whereas 53 (65.4%) preferred other recorded playables as source of in-vehicle music communication platform. From this observation, it could be said that most commercial drivers in South–East Nigeria prefer recorded playables as their music source.

Table 12j: ***Frequency Table for Frequency of Music Change***

Variable	Frequency	Percent
Often	25	30.9
Rarely	56	69.1
Total	81	100

From descriptive statistics in table 12j above, it could be seen that observed cases for frequency of music change showed that 30.9% (25) drivers often change their music while 56 (69.1) rarely change music.

Table 12k: ***Change of Music on Passengers' Demand and Abrupt Turn Off of Music***

Variable	*Change of music on passengers' demand*	*Abrupt turn-off of music*
Yes	43.2	37
No	56.8	63
Total	**100% (n= 81)**	**100% (n= 81)**

From descriptive statistics in table 12k above, it could be seen that observed cases for change of music on passengers' demand showed that 43.2% (35) drivers obliged the passengers request on change of music whereas 56.8% (46) did not.

Also, observed cases for drivers' abrupt turn-off of music showed that 37% (30) indulged in abrupt turn off of music while 63% (51) did not. However, it must be pointed out that most of the respondents turned down the volume of the radio or playables when approaching a military check point or FRSC check point. Again, it was observed that when respondents get to a very bad section of the road, they also turn off the radio or playables only to turn it back on when they drive past the bad section. The explanation could be from the observation that those who didn't turn off their sets when they got to a bad section had their musical sets turned off by the impact of the bumps and pot holes on the road. This, however, did not apply to the more careful drivers who navigate those sections slowly with no effect on their musical sets.

Table 12l: ***Frequency Table for Effect of Music on Drivers' Performance***

Variable	Frequency	Percent
Always	20	24.7
Sometimes	46	56.8
Never	15	18.5
Total	81	100

From descriptive statistics in table 12l above, it could be seen that observed cases for effect of listening to music on drivers' performance showed that 20 (24.7%) was always affected, 46 (56.8%) were sometimes affected whereas 15 (18.5%) were never affected.

4.4 THEMATIC PRESENTATION OF QUALITATIVE DATA (IDI)

A total of 15 interviews were conducted across the 5 States in the South-East. They were made up of 2 commercial drivers and 1 Road Safety Official in each of the 5 states in the population of the study. The interview covered five (5) major aspects of the study guided by the research questions. They are:

i) Evidence of prevalence of the practice of in-vehicular music communication among commercial drivers in the South-East Nigeria.
ii) Preference of in-vehicular music communication channel source
iii) The utility of in-vehicular music communication among commercial drivers in South-East Nigeria.
iv) Awareness of the dangers and hazards associated with the practice of in-vehicular music communication among commercial drivers in the South-East Nigeria.
v) Future behaviour pattern given individual's awareness of the dangers of in-vehicular music communication among commercial drivers in the South-East Nigeria.

1. Prevalence of IMC

There is evidence of the prevalence of in-vehicular music communication (IMC) among commercial drivers in South-East of Nigeria. Answers from responses of 14 of the interviewees including the traffic officials confirmed that most commercial drivers in South-East Nigeria at least play music or listen to the news while driving.

An interviewee responded:

"Ok, they do. It is a popular practice"

It is indeed a popular practice that such was the responses from almost all the interviewees that concurred that the practice of in-vehicular music communication (IMC) is appreciably high among commercial drivers in South-East of Nigeria. However, one interviewee had this to say:

"It's against the law for me to drive and listen to music so I don't"

This confirmation from qualitative data (IDI) is 90% affirmation of the prevalence of in-vehicular music communication (IMC) among commercial drivers in South-East of Nigeria (see excerpts on the appendix on the question "do you think commercial drivers listen to the radio or play music while driving").

2. Source preference

The question on preference was answered by 10 interviewees while 5 had no answer to the question on preferred source of in-vehicle musical communication. With reference to preferred source of in-vehicular music communication (IMC) channel among commercial drivers in South-East of Nigeria, qualitative data revealed that IDI with interviewees 2, 4 & 9 which is (30%) affirmed that commercial drivers in the study population prefer playables as their source of music communication while driving whereas only the first interviewee (10%) used only the radio as the preferred source of in-vehicle music communication channel. However, interviewees 3, 5, 6, 7, 8 & 10 (60%) indicated that their choice of source of music communication channel is both (playables & radio). This evidence from qualitative data further supports the prevalence of in-vehicular music communication among commercial drivers in South-East Nigeria.

Some of the responses are presented thus:

"I prefer radio so that I get to play my favorite songs…"

"I usually play gospel music so I think I prefer music player"

A response from the opposing side had this to say: "*I do but as a matter of principle, I listen to the radio at home but I usually buy newspapers which I read at work when idle".* "I do" in his response was to the question of listening to any form of the electronic media to which he quickly pointed out that he does that within the comfort of his home. From his response and by implication, his preferred in-vehicle communication source was the radio even though he was vehemently against driving and music.

3. Utility

Despite its criticisms, in-vehicular music communication serves certain purposes for the users; this has been termed "utility" which is categorized into two: relaxation and concentration utility in this study. Qualitative data analyzed from the In-depth Interview (IDI) confirmed that 60% opined that in-vehicular music communication serve them relaxation utility whereas 20% opined that it serves them concentration utility. Only 10% agreed that IMC serves both relaxation and concentration utility while another 10% did not agree that in-vehicular music communication serves any utility.

Quoting an interviewee verbatim:

"If you are always active on the steering, music guides you. Assuming you did not sleep well the previous night or went for a vigil, you cannot cheat sleep, and music will help you go on.

Even when am not working and at home, I enjoy music. More especially if it a long distance journey, I collect and play good gospel music…… The one I am familiar with, I sing along and it keeps me awake".

Worthy of note is that this interviewee who happens to be a driver saw music as being therapeutic. According to him and from different responses to different questions,

> *"My wife works in a psychiatric hospital and most psychiatric hospitals have music band. It soothes the nerves of the patients. At Enugu, every Thursday is dance night and when the music is playing, you will see a mentally unbalanced man dance to the extent they wouldn't know when the music ends. When he looks around to see that maybe he was the only one still dancing, the next thing you will hear is, "ndi araa tinyerenum egwu***"*** *(these mad people should put music for me)……..*
>
> *So music is a therapy for those with mental problem and if your head is full like when you are thinking here and there. What I mean is when you have so many things you are thinking about and you play a good gospel music, you will see yourself relaxing…..*
>
> *That is why it is a therapy. You will see yourself relaxing. By the time you drive for one hour, you have forgotten about your thoughts"*
>
> *"…A good driver without music as a companion will sleep at the steering once the breeze touches you. If the car is air conditioned, cold will catch your brain and you will sleep. There is no magic about it……..But when you have music, you are awake. It is to avoid sleeping while driving that oyibo (white) people put that musical set in the first place*

In agreement, a traffic official revealed that "… *Some of them use it to keep themselves busy while for others it is for entertainment and it helps them relax and concentrate".*

As earlier pointed out, not all share the same opinion with regards to the utility. According to another interviewee and a driver, *"...It depends on the particular driver. For me as a commercial driver and a professional one at that, I cannot put on my radio in the motor when I am carrying passengers while driving".*

When further queried if he was of the opinion that driving with music has no benefit, he quickly added:

"there is no benefit whatsoever; rather it is fatal and prone to accident because it distracts the driver". Continuing, *"No no no, those who are telling you that are liars (*by liars, he meant the interviewees who pointed out the different gratifications from IMC). *You can be listening to the music and be enjoying it but you wouldn't know when you will be carried away by the music. Temporarily or momentarily, it can make you happy but as time goes on, you will be carried away and if you are carried away, a second is enough to cause disaster. This is true.*

4. Distractibility of IMC

On the distractibility of IMC, there was a slight difference in responses, while some pointed out that it depends on individual differences, some pointed at educational qualification, unqualified drivers and age while another accuses IQ. Some of the arguments or responses are presented below:

- *"…it is not something to generalize because it depends on individuals and again, it is not a traffic offense….Personally, I don't think music causes over speeding because most of them play Christian music. I doubt if Christian music makes them over speed….. some drivers will over speed even without music and if gospel music offers some kind of protection, it should be encouraged*". (That was from an official)

- *"There is no benefit whatsoever; rather it is fatal and prone to accident because it distracts the driver…… It is usually the younger ones and they do so carelessly because they have not had a taste of life. The elder ones have wives and children and are therefore more careful"*

- *"Let me clear something here; Individuals have different body systems. There are some like the young drivers, when they smoke igbo (Indian hemp) and drink kai kai (hot drink), when you jam such drivers, you will see them dancing at the steering. In that situation, the music is a distraction. But when you see a gentleman driving whether commercial or private, he wouldn't allow the person behind to hear the music. He will turn it down so that he will enjoy the music while driving. When you do that, you will see a passenger that may request that you increase the volume because he/she likes the track.*

- "*…but some practice noise making"*

- *"How can someone have speakers in their vehicle; two in the front with another two at the back? He will still go and get one big speaker and mount in the boot or behind the seats and when driving you will be hearing gbum gbum gbum, there is no way you can enjoy music like that. That is why its noise making. Your bus is not a bar. And when you see them you will know they are illiterates because learned drivers avoid that kind of character"*

- *Illiteracy is not about education but you are an illiterate when you do not know what you are driving. I advise drivers when you go to mechanic; check your brake system, monitor the parts they put for you. Driving needs education on the mechanics of driving. If you go to my car, I have tools, parts and even razor.*

- *Because not all of them are bad. There are individuals and there are individuals*

- *80% of the accidents you see on the road are caused not by music but by drunkenness, marijuana, kai kai. Drink causes sleep. A bottle is good because it energizes the blood but with two or three bottles, music and breeze will induce you to sleep naa.*

- *Based again on individual…Most of these Abakaliki boys did not attend any driving school. From conductor they will get business driving license and the next day, they are drivers. My vendor suddenly went missing in action and when I asked after him, I was told he was now a keke driver. Before you know it, you will see him driving a bus without training.*

In view of the dangers and hazards associated with the practice of in-vehicular music communication as theorized in various literature, the awareness of the commercial drivers on the dangers and hazards associated with in-vehicular music communication, by asking their stance on the awareness of supposed hazards, was tested and qualitative data analyzed confirmed that knowledge and awareness of the drivers on the dangers and hazards associated with the practice is most significant as all the interviewees (100%) opined that they are aware of its dangers and associated hazards. However, being aware and pointing out IMC as the cause of the hazards while driving are two different issues.

5. Behavioral change upon awareness

Here, there was a positive uniformity in responses from survey and IDI on behavioral change on awareness of the potential hazards of IMC. Despite knowing the dangers and hazards associated with in-vehicular music communication, future behaviour on the practice is positive and affirmative. Evidence from qualitative data analyzed for 10 interviewees (100%) out of 15 confirmed that whether hazardous or not, commercial drivers will always practice in-vehicular music communication.

The solutions to the perceived dangers of IMC range from establishment of driving schools to a form of education. Few excerpts are presented below:

- *FRSC is trying to introduce it now. They are pushing for each State to have a driving school. Last week, Oloyemi, the Corps officer went to Osun or Ogun State and asked them to establish a driving school so that they will send a personnel once or twice a week for lectures.*

- *The States have to be involved to establish driving schools*

- *If the driver is a little bit literate, he doesn't even need to high the set; Even if it is ordinary school cert.*

- *The drivers, most literate and lettered commercial drivers understand the responsibility of a driver because you are responsible for the lives of others. If you know what will help you achieve that, I think it will be adopted if discontinuing IMC will help them do that*

- *"...because the more educated you are, the more aware you become. Illiteracy is a disease"*

Other findings from the analysis of qualitative data (in-depth interview) confirmed the following:

i) Younger drivers mostly practice in-vehicular music communication more than their older counterparts. Younger drivers in terms of biological age prefer playables as source of music channel than radio and are more interested in

African hip-hop music than older drivers who prefer to listen to the news and play Christian music.

ii) Years of driving experience hold a significant influence in the practice of in-vehicular music communication among commercial drivers; drivers with more years of experience tend to practice in-vehicular music communication less that those with lesser years of experience. However level of education did not play significant role in the practice of in-vehicular music communication among commercial drivers in South-East Nigeria.

iii) According to the drivers, frequent adjusting of the source of in-vehicular music communication channel is as a result of the need to gain more auditory attention while approaching traffic checking point and attending to passengers e.g. bus stops and disbursing the passengers' change (this was gotten from the drivers' responses).

iv) Although the practice of in-vehicular music communication is not prohibited by law, officials in interview sessions 3, 6 & 7 opined that drivers can be penalized if the in-vehicular music communication behaviour endangers other road users or cause any harm to the passengers or other road users. How to ascertain when IMC endangers other users will be explored in further studies.

4.5 HYPOTHESIS TESTING

The aim of the hypothesis testing was to ascertain the basis for accepting the observed relationship effects or observed group differences using appropriate statistics. For this study, the hypotheses developed for this study were statistically tested using percentile analysis, and ANOVA. This was to establish if any relationship exists between the predictor variables and the independent variables.

4.5.1 Testing Hypothesis 1

Hypothesis 1 states that the use of in-vehicular musical communication will significantly be high among commercial drivers in South-East Nigeria. In the above alternate and directional hypothesis, the prevalence rate of in-vehicular musical communication among commercial drivers in South-East Nigeria was sought. In testing this hypothesis, frequency and percentile

analysis was adopted because the statistical tool used for analyzing the hypothesis was descriptive statistics.

Descriptive analysis deployed to analyze the data obtained, confirmed that prevalence rate is high in South-East Nigeria. To test hypothesis one, key indices that imply high prevalence rate was extracted for this hypothetical testing. First, consider the descriptive statistics as demonstrated in tables 4a-d; ownership of in-vehicular musical gadgets was high at 246 (76.64%) of 321 participants, regularity of playing in-vehicular music was high at 33.6% for those who played radio all the time, 25.5% for playables and 28.1% and 42.4% for those who played it most of the time for radio and playables respectively. It is also considered that the descriptive statistics showed that 73.52% of the 321 participants equally have other sources of in-vehicular music communication other than radio. Therefore higher percentages of these data are evidence that the hypothesis tested is accepted, confirmed and upheld. Consequently, this study accepts the higher percentage rate recorded as evidence of high rate of prevalence in line with the basis of accepting and adopting hypothesis 1 as an empirical finding.

4.5.2 Testing Hypothesis 2

Hypothesis 2 which states that recorded playable will be a more preferred in-vehicular music communication channel among Nigeria commercial drivers than radio channel sources was also accepted. Data confirmed that the descriptive statistics was in favour of recorded playables than radio. In testing this hypothesis, descriptive statistics using frequency and percentile analysis was also adopted because the statistical tool used for in analyzing the hypothesis was descriptive statistics.

Consider the percentage rate of preference for radio channel source and recorded playables which stood at 65.4% for a mean of 3.27 for radio and 76.6% for a mean point of 3.83 for recorded playables. The above showed a higher descriptive frequency for recorded playables than the radio; hence, was accepted because the alternate hypothesis tested and confirmed

significantly achieved higher frequency which is the norm of frequency statistics. The basis of accepting and adopting hypothesis 2 as an empirical finding is statistically confirmed.

4.5.3 Testing Hypothesis 3

Hypothesis 3 states that "in-vehicular music communication will serve Nigerian commercial drivers more of relaxation/therapeutic needs than concentration/alertness needs while driving". In the above alternate and directional hypothesis, what was sought was evidence for group differences on the utility purpose of in-vehicular musical communication using descriptive statistics and 2 way analysis of variance as the appropriate design and statistics.

To test the alternate and directional hypothesis above, table of descriptive statistics was observed and mean and standard deviations on participants' response to their utility preference of in-vehicular music communication for either relaxation or concentration purposes showed a discriminate observation among the groups. Hence, the need for use of between subjects' effect (2-way ANOVA) to determine if the observed difference in the table of descriptive statistics reached significant proportion using the calculated value and critical t-value significance at appropriate degrees of freedom for the factors. Mean responses for question items 12, 15, 16, 19 for concentration utility and 13,14,17,18 for relaxation utility were reported as 12.38 and 15.14 respectively. Having observed this difference, the ANOVA test further confirmed that this difference is significant at .001*, $p < .05$. $F = 7.057$, $(n = 321)$. Based on the findings, the observed differences in mean and consequent significance in F ratio which are the basis of validating ANOVA tests as an empirical finding was ascertained and confirmed.

4.5.4 Testing Hypothesis 4

Hypothesis 4 states that "Commercial drivers in Nigeria who are more experienced are likely to be more aware of the hazards of in-vehicular music communication than less experienced ones.

In the above alternate and directional hypothesis, what was sought was evidence for group differences on the awareness and knowledge hazards associated with the use of in-vehicular music communication while using descriptive statistics and 2-way analysis of variance as the appropriate statistics.

To test the alternate and directional hypothesis above, table of descriptive statistics was also observed to measure the mean and standard deviations on participants' responses to knowledge of the hazards associated with playing music while driving. Significant mean differences were observed and test of between subjects effects in the ANOVA further confirmed that this difference is significant at .000* $p < .05$. Based on the findings, the observed differences in mean and consequently significance in F ratio which are the basis of validating ANOVA test as an empirical finding was ascertained and confirmed.

4.5.5 Testing Hypothesis 5

In hypothesis 5, the assumption that Nigeria commercial drivers will still practice in-vehicular music communication despite being aware of its hazards was confirmed and accepted using descriptive analysis as statistical method of analysis. Consequently, it was equally tested with an aid of descriptive analysis. From the findings in table 11, it was observed that a mean response of 3.84 was obtained on a scale of 1-5. This implies a 76.8% affirmation rate from the participants on the occurrence of the behaviour in the future. Therefore the basis of descriptive statistics is to accept higher frequency which is achieved by the test result of this hypothesis. The basis of accepting and adopting hypothesis 5 as an empirical finding is statistically confirmed because the alternate hypothesis tested and confirmed, significantly achieved higher frequency which is the norm of frequency statistics.

In summary, five hypotheses were tested in the course of the study with the use of appropriate statistical tools and analysis. The use of descriptive statistics and ANOVA tests examination was used to test the true relationship effects and significant differences observed in the hypothesis. The descriptive statistics adopted higher frequency norm in either percentile distribution or simple observation to accept or to reject hypothetical statements

tested whereas mean differences and significant values of F tests were used as norm for accepting or rejecting test of between subjects effects or ANOVA tests used in the study. All hypothetical tests confirm that the hypotheses tested in the study were accepted based on statistical norms used and hence can be extrapolated as empirical finding worthy of scientific attributes such as replicability and generalizability of result. Therefore, findings can be adopted as reliable.

.

4.6 DISCUSSION OF RESULTS

The first Research Question of this study was to what extent do drivers in Nigeria engage in in-vehicle musical communication?

Answer to research question 1 were provided following the analyses of research items 1-6, 9-11 from the in-vehicle music communication (IMC) scale. Mean returns from the items on a 5-point scale ranged from 3.79 to 4.00 approximately 75.8% to 80% prevalence rate. From IDI, there is evidence of the prevalence of in-vehicular music communication (IMC) among commercial drivers in South-East of Nigeria. Responses from the in-depth interview (IDI) conducted confirmed that most commercial drivers in South-East Nigeria at least play music or listen to the news while driving.

This confirms hypothesis 1 that states that the prevalence of in-vehicle music communication among Nigerian commercial drivers will significantly be high. Hypothesis 1 is hereby accepted. This findings confirmed the earlier work in America by Stutts, Reinfurt, Stapling and Rodgman, (2003) which found that 72% of American drivers showed through an observational study that audio music (mostly radio) was playing in their vehicles while driving with only four out of 70 observed participants not listening to any form of music at all. The authors opined that the prevalence of in vehicle music communication increased with the growth of music feature in most automobiles and the easy affordability of the musical sets– such as radios, stereos, compacts discs, tape recorders and MP3 increasing the opportunity for self –selected music listening and driving. Equally, this is in consonance with a much earlier study in England by Sloboda, O'Neill and Invaldi, (2001) in a small scale diary study which revealed that music was playing in vehicle during 91% transport experience.

Consider also result from observational schedule in result II, Observation item 5 (table 12d) where it was observed that 66.7% of 81 observed cases indulge in in-vehicle music listening and communication against 33.3% that does not. These confirms that in-vehicle music listening and communication is a standard feature in Nigeria driving – which, highlights that happiness revolve around many econo-socio-cultural backgrounds in Nigeria and also influence driving behaviour. These also confirm the ubiquitous nature of music.

Furthermore, in order to determine the preferred in-vehicular music channel source among Nigerian commercial drivers, answers were provided by the analysis of items 7 and 8 of in-vehicle music communication (IMC) scale. Mean scores showing respondents preference towards in-vehicle music communication channel source indicated that 70.4% of 321 preferred playables as music source. Thus, hypothesis 2 that stated that Recorded playables will be a more preferred channel source of dialogic in-vehicle musical communication source among Nigerian commercial drivers than radio channel sources was accepted. Consider also significant mean difference at 3.27, SD= 1.142 and 3.83, SD=1.1075 respectively for radio channel sources and recorded playables.

The finding is in contrast to that made earlier by Stutts, Reinfurt, Stapling and Rodgman, (2003). The authors found that greater percentage of 70 (72%) American drivers observed that indulge in in-vehicle musical communication showed more preference to radio channel source. The reason for this contrast may be a result of socio-cultural differences or still developmental evolutions that has increased awareness levels in developed countries thereby influencing more people to listen more to news through radios than other music channels. However, the outcome of this finding may be explained through the empirical works of Bull, (2007), Haak (2006) and DeNora (2000) who found that music listening is beneficial to the listener with regards to different areas in our society like education, government, News, therapy, medicine etc. The authors' assertion here may be as a result of the listeners' need for engaging in in-vehicle music listening and communication.

Consider also result from the observational schedule item presented in table 12i which showed that in 81 observed cases, 53 (65.4%) of the observed drivers used recorded playables as their preferred in-vehicle music channel source against 28 (34.6%) that used radio. Consequently, the similarity of these separate empirical results from IDI, survey and observation makes the researcher conclude that among Nigerian commercial drivers,

recorded playables is the more preferred in-vehicle music listening/communication channel source. Also, with reference to preferred source of in-vehicular music communication (IMC) channel among commercial drivers in South-East of Nigeria, qualitative data analyzed revealed that IDI with 30% of the interviewees affirmed that commercial drivers in the study population prefer playables as their source of music communication while driving whereas only the first interviewee (10%) used only the radio as the preferred source of music communication channel. However, 60% indicated that their choice of source of in-vehicle music communication channel is both (playables & radio).

In the same vein, to determine the preferred in-vehicle music channel source among Nigerian commercial drivers based on age group differences, there was an assumption developed that older age group Nigerian commercial drivers will significantly differ from younger age group on preference of in vehicle music communication channel source. For the test, a multiple analyses of variance (MANOVA) were tested across the groups and across the channel sources (radio and playables). Descriptive statistics as shown in table 7 above confirmed drivers between 20-30years age group significantly scored higher mean 3.36, N=115, SD=1.17 on preference of recorded playables as a channel source more than other older age groups. Consider 31-40years age group at m=3.28, N=121, SD = 1.11 and 41 years and above age group at 3.11, N = 85, SD=1.13. These empirical findings showed a diminishing preference to recorded playables as the age of the drivers' increases. Equally, the tests of Between subjects effects showed that there is age group difference in preference to recorded playables. Consider F (1,321 = .031) at P ≤ -05 (2-tailed).

Consequently, the assumption which stated that older age groups of Nigeria commercial driver will significantly differ from younger ones in preferences of recorded playables as source of in-vehicle music listening and communication source was hereby accepted. This result also aligns with findings by Nguyen, (1998) who found that greater number of male college students turn up the volume of the radio set while driving as the most common technique to avoid drowsiness. Nguyen (1998) findings suggest that younger male drivers (younger because they were college students between 14-20years) similar with the age bracket in this study only used radio channels for distraction utility to keep off sleep whereas it could be inferred that all other times, they could possible use recorded playables for relaxation and therapeutic utility. Moreover, high preference and usage of recorded playables as music channel source confirms why Brumby, Salvucci, Manowski & Howes (2007) and

Salvucci, Markley, Zuber & Brumby (2007) referred AM/FM car – radio receiver as a once upon a time vehicle entertainment feature now replaced by today's CD/cassette player, USB flash sticks, IPods, MP3 etc.

The third research objective was to ascertain the utility of in-vehicle musical communication for Nigerian commercial drivers.

To answer the research question from that objective above, the utility of in-vehicle music listening and communication was compared based on respondents answer to questions items 12, 15, 16 and 19 for concentration utility and 13, 14, 17 and 18 for relaxation utility. Consequently, descriptive statistics in table 9 rated on a 5-point scale of 4 items each showed that Nigerian commercial drivers used in vehicle music listening/communication more for relaxation utility than concentration utility. This was evident in higher mean scores obtained for relaxation utility over concentration utility. Consider M = 15.14, SD=1.78 and M=12.38, SD 2.04 (N=321) for relaxation utility and concentration utility respectively. This finding confirms hypothesis 3 which stated that in-vehicle music communication will serve commercial drivers in Nigeria more relaxation/therapeutic utility than concentration/alertness utilities. Qualitative data analyzed from the In-depth Interview (IDI) confirmed that 60% opined that in-vehicular music communication serve them relaxation utility whereas 20% opined that it serves them concentration utility. Only 10% stated that IMC serves him both relaxation and concentration utility while another 10% did not agree that in-vehicular music communication serves any utility at all.

This empirical evidence is supported greatly by theories explaining the motivation for driving and listening to in-vehicular music communication most especially Uses and Gratifications theory and Abrams music as therapy (2005). The authors theorized that music has soothing and relaxation/therapeutic qualities that indulge the listener not excluding commercial drivers. The findings for utility use in this study was supported by earlier study done by Chablis (1999) and confirmed latter by Thompson et al (2001) which suggested that stimuli that are enjoyable to an individual elicited by music elevates positive mood which increase arousal level, consequently relaxes the listener and enhances performance of a task. This effect so elicited serves a relaxation utility purpose to the commercial drivers. In other words, music does something to the listener which ensures its continued usage. In communication studies, the effect and subsequent utility is explained by uses and gratification theory which

posits that the decision to practice selective exposure depends primarily on the uses which members of the mass media audience want to make of media messages and the benefits which they hope to derive from the media (Okunna &Omenugha, 2012; Cantril 1942 in Ruggiero, 2000). Consider also data provided from the observational schedule item 8 (table 12g) which shows a combined 60 (174%) drivers out 81 observed cases either sings, hums or nods to in-vehicle music while driving, evidence for relaxation utility as thus suggested.

The second part to answering research question 3 emphasized age differences in relaxation utility function of in vehicular music communication. Answers to items, 13, 14, 17 and 18 were provided by means of a One-way Analysis of variance. Tests of between subject groups for 321 participants at 2 degrees of freedom showed that Age group difference were significant enough on relaxation utility of in vehicle music communication among the three age groups $F(1,321)= 00$ at $p \leq 05$ (2-tailed). Consider also mean at 15.47, 14.55 and 15.23, and standard deviation = 1.49, 2.10 and 1.71 respectively for 20-30 years, 41years and above and 31-40 years age groups. Based on the above, the assumption which stated that younger Nigerian commercial drivers will significantly differ from older ones on the relaxation use of dialogic in- vehicular music communication was also accepted. This finding supports and strengthens the findings to research question 3 and thus help throw more insights to the problem of research question 3.

The fourth research objective was to ascertain the extent of respondents' awareness of the hazards of the interface in driving and listening to in-vehicle musical communication.
From qualitative data, the awareness of the commercial drivers on the dangers and hazards associated with in-vehicular music communication confirmed that knowledge and awareness of the drivers on the dangers and hazards associated with the practice is most significant as all the interviewees (100%) opined that they are somehow aware of its dangers and associated hazards even though they did not totally agree that IMC was the sole cause of dangerous driving.

Quantitative data provided showed that respondents total mean score as could be obtained from table of descriptive statistics in table 10 above is significantly higher than theoretical mean point for 13-items (5x13=65+1/2=33) at 45.81, SD=3.52, N=321 which is approximately 70.47% mean return from total possible awareness response points of 65. This is also confirmed by the test of between subject effects as shown in table 10b that drivers

with more driving experience in years showed more awareness to the hazards of interface in driving and listening to in-vehicle music communication, F(1,321)= 000, P=05. The negative consequences of in-vehicle music listening and communication has been evidenced in several studies in the past. For example, Ayres and Hughes (1986) found that visual acuity was impaired by loud music up to 107dBA. Later Ramsey and Simmons (1993) set the range to be around 83–130 dBA depending on individual differences.

However, the awareness of the hazards of in-vehicle music listening and communication was played down by Turner, Fernandez and Nelson (1996) and later on by Spinney, (1997) who challenged such theory of thought by demonstrating that music exposure during driving actually increased performance ability and focus of attention. Also the hazards of music listening and communication were debunked by Bach and Hirst (1999) who explored low demand single task driving versus high demand multi-task driving under soft (50dBA) and loud (85 dBA) background music. Their findings showed that though low demand single task driving were not affected on either soft and loud music, high demand multi-task driving significantly increased reaction times to peripheral signals under loud background music. Despite their uninhibited findings, North, Hargreaves and MCKendrick, (1999) concluded that background music alter attention (e.g. buying attention) and thus is hazardous.

To ascertain the extent of respondents awareness to the hazards of the interface in driving and listening to in-vehicle musical communication with regard to drivers educational qualification, consideration for second part of research question 4 was done in comparison to drivers levels of educational qualification as a moderating factor on the awareness of the hazards of in-vehicle music listening and communication. Table of between subjects effects as indicated in table I0b above confirmed that, observed differences in contrast to education level of the drivers did not reach significant proportion at F(1,321)= 898. Consider also low differences in Mean and SD as observed in summary table for descriptive statistics, M = 45.39, SD = 3. 35 for those with First School Leaving Certificate where as those with SSCE pulled a total mean score of 45.19, SD=3.71.

From this happenstance, the assumption which stated that drivers with SSCE will significantly differ from drivers with only First School Leaving Certificate on the awareness of the hazards of in-vehicle music listening and communication was rejected. This implies that with increasing knowledge through formal education as the moderator, awareness of the

hazards of IMC did not significantly improve. Hence, the assumption was rejected. Zakay (1989) opined that music as a stimulus has temporal effects and may well depend on sensory input with other temporal perceptual impressions such as internal timing mechanism. This may explain why experience and not educational qualification affected the awareness of the hazards of using interface in music listening and driving. Therefore the study by Zakay ((1989) seems to provide understanding that music and performance are perceptual phenomenon rather than an educational construct, thus offering explanation why awareness of the hazards of in-vehicle music listening/communication was not moderated by educational qualification of the drivers.

Having ruled out educational qualification as a prerequisite for knowledge of the hazards of in-vehicle musical communication, the stage was set to measure the awareness of the hazards of interface of driving and dialogic in vehicle music listening/communication with regard to respondents age. Analysis of the third part of research question 4 compared the moderation effect of participants age to the awareness of the hazards associated with interface driving and in-vehicle music listening/communication. Evidence from descriptive statistics as shown in table 10 confirmed low mean difference across age groups at M-46.59, SD 1.41, 46.53, SD=2.81 and 46.49, SD = 3.57 for 20-30 years, 31-40years and 41years and above respectively. This also confirms the findings obtained from test of Between subjects effects where F ration failed to reach significant proportion at $F(1,321) = 159$, $P \leq 05$. Consequently, the statement that older Nigerian commercial driver will be more aware of the hazards of interface of driving and in-vehicle music listening/communication than younger ones was rejected. This also tallies with the perceptual theorem of Zakay (1989) as the moderator of driving performance which could be extended to cover the awareness of the hazards of interface of driving and listening. In line with the assertion of perceptual theorem by Zakay (1989), the rejection of the research statement above was upheld.

Furthermore, the fifth and last objective of this study was to ascertain the behavioral change of Nigerian commercial drivers upon awareness of the hazards of interface of in-vehicle music listening and communication while driving. Statistical analysis done in order to provide answers to the above research question showed that only 50 (15.5%) of the 321 participants refrained from the behavior whereas while (10%) were undecided about their behavioral change while 239 (74.4%) opined that they will continue in the indulgence. Overall, this puts the general participants acceptance of the behavioral at a mean point of M=

3.84, SD-1.09 for 32 participants. This statistical evidence is significantly higher than the theoretical mean point of the response item set at 1-5. Consider the theoretical mean point at 3.00 (5+/2=3). Consequently, it is decided from the findings that though the drivers may be aware of the hazardous of interface dialogue in-vehicular music listening/communication and driving, they are unwilling to stop the practice. The reason behind this could be as a result of various utility which music serves. For example, Nguyen (1998) found that in-vehicular music listening especially radio channel sources serve most college students distraction purpose to keep them awake while driving and/or to manage or fight drowsiness.

In contrast, Brumby, Salvucci, Manowski and Howes (2007) regarded AM/FM car – radio receiver as outdated and opined that advancement in technology has made in–vehicle music source very cheap in form of recorded playables e.g. Tapes/CD, VCD cassette, USB flash sticks, memory cards, IPods, MP3 etc. Burmby et al concluded that more available recorded playables offers more entertainment for drivers and passengers. Therefore in line with their findings; entertainment may be the reason behind why drivers are unwilling to stop the practice despite being aware of the hazards/dangers associated with the practices. This entertainment gained is hugely supported by uses and gratification theory. Equally its distractibility utility is also supported by distraction theory by Mitchell and McDonald, (2006).

Gopher and Donchin, (1985) provided ground work for understanding distraction theory in what he termed multiple resource tasking which is the main reason why attention and concentration is affected while doing two things simultaneously with obvious implication to quality and quantity of performance outcome. Also the foundation to understanding therapeutic effects of music and how this relate to performance was laid in the study by Chablis (1999) where the author postulated that background music helps to elevate the soul and ignite positive mood which increases arousal level positively. From these backgrounds, it is ascertained that music utility may make it difficult for drivers to abstain from its indulgence hence, the reason for its continued practice despite awareness of the dangers and hazards associated with the practice.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

In this chapter, the researcher presents the summary of the findings of the study and concludes the study while highlighting the limitations, and making recommendations; plus suggestions for further studies.

5.1 SUMMARY OF FINDINGS

This study examined in-vehicular music listening and communication among commercial drivers in Nigeria. Both the theoretical and empirical model of this study enabled the researcher set out the main purpose of the study and this guided the formulation of the research questions and tested hypotheses. These guided the researcher to make the following findings:

In response to research question 1 which sought to find out the extent to which Nigeria commercial drivers engage in in-vehicular music listening and communication, data analyzed respectively for both qualitative data and quantitative data showed indulgence rate of 90% (from qualitative data) and an average of 75.8% (quantitative data) from participants' mean responses to the items which ranged from 3.79 to 4 on a 5-point scale. This empirical assertion, confirms that there is significantly high indulgence rate of in-vehicular music listening and communication among Nigeria commercial drivers. Hypothesis 1was therefore accepted.

It was also found out in research question 2 which sought to ascertain the preferred in-vehicular music listening and communication channel source that more Nigerian commercial drivers preferred recorded playables as in-vehicular music listening and communication channel source than radio channel sources. Average preference rate from respondents 'answers showed 76.6% practice rate (from a mean point of 3.83) for recorded playables as against 65.40% practice rate (from a point of 3.27) for radio channel sources. This confirms the findings from the qualitative data of 30% preference rate of playables against radio music channel sources. Hypothesis 2 was also accepted.

Equally, it was found that older age group differed from younger age groups on preference to in-vehicular music listening and communication channel source. Whereas younger age group

(67.20%) significantly preferred recorded playables as in-vehicular music listening and communication channel source, older age group preferred radio channel sources. This is evidenced by higher mean points (M = 3.36 for age group 20 – 30yrs) scored by younger age group on recorded playables as preferred channel source against all other older age groups. This is also supported by the findings from the qualitative data. The second part of Hypothesis 2 was also accepted.

In answer to research question 3 on the utility of in-vehicular music listening and communication among Nigerian commercial drivers, empirical evidence showed that in-vehicular music listening and communication served more relaxation/therapeutic needs than concentration/alertness needs. Participants scored higher mean to the relaxation/therapeutic utility needs than they did to concentration/alertness needs which is an affirmation rate of 75.70% as against 61.90% for concentration/alertness as shown in the mean differences of M=15.14 and M=12.38 respectively for relaxation/therapeutic utility and concentration/alertness utility. This quantitative evidence lends support to qualitative findings which emphasized that in-vehicular music communication serves commercial drivers relaxation needs than concentration with 60% affirmation as against 20% recorded for concentration needs although 10% of the interviewees indicated that it serves them both. Consequently, hypothesis 3 was also accepted.

Furthermore, to consider age group differences to relaxation/therapeutic utility of in-vehicular music listening and communication, data analyzed showed that significant age group differences were observed between the age groups. Younger age groups (20 – 30yrs) significantly scored higher on the relaxation/therapeutic utility of in-vehicular music listening and communication with a mean point of M = 15.47 (77.35% affirmation) against 14.55 (72.75%) and 15.23 (76.15%) respectively for age groups 41yr & above and 31 – 40yrs.

Research question 4 was to ascertain the extent of respondents' awareness of the hazards of the interface in driving and listening to in-vehicular music listening and communication based on driving experience in years. The result of this hypothesis confirmed that driving experience in years affected the awareness of the hazards of interface in driving and listening to in-vehicular music listening and communication. Participants differed on awareness of the hazards of driving and listening to in-vehicular music listening and communication based on differences in driving experience in years at $F(1, 321) = .000^*$, $P < .05$. This statistical

evidence from field survey is equally supported by the findings from the qualitative data which confirmed 100% commercial drivers' awareness of the hazards and associated dangers of dialogic in-vehicular music communication; all the respondents interviewed opined that they are somehow aware of its dangers and associated hazards. In line with this qualitative and quantitative evidence, hypothesis 4 was hereby accepted.

However, the second part to research question 4 which wishes to ascertain the extent of respondents' awareness of the hazards of the interface in driving and listening to in-vehicular music listening and communication based on educational qualification found that educational qualification differences did not affect the awareness of the hazards of interface in driving and listening to in-vehicular music listening and communication. It was found that participants did not differ on awareness of the hazards of driving and listening to in-vehicular music listening and communication based on differences in educational qualification at $F (1, 321) = .898$, $p < .05$. Though there were observed mean differences as in $M = 45.39$ (and $M = 45.19$ for First School Leaving Certificate holders and SSCE holders respectively, it did not reach significant proportions. This finding corresponds with that of the qualitative data analysis which found association on the practice of in-vehicular music communication with level of educational qualification. Therefore, the extension of Hypothesis 4 was therefore rejected.

The third part of research question 4, sought to ascertain whether respondents' awareness of the hazards of the interface in driving and listening to in-vehicular music listening and communication will differ based on age group differences. Findings from statistical data analyzed showed that observed differences did not reach significant proportions, $F (1, 321) = .159$, $P < .05$. This finding was also supported by the qualitative data analysis which confirmed that all (100%) of the respondents are aware of the hazards and dangers associated with the practice of in-vehicular music communication regardless of age group differences, educational qualification and experience. Consequently, third part of hypothesis 4 was equally rejected.

Finally, in the last research question of this study (research question 5), behavioural changes upon awareness of the hazards of the interface in driving and listening to in-vehicular music listening and communication was sought. Surprisingly, qualitative data analyzed confirmed that likelihood of future practice of in-vehicular music communication among the

commercial drivers is positive at 90% affirmation; almost all respondents interviewed confirmed the possibility of continued practice despite being aware of the dangers and hazards. This finding further supports empirical evidence found from the analysis of the quantitative data. Analyzed result to the research question showed that only 50 (15.5%) of 321 respondents having known the dangers and possible hazards are willing to disengage in the behaviour whereas 239 (74.4%) opined that they will continue in the behaviour leaving out 32 (10%) respondents still undecided about their behaviour change. Based on the above, hypothesis 5 is accepted.

5.2 IMPLICATION OF RESEARCH FINDINGS

The findings from this study reveal several theoretical and practical implications to the academic foray, road safety corps and the transport industry. In line with Bull (2001), in-vehicular music communication involves the use of media in vehicles to mask random environmental sounds, creating an 'accompanied' form of aural privacy, in which music provides an experience of 'connection' with others. This 'private space' makes possible a range of other experiences. Music is both a channel of communication to drivers as well as to the passengers. Music can be used to entertain and to relax, (Stutts, 2003). For this purpose, many drivers report that they listen to whatever they like, as loudly as they like, and can even sing along because they feel less observed than at home; they report finding potential frustrations of driving transformed by listening thereby savouring its ecstatic and therapeutic effects for improved relaxation and concentration.

Despite these positive implications, other attending problems also emanate from in-vehicular music listening/communication. Notably among them are the problems of distraction and attention deficit which it may induce on drivers which tasks the health and the wellbeing of the drivers and passengers since passengers' depend on the drivers on whether they drive well or not. Also, outside the passengers, other peoples' lives may also be at stake such as the pedestrian users, passers-by, passengers in other vehicles and other numerous road users. The greatest danger that in-vehicular music communication may pose to any motorist is the direct inhibition of primary, secondary and tertiary tasks of driving and these are known to be the basis for all types of attention deficit problem such as focused attention, selected attention and divided attention (Wickens and Hollands, 2000) and these are the commonest sources and causes of road accidents.

5.3 CONCLUSION

This study among other things found that the use of in-vehicular music listening/communication while driving is significantly high among Nigerian commercial drivers. The study characteristically, opened two major sources of in-vehicular music listening/communication as either through radio channel sources such as AM/FM, Medium and Shortwave frequency bands or through recorded playables such as tape recorders, cassette/VCD players, iPods, USB flash sticks, MP^3 etc. Characteristically, Nigerian commercial drivers preferred recorded playables as their in-vehicular music listening/communication channel source than radio sources. Younger age groups (20 -30yrs) in the study preferred recorded playables to radio as their in-vehicular music listening/communication channel source than do the older age groups (31 – 40yrs and 40yrs & above). In terms of utility, Nigerian commercial drivers opined that in-vehicular music listening/communication served them more relaxation/therapeutic needs than concentration/alertness utility needs. Equally, younger age groups among Nigerian commercial drivers opined that in-vehicular music listening/communication served them more of relaxation utility needs than their older age group counterparts. However, on the awareness of the hazards of in-vehicular music listening/communication, though there is a general acceptability of this knowledge, only driving experience in years seemed to add further moderating effect, suggesting that the more experienced the drivers' are in years of driving, the more they are likely to be aware of these hazards related to in-vehicular music listening/communication and driving. However, it is shocking that greater number of the respondents opined that although they may be aware of these dangers, they may not be willing to stop their indulgence on in-vehicular music listening/communication while driving. This may be particularly of concern to transport and road safety management as road transport accidents remain considerably high. In view of these findings, proactive measures in terms of sensitization may be required to further educate the general public on the hazards of the behaviour. The researcher concludes that though in-vehicular music listening/communication elevates more than it abates, industry stakeholders should not cease to highlight its lurking hazards waiting to happen. This might be the only middle ground for enjoying this channel of communication albeit the dangers associated with its practice.

5.4 RECOMMENDATIONS

From both the theoretical assumptions of this study to the empirical findings, it could be garnered that in-vehicular music listening/communication can make or mar the welfare of the

drivers and the passengers considering its aesthetic qualities which can either uplift the soul or distract it. In as much as several authors suggested that background music helps to increase positive feelings which arouses relaxation thereby improving performance, it is recommended that drivers moderate their behaviour guarding against other unpalatable outcomes such as distraction which emanate from it. Particularly, it is recommended that there are different kinds of music for different purposes; hence, drivers should adhere to use of music that is suitable to their circumstances while driving.

It is also recommended as a safety tip that drivers regulate the nature, the tempo and the intensity of the music they play while driving as these have capacity to mount serious challenges towards resource tasking and attention thereby increasing the chances of distractibility and eventual vulnerability.

It is also recommended that while driving, that drivers should do their best to control all the impulses that may affect their primary and secondary tasks of driving such as longitudinal and lateral focus, steering and wheeling, lane keeping, reaction time etc.

It is recommended that drivers adapt their vehicles in a way that tertiary tasks may not affect both primary and secondary tasks. This way the drivers and passengers may have the chance of indulging in dialogic in-vehicular music listening/communication with lesser hazards.

5.5 SUGGESTION FOR FUTURE STUDIES

The exploratory nature of this study allowed it the privilege to access commercial drivers in Nigeria with the ability of ascertaining prevalence rate of in-vehicle musical communication all through survey method of research using structured questionnaire and observational schedule and in-depth interview. It is therefore suggested that other relevant factors and circumstances be imbued into the study in the near future in order to bolster the quality of findings, its theoretical connections and applications. Such integration may well consider, the problems of drivers' background influences such as personality, socio-economic situations and other personal characteristics affecting such behaviour.

5.6 LIMITATIONS OF THE STUDY

Without doubt, several factors have made this study an imperfect one. The fact that this study was carried out among semi-illiterate and near illiterate population is a very limiting factor as it is not clear whether most of the respondents understood the items in the questionnaire. Again, getting a local translation was also very difficult on its own. Hence,

the possibility of respondents' bias as a result of poor understanding of the items in the question is an expected limiting factor of this study.

Still on the respondents' limitations, it was difficult getting the respondents to participate in this study as most observed drivers were totally unapproachable whereas some others due to ignorance feared that their responses may be for evaluation purposes thereby may be one of the factors prompting them to give biased answers to response items in the questionnaire.
Equally, the design of the study made it difficult for the observational schedule to provide answers to all the research questions raised and as such could not provide the all needed confirmation to the responses to the items in the questionnaire. It is in the mind of the researcher to use the analyses of the observational schedule to cross check all the result findings made from the analyses of the participants' responses to the items to the research questions, however, not all the research questions were able to be answered through the analyses of the observational schedule. This informed the inclusion of IDI as a data collection method.

Another limitation was in the area of documentation. It was found that there was poor documentation of record of inter-state drivers. This limitation was addressed by going to the emblem unit of the state ministry of transport. For Umuahia and Abakaliki, the estimate of drivers was gotten from the motor parks.

REFERENCES

Aasgaard, T. (2001) Ecology of Love: Aspects of Music Therapy in Pediatric Oncology Environment. *Journal of Palliative Care, 17*(3), 177-181.

Aasgaard, T. (2005) Assisting Children with Malignant Blood Diseases to Create and Perform their own Songs. In F. Baker & T. Wigram (Eds.), *Songwriting: Methods, Techniques and Clinical Applications for Music Therapy Clinicians, Educators and Students* (Pp. 154-179). Philadelphia: Jessica Kingsley.

Abbott, A (2002) Neurobiology: Music, Maestro, Please! *Nature* 416, 12–14 (7 March 2002) Doi: 10.1038/416012a

Abrams, A. (2011a). Understanding Music as a Temporal-Aesthetic Way of Being: Implications for a General Theory of Music Therapy. *The Arts in Psychotherapy, 28*, 114-119.

Abrams, A. (2011b). A Relationship-Based Theory of Music Therapy: Understanding Processes and Goals as Being-Together-Musically. In K.E. Bruscia (Ed.) *Reading on Music Therapy Theory*, New Braunfels, TX: Barcelona.

Adewunmi, R. (1996). *Nigeria Roads: Road Map to Progress.* New Cable University, UK.

Adum, A (2011) HIV/AIDS Controversies *as a Probable Influence on the Believability of HIV/AIDS Communication in South-Eastern Nigeria*. Unpublished Ph.D Dissertation Submitted to the Department of Mass Communication, UNIZIK.

Agbonkhese, O 1; Yisa, G.L 1; Agbonkhese, E.G 2; Akanbi, D.O 1; Aka, E.O 1; Mondigha, E (2013) Road Traffic Accidents in Nigeria: Causes and Preventive Measures. *Civil and Environmental Research.* Vol.3, No.13, 2013

Aigen, K. (2005). *Music-Centered Music Therapy*. New Braunfels, TX: Barcelona.

Alvarez, I., Martin, A., Dunbar, J., Taiber, J., Wilson, D.-M., & Gilbert, J. E. (2010). Voice Interfaced Vehicle User Help. In: Proceedings of the Second International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI 2010), November 11-12, 2010, Pittsburgh, Pennsylvania, USA.

Atkinson J & Flint J (2004) *The SAGE Encyclopedia of Social Science Research Methods* . http://dx.doi.org/10.4135/9781412950589

Bernatzky, G., Bernatzky, P., Hesse, H.-P., Staffen, W., & Ladurner, G. (2004) Stimulating Music Increases Motor Coordination in Patients Afflicted with Morbus Parkinson. *Neuroscience Letters*, 361, 4-8.

Boles, D (2002) Lateralized Spatial Processes and their Lexical Implications. *Neuropsychologia, 40*, 2125–2135.

Boles, D. B., Bursk, J. H., Phillips, J. B., & Perdelwitz, J. R. (2007). Predicting Dual-Task Performance with the Multiple Resource Questionnaire. *Human Factors, 49,* 32–45.

Bonny, H. (2002) *Music Consciousness: The Evolution of Guided Imagery and Music*. (L. Summer, Ed.). Gilsum, NH: Barcelona Publishers.

Booher, H., & Minninger, J. (2003) Human Systems Integration in Army Systems Acquisition. In H. R. Booher (Ed.), *Handbook of Human Systems Integration* (Pp. 663–698). Hoboken, NJ: Wiley.

Boundless (2014) "The Importance of Listening." *Boundless Communications*. Boundless, 03 Jul. 2014. Retrieved 05 Apr. 2015 From Https://Www.Boundless.Com/Communications/Textbooks/Boundless-Communications-Textbook/Learning-To-Listen-And-Helping-Others-Do-The-Same-5/Understanding-Listening-29/The-Importance-Of-Listening-132-8285/

Brodsky W (2002) The Effects of Music Tempo on Simulated Performance and Vehicular Control. *Transportation Research* Part F, 4

Bronfenbrenner, U. (1979). *The Ecology of Human Development. Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.

Bronzaft, A. L. (2002). Noise Pollution: A Hazard to Physical and Mental Well-being. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology (*2nd ed., pp. 499-510). New York: John Wiley & Sons, Inc.

Bull, M. (2007). *Sound Moves: iPod Culture and Urbane Experience* (1st Ed.). New York: Routledge.

Castro, C. (2009*). Human Factors of Visual and Cognitive Performance in Driving.* Boca Raton, Fla.: CRC Press.

Castronovo, S., Mahr, A., Pentcheva, M., & Mueller, C. (2010). *Multimodal Dialog in the Car: Combining Speech and Turn-And-Push Dial to Control Comfort Functions.* In: Proceedings of Interspeech (2010). Conference in the Annual Series of Interspeech Events (INTERSPEECH-2010), September 26-30, Makuhari, Japan, ISCA, Makuhari, Japan, 9/2010.

Chang, J. C., Lien, A., Lathrop, B., & Hess, H. (2009). *Usability Evaluation of a Volkswagen Group In-Vehicle Speech System.* In: Proceedings of the First International Conference on Automotive User Interfaces and Interactive Vehicular Applications (Automotiveui 2009), Sep 21-22 2009, Essen, Germany.

Chidoka, O. (2012) *Federal Road Safety Corps: "The Journey So Far".* Nigeria Television Authority 08 March, 2012.

Chisholm, S., Caird, J.K., & Lockhart, J. (2008) The Effects of Practice with MP3 Players on Driving Performance. *Accident Analysis Aand Prevention 40, 704–713.*

Delgrossi L (2014) *The Future of the Automobile Vehicle Safety Communication.* Stanford University ME302.

DeNora, T. (2000) *Music in Everyday Life*. UK: Cambridge University Press.

Denzin N & Lincoln Y (2003) *Strategies in Qualitative Inquiry.* London: Sage Publications.

Dibben N & Williamson V (2007) An Exploratory Survey of In-Vehicle Music Listening *Psychology of Music October 2007 35: 571-589, First Published On August 16, 2007*

Dorsey (2012) *Driving Ergonomics*. APHIS Ergonomics Program.

Duncan, J. (1979). Divided Attention: The whole is more than the sum of its parts. *Journal of Experimental Psychology: Human Perception and Performance, 5,* 216–228.

Eby D, & Kostyniuk L (2003) *Driver Distraction and Crashes: An Assessment of Crash Databases and Review of the Literature.* The University of Michigan Transportation Research Institute: No UMTRI-2003-12.

Engle, R. W. (2002). Working Memory Capacity as Executive Attention. *Current Directions in Psychological Science, 11*, 19–23.

Engstroem, J., Johansson, E., & Oetslund, J. (2005) Effects of Visual and Cognitive Load in Real and Simulated Motorway Driving. Transportation Research Part F 8 (2005). 97–120.

Estrada, C. A., Isen, A. M., & Young, M. J. (1997) Positive affect facilitates integration of information and decreases anchoring in reasoning among physicians. *Organizational behavior and human decision processes*, 72, 117-135.

Eyben, F., Wöllmer, M., Poitschke, T., Schuller, B., Blaschke, C., Färber, B., & Nguyen-Thien, N. (2010) Emotion on the Road—Necessity, Acceptance, and Feasibility of Affective Computing in the Car. *Advances in Human-Computer Interaction - Special issue on emotion-aware natural interaction.* Volume 2010. Hindawi Publishing Corp. New York, NY, United States.

Falola, T. & Olarewaju, S.A. (1986). *Transport System in Nigeria.* Maxwell School of Citizenship & Public Affairs, Syracuse University, Syracuse.

Fischer, P., & Nürnberger, A. (2010). myCOMAND automotive user interface: Personalized interaction with multimedia content based on fuzzy preference modeling. In: User Modeling, Adaptation, and Personalization. *Lecture Notes in Computer Science*, 2010, Volume 6075/2010, 315-326.

Ford Motor Company (2009). Virginia Tech Transportation Institute Study Shows Ford SYNC's Voice Technology Helps Drivers Keep Eyes on Road. http://media.ford.com/article_display.cfm?article_id=32381

Furnham, A., & Strabac, L. (2002) Music is as distracting as noise: The differential distraction of background music and noise on the cognitive test performance of introverts and extraverts. *Ergonomics*, 45(3), 203-217.

Garavaglia J (2012) *Music Dramaturgy and Human Reactions: Music as a Means for Communication*. 9th International Symposium on Computer Music Modeling and Retrieval (CMMR 2012) 19-22 June 2012.

Gärtner U., König, W. & Wittig, T. (2002). Evaluation of manual vs. speech input when using a driver information system in real traffic. Proceedings of the First International Driving Symposium on Human Factors in Driver Assessment (Ed.).

Gawron, V. J. (2008). *Human Performance, Workload and situation awareness measures handbook*, 2nd ed. Boca Raton, FL: CRC Press.

Gore, B. F., & Jarvis, P. A. (2005). *New integrated modeling capabilities: MIDAS' recent behavioral enhancements* (SAW-2005-01- 2701). Warrendale, PA: Society of Automotive Engineers.

Grier, R. (2008). *The Redline of workload: Theory, research and design.* To be presented at the 52nd Annual Meeting of the Human Factors and Ergonomics Society, September 22–26, in New York.

Green P. (2000). Crashes Induced by Driver Information Systems and What Can Be Done to Reduce Them. Society of Automotive Engineers, Inc.

Haake, A. B. (2006). *Music Listening Practices in Workplace Settings in the UK: an Exploratory Survey of Office-based Settings*. Paper presented at the 9th International Conference on Music Perception & Cognition (ICMPC9).

Harbluk, J.L., Noy, Y.I., & Eizenman, M. (2002) The Impact of Cognitive Distraction on Driver Visual Behaviour and Vehicle Control. Report no. TP13889E. Transport Canada, Ontario.

Hedge T (2000) *Teaching and Learning in the Language Classroom.* Oxford: Oxford University Press.

Henry Ford (2011) *Transportation: Past, Present and Future.* Available at www.henryford.org

Hester K (2004. *Bigotry and the Afrocentric "jazz" Evolution.* Global Academic Publishing.

Hurst, W., & Kalmar, D. (1987) Characterizing attention resources. *Journal of Experimental Psychology: General, 116,* 68–81.

Horrey, W. J., & Wickens, C. D. (2003) Multiple resource modeling of task interference in vehicle control, hazard awareness and in-vehicle task performance. In *Proceedings of the Second International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design* (pp. 7–12). Iowa City: Human Factors Research Program, University of Iowa.

Horrey, W. J., & Wickens, C. D. (2004). Driving and side task performance: The effects of display clutter, separation, and modality. *Human Factors, 46,* 611–624.

Horrey, W. J., Wickens, C. D., & Consalus, K. P. (2006) Modeling drivers' visual attention allocation while interacting with in-vehicle technologies. *Journal of Experimental Psychology: Applied, 12*(2), 67–86.

Hosking, S. G., Young, K. L., & Regan, M. A. (2009). *The Effects of Text Messaging on Young Drivers.* SAGE Psychological Science.

Husain, G., Thompson, W. F., & Schellenberg, E. G. (2002). Effects of musical tempo and mode on arousal, mood, and spatial abilities. *Music Perceptions, 20(2), 151-171.*

Insurance Institute for Highway Safety (2010). IIHS Status Report newsletter: Phoning while driving. Insurance Institute for Highway Safety.

Jaaniste, L. (2007). *Approaching the Ambient: Creative Practice and the Ambient Mode of Being*. (Unpublished Doctoral Dissertation) Queensland University of Technology, Queensland, Australia. Retrieved from http:// www. lukejaaniste.com/phd-text

Jameson, A.H., Westerman, S.J., Hockey, G.R., & Carsten, M.J. (2004). Speech based e-mail and driver behaviour: effects of an in-vehicle message system interface. Human Factors 46 (4), 625–639.

Jensen, B. S., Skov, M. B., & Thiruravichandran, N. (2010). Studying driver attention and behaviour for three configurations of GPS navigation in real traffic driving. In: CHI '10 Proceedings of the 28th international conference on Human factors in computing systems. ACM, New York, NY, USA.

Just, M. A., Carpenter, P. A., Keller, T. A., Emery, L., Zajac, H., & Thulborn, K. R. (2001). Interdependence of non overlapping cortical systems in dual cognitive tasks. *Neuroimage, 14,* 417–426.

Just, M. A., Carpenter, P. A., & Miyaki, A. (2003). Neuroindices of cognitive workload. *Theoretical Issues in Ergonomic Sciences, 4,* 56–88.

Kahneman, D. (1973). *Attention and effort.* Englewood Cliffs, NJ: Prentice Hall.

Kalliene, K. (2002). Reading news from a pocket computer in a distracting environment: effects of the tempo of background music. *Computers in Human Behavior, 18, 537-551.*

Kalsbeek, J., & Sykes, R. (1967). Objective measurement of mental load. *Acta Psychologica, 27,* 253–261.

Kantowitz, B. H., & Knight, J. (1976). Testing tapping time sharing: Auditory secondary task. *Acta Psychologica, 40,* 343–362.

Karmarkar N & Diwanji V (2012) *Exploring the Connected Car.* Cognizant Report 20-20 Insights.

Kenny, C. (2006). *Music and life in the field of play: An anthology*. New Braunfels, TX: Barcelona.

Kern, D., & Schmidt, A. (2009). Design Space for Driver-based Automotive User Interfaces. In: Proceedings of the First International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI 2009), Sep 21-22 2009, Essen, Germany.

Kieras, D. (2007). Control of Cognition. In W. Gray (Ed.), *Integrated models of cognitive systems* (pp. 327–355). New York: Oxford University Press.

Kittay, J. (2008). The Sound Surround: exploring how one might design the everyday soundscape for the truly captive audience. *Nordic Journal of Music Therapy. 17,* 41-54.

Klauer S (2007) Risky Behavior behind the Wheels Can Lead to Car Crashes at www.genins.com/2/11/14

Klauer, S. G., Dingus T. A., Neale V. L., Sudweeks J. D., & Ramsey D. J. (2006). The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data. Virginia Tech Transportation Institute, National Highway Traffic Safety Administration.

Konecni, V. J. (1982). Social Interaction and Musical Preference. In D. Deutsch (Ed.), *The psychology of music*. San Diego, CA: Academic Press.

Konkwo D (2003) *Principles, Concepts, Theories and Practice of Mass Communication*. Owerri: Concave publications.

Kramer, A. F., & Parasuraman, R. (2007). Neuroergonomics: Applications of Neuroscience to Human Factors. In J. T. Cacioppo, L. G. Tassinary, & G. G. Berntson (Eds.), *Handbook of psychophysiology* (3rd ed., pp. 704–722). New York: Cambridge University Press.

Kun, A., Peak, T., & Medenica Z. (2007). The Effect of Speech Interface Accuracy on Driving Performance. *Interspeech* 2007.

Lateef, Y (1987): *Hausa performing Arts and Music. Lagos:* Lagos Federal Ministry of Information and Culture.

Laughery, K. R., LeBiere, C., & Archer, S. (2006). Modeling human performance in complex systems. In G. Salvendy (Ed.), *Handbook of human factors and ergonomics* (3rd ed., pp. 965–996). Hoboken, NJ: Wiley.

Lee, J.D., Caven, B., Haake, S., & Brown, T.L. (2001). Speech-based interactions with in-vehicle computers. The effect of speech-based e-mail on drivers' attention to the roadway. *Human Factors 43, 631–640.*

Leibowitz, H., & Post, R. (1982). The two modes of processing concept and some implications. In J. Beck (Ed.), *Organization and representation in perception* (pp. 343–363). Hillsdale, NJ: Erlbaum.

Lesiuk, T. (2005). The Effect of Music Listening on Work Performance. *Psychology of Music,* 33(2), 173-191.

Liang, Y., & Lee, J. D. (2010). Combining cognitive and visual distraction: Less than the sum of its parts. *Accident Analysis and Prevention 42 (2010) 881–890.*

Liu, Y., & Wickens, C. D. (1992). Visual scanning with or without spatial uncertainty and divided and selective attention. *Acta Psychologica, 79,* 131–153.

Maciej, J., & Vollrath M. (2009). Comparison of manual vs. speech-based interaction with in-vehicle information system. *Accident Analysis and Prevention 41 (2009) 924–930*

Mattes, S., 2003. The lane-change-task as a tool for driver distraction evaluation. In: Strasser, H., Kluth, K., Rausch, H., Bubb, H. (Eds.), Quality of Work and Products in Enterprises of the Future. *Ergonomia Verlag, Stuttgart, pp. 57–60.*

McCallum, M. C., Campbell, J. B., Richman, J.B., Brown, J.L. & Wiese, E. (2004). Speech Recognition and In-Vehicle Telematics Devices: Potential Reductions in Driver Distraction. *International Journal of Speech Technology, 7(1), 25-33.*

McClellan, R. (1988): *The Healing Forces of Music*. Amity House Inc., New York.

Meyer, D. E., & Kieras, D. E. (1997). A computational theory of executive cognitive processes and multiple-task performance: Part 2. Accounts of psychological refractory-period phenomena. *Psychological Review, 104,* 749–791.

Milliman, R. E. (1982). Using background music to affect the behavior of Supermarket Shoppers. *Journal of Marketing,* 46, 86-91.

Milliman, R. E. (1986). The influence of Background Music on the Behavior of restaurant Patrons. *Journal of consumer Research,* 12, 286-289.

Mitchell, L. A., & MacDonald, R. A. R. (2006). An Experimental Investigation of the Effects of Preferred and Relaxing Music Listening on Pain Perception. *Journal of Music Therapy*, 43(4), 295-316.

Monsell, S. (2003). Task switching. *Trends in Cognitive Science, 7,* 134–140.

Moray, N. (1967). Where is attention limited? A survey and a model. *Acta Psychologica, 27,* 84–92.

Moray, N. (1979). *Mental workload: Its theory and measurement.* New York: Plenum.

Mume, J. (1973): *Traditional Medicine in Nigeria.* Agbarho: Jom Nature Cure Publisher.

Nantais, K. M., & Schellenberg, E. G. (1999). The Mozart effect: an artifact of preference. *Psychological Science,* 10(4), 370-373.

National Bureau of Statistics (2009). *Social Statistics in surveying 2009*. Federal Republic of Nigeria, pp 384 – 390.

National Population Commission, (2013). *Urban Report: Housing and Road Development.*

National Safety Council (2010). Understanding the distracted brain: Why driving while using hands-free cell phones is risky behavior. National Safety Council *a*t www.distracteddriving.nsc.org 27/10/14

Nattiez, J (1990). *Music and Discourse: Toward A Semiology of Music*. Carolyn Abbate, Translator. Princeton University Press. Pp. 48, 55.

Navon, D., & Gopher, D. (1979). On the economy of the human processing systems. *Psychological Review, 86,* 254–255.

Ndolo I (2005) *Mass Communication Systems and Society.* Enugu: Rhyce Kerex Publishers.

NHTSA National Highway Traffic Safety Administration (2010). Driving Distracted Stats and Facts Driving and Texting. U.S. Department of Transportation.

Nicola D and Victoria J. (2007) An exploratory survey of in-vehicle music listening *Psychology of Music* 2007 35: 571.

Nigerian Tribune (2014) at http://tribune.com.ng/news/news-headlines/item/20609-our-improved-road-networks-boosting-economy-onolememen 5/11/14

North, A. C., & Hargreaves, D. J. (1999). Music and driving game performance. *Scandinavian Journal of Psychology, 40, 285-292.*

North, A. C., Hargreaves, D. J., & McKendrick, J. (1999). The Influence of In-Store music on Wine Selections. *Journal of Applied Psychology, 84, 271-276.*

North, A. C., & Hargreaves, D. J. (2008). *The social and applied psychology of music:* Oxford University PressNorth, R. (1977). Task functional demands as factors in dual task performance. *Proceedings of the 21st Annual Meeting of the Human Factors Society* (pp. 367–371). Santa Monica, CA: Human Factors Society.

North, R., & Gopher, D. (1976). Measures of attention as predictors of flight performance. *Human Factors, 18,* 1–14.

Nyitor A & Shenge N (2010) Psychosocial Correlates Of Road Crashes In Ibadan, Nigeria. *2010 J Hum Ecol,* 31(3): 165-169 (2010).

Ojiakor 1 & Etodike C (2016) Development, Validation and Application of In-vehicular music communication Scale (IMC scale). *International Journal of Communication and Technology* (forthcoming).

Okunna, C& Omenugha K (2012) *Introduction to Mass Communication.* Enugu: New Generation Books.

Olayiwola, A.G (2010). Tackling Road Traffic Congestion in a developing country: A Contemporary Approach, *Journal of applied science Research, pp 529 – 542*.

Oldham, G. R., Cummings, A., Mischel, L. J., Schmidtke, J. M., & Zhou, J. (1995). Listen while you work? Quasi-experimental relations between personal-stereo headset use and employee work responses. *Journal of Applied Psychology, 80(5), 547-564.*

Olson, R. L., Hanowski, R. J., Hickman, J. S., & Bocanegra, J. (2009). Driver Distraction in Commercial Vehicle Operations. Virginia Tech Transportation Institute. U.S. Department of Transportation.

Ostun, S. (1988). Transport studies in Nigeria: A review from Odu: *Journal of West African Studies, pp 219 – 225.*

Opeyemi M & Opeyemi, D (2012) Understanding Of Traffic Signs By Drivers – A Case Of Akure City, Ondo State, Nigeria. *ARPN Journal of Science and Technology* VOL. 2, NO. 7, August 2012. ISSN 2225-7217.

Owuamalam, O (2012) *Elements of Broadcasting*. Owerri: Top Class Publishers.

Pashler, H. (1989). Dissociations and contingencies between speed and accuracy: Evidence for a two-component theory of divided attention in simple tasks. *Cognitive Psychology, 21,* 469–514.

Pashler, H. (1998). *The [Psychology of Attention.* Cambridge, MA: MIT Press.

Polson, M. C., & Friedman, A. (1988). Task-sharing within and between hemispheres: A multiple-resources approach. *Human Factors, 30,* 633–643.

Previc, F. H. (1998). The neuropsychology of 3-D space. *Psychological Bulletin, 24,* 123–164.

Prichard, C., Korczynski, M., & Elmes, M. (2007). Music at work: An introduction. *Group & Organization Management, 32(1), 4.*

Rakauskas, M. E., Gugerty, L. J., & Ward, N. J. (2004). Effects of naturalistic cell phone conversations on driving performance. *Journal of Safety Research 35 (2004), 453–464.*

Rauscher, F; Shaw, G.& Ky, C (1993). Music and Spatial Task Performance. *Nature, 365, 611.*

Regan, M. A., Lee, J.D. & Young, K. (2009). Driver distraction: Theory, Effects, and Mitigation. Boca Raton, Fla.: CRC Press.

Rentfrow, P. J., & Gosling, S. D. (2003). The Do Re Mi's of Everyday Life: The Structure and Personality Correlates of Music Preferences. *Journal of Personality and Social Psychology, 84(6), 1236–1256.*

Ruggiero T (2000) Uses and Gratifications Theory in the 21st Century. *Mass Communication & Society,* 2000, *3*(1), 3–37

Ruud, E. (2010). *Music Therapy: A Perspective from the Humanities*. New Braunfels, TX: Barcelona.

Salvucci, D., & Taatgen, N. A. (2008). Threaded Cognition: An Integrated Theory of Concurrent Multitasking. *Psychological Review, 115*, 101–130.

Sarno, K. J., & Wickens, C. D. (1995). The Role of Multiple Resources in Predicting Time-sharing Efficiency: An evaluation of three workload models in a multiple task setting. *International Journal of Aviation Psychology, 5*(1), 107–130.

Savan, A. (1999). The Effect of Background Music on Learning. *Psychology of Music, 27, 138-146.*

Schellenberg, E. G. (2005). Music and Cognitive Abilities. *Current directions in psychological sciences, 14(6), 317-320.*

Schögle B (1990) Music as a Tool in Communication Research. *Nordic Journal of Music Therapy*, Vol.7 (1), Pp 40-49.

Shek V, Schubert E (2005) Background Music at Work – A literature review and some hypotheses. *The Second International Conference on Music Communication Science, 3-4 December 2009,* Sydney, Australia.

Slawinski, E. B., & MacNeil, J. F. (2002). Age, music, and driving performance: Detection of external warning sounds in vehicles. *Psychomusicology, 18(1- 2), 123-131.*

Sogin, D. W. (1988). Effects of three different musical styles of background music on coding by college-age students. *Perceptual and Motor Skills, 67, 275- 280.*

Stige, B. (2002). *Cultured-Centered Music Therapy*. New Braunfels, TX: Barcelona.

Strayer D & Johnston W (2001) Driven To Distraction: Dual Task Studies Of Simulated Driving And Conversing On A Cellular Telephone. *American Psychological Society* Vol 12 No 6.

Strayer, D., & Drews, F. (2007). Multi-tasking in the automobile. In D. W. A. Kramer, D. Wiegmann, & A. Kirlik (Eds.), *Attention: From theory to Practice* (pp.121–133). New York: Oxford University Press.

Stutts, J. C., Reinfurt, D. W., Staplin, L., & Rodgman, E. A. (2001). The Role of Driver Distraction in Traffic Crashes. AAA Foundation for Traffic Safety.

Thompson, W. F., Schellenberg, E. G., & Husain, G. (2001). Arousal, mood, and the Mozart effect. . *Psychological Science, 12, 248-251.*

Trafton, J. G., & Monk, C. A. (2008). Task interruptions. In D. A. Boehm-Davis (Ed.), *Reviews of human factors and ergonomics* (Vol. 3, pp. 111–126). Santa Monica, CA: Human Factors and Ergonomics Society.

Tsang, P. (2006). Regarding time-sharing with convergent operations. *Acta Psychologica, 121*, 137–175.

Tsang, P., & Vidulich, M. A. (2006). Mental workload and situation awareness. In G. Salvendy (Ed.), *Handbook of human factors & ergonomics* (pp. 243– 268). Hoboken, NJ: Wiley.

Tugbodo, B. (2009). Road Development in Nigeria, *Journal of Transport Forum, 2009 Annual Forum.*

Ukwueze C (2014) *Internet usage pattern among academics in federal universities in South East Nigeria.* Unpublished Ph.D Dissertation submitted to the Department of Mass Communication, UNIZIK.

Ullmann, Y., Fodor, L., Schwarzberg, I., Carmi, N., Ullmann, A., & Ramon, Y. (2008). The sound of music in the operating room. *Injury, 39, 592-597.*

Unal, A (2013) *The Influence of Music and Radio on Cognitive Processes, Arousal and Driving Performance.* Netherlands: Lovebird Design and Printing Solutions.

Underwood M (1989) *Teaching Listening.* New York: Longman.

Vanguard (2014) Nigeria's road shame goes online on #MyRoadIsWorseThanYours. http://www.vanguardngr.com/2014/11/nigerias-road-shame-goes-online-myroadisworsethanyours/#sthash.hj5OzzHB.dpuf November 05, 2014.

Viega, M. (2010). Body listening as a method of understanding a music program used in the Bonny Method of Guided Imagery and Music. *Journal of the Association for Music and Imagery, 12*, 21-46.

Viega, M. (2013). *"Loving me and my butterfly wings": A study of hip-hop songs created by adolescents in music therapy* (Unpublished doctoral dissertation) Temple University, Philadelphia, PA.

Wang, Y., Mehler, B., Reimer, B., Lammers, V., D'Ambrosio, L. A., & Coughlin, J. F. (2010). The validity of driving simulation for assessing differences between in-vehicle informational interfaces: A comparison with field testing. Ergonomics, 53: 3, 404 — 420.

Wal, V (2007) *Evolutionary Change in Automotive Technology: Long Term Developments, Artefacts, Producers And Consumers.* Jena, Germany, October 18-19, 2007.

Warren, B. and Zack S. (2012) *Background music as a risk factor for distraction among young driver*. International Conference on Music Perceptions and Cognition and the 8th Terminal Conference of European Society for Cognitive Sciences in Music.

Wickens, C. D., & Hollands, J. G. (2000). Engineering psychology and human performance (3. Ed.). Upper Saddle River, NJ: Prentice-Hall.

Wickens, C. D. (2002). Multiple resources and performance prediction. *Theoretical Issues in Ergonomics Science, 3*(2), 159–177.

Wickens, C. D. (2005). Multiple Resource Time Sharing Models. In N. Stanton, A. Hedge, K. Brookhuis, E. Salas, & H. Hendrick (Eds.), *Handbook of human factors and ergonomics methods* (pp. 40.1–40.7). Boca Raton, FL: CRC Press.

Wickens, C. D. (2007). How many resources and how to identify them? Commentary on Boles et al. and Vidulich and Tsang. *Human Factors, 49,* 53–56.

Wickens, C. D., Dixon, S. R., & Seppelt, B. (2005). Auditory preemption versus multiple resources: Who wins in interruption management? In *Proceedings of the Human Factors and Ergonomics Society 49th Annual Meeting—2005* (pp. 463–467). Santa Monica, CA: Human Factors and Ergonomics Society.

Wickens, C. D., Dixon, S. R., & Ambinder, M. S. (2006). Workload and automation reliability in unmanned air vehicles. In N. J. Cooke, H. Pringle, H. Pedersen, & O. Connor (Eds.), *Advances in human performance and cognitive engineering research: Vol. 7. Human factors of remotely operated vehicles* (pp. 209–222). Amsterdam: Elsevier.

Wickens, C. D., & Colcombe, A. (2007). Dual-task performance consequences of imperfect alerting associated with a cockpit display of traffic information. *Human Factors, 49,* 839–850.

Wickens, C. D., & McCarley, J. (2008). *Applied attention theory.* Boca-Raton, FL: Taylor & Francis.

Wiesenthal D, Hennessy D & Totten B (2000) The Influence Of Music On Driver Stress (2000**)** W. *Journal Of Applied Social Psychology,* 2000, 30, 8, Pp. 1709-1719.

World Health Organization (2004): *World Report on Road Traffic Injury Prevention.* Geneva: WHO Library Cataloguing.

Wolvin, Andrew D. "Listening, Understanding, and Misunderstanding." *21st Century Communication: A Reference Handbook.* Ed. . Thousand Oaks, CA: SAGE, 2009. 137-47. *SAGE Reference Online*. Web. 29 Jun. 2012.

Zhang, H., Smith, M. R. H., & Witt, G. J. (2006). Identification of Real-Time Diagnostic Measures of Visual Distraction With an Automatic Eye-Tracking System. Human Factors, Vol. 48, No. 4, Winter 2006, pp. 805–821.

Zhang, H. & Wei, L. N. (2010). Speech Recognition Interface Design for In-Vehicle System. Proceedings of the Second International Conference on Automotive User Interfaces and Interactive Vehicular Applications (Automotive UI 2010), November 11-12, 2010, Pittsburgh, Pennsylvania, USA.