The influence of Emotional Intelligence on Driving Behavior in the Transportation Sector: A literature review

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Abstract

The spate of road accidents in transportation sector around the world is so worrying that, it is imperative to look into the behaviour of drivers. One key factor that influences the behaviour of drivers is emotional intelligence. The objective of this paper is to give a systematic review of literature on the relationship between emotional intelligence and driving behaviour. The results show that, different emotional states of drivers have different effects on the behaviour of drivers. Many of the findings show that, risky driving behaviour is more associated with high emotional states. Since the emotional states of drivers affect their behaviour, it is imperative that, transport companies track the emotional states of drivers at the time they are scheduled to drive. In addition, management of all transport companies and organisational policies should consider emotional intelligence as important since emotional intelligence training programs could enhance emotional intelligence.

Keywords: Emotion, emotional intelligence, errors, violations.

Introduction

Transportation sector plays an important role in the growth and development of every country aiding in the allocation of wealth and boosting trade (Wang et al., 2018). In several countries all over the world, the transfer of people, goods and services is principally contingent on transportation (Obiri-Yeboah et al., 2021). Theoretically and empirically, there exist a direct association between economic growth and transportation and is critical for the prosperity of all nations (Yeboah and Asibey, 2019). Transportation is the transfer of people and goods from one place to another (Solomon et al., 2021) and is the backbone of every economy not excluding Ghana.

Despite the role of road transportation, it is plagued with several challenges including accidents and deaths. Research indicates that road transport is the highest cause of unnatural deaths (Konkor et al., 2019; Osei et al., 2019) affecting both life and property. According to Manuhwe

et al. (2021), almost all accidents occurring in the petroleum business happen during transportation. There are many existing and potential sources of accidents on the road (M'bailara et al., 2018). These factors are classified in to exogenous such as alcohol or drugs consumption and endogenous for instance the behaviour of drivers (M'bailara et al., 2018).

It is recognized that, driving behaviour plays a key part in road accidents and deaths (Chu et al., 2019; Hung, 2018; Hay et al., 2017; WHO; 2018) most especially car drivers (Teye- Kwodjo, 2019). Research shows that, human errors account for about 90% of road accidents that occur world wide of which drivers are liable for about 78% of road accidents that occur (Verma et al., 2016; Chu et al., 2019). The driving style of many drivers such as risky driving behaviour is significantly responsible for many accidents that take place (Trepáčová, et al., 2019). Physiological and psychological variables such as gender, experience, age and emotions influence the behaviour of drivers (M'bailara et al., 2018). Emotional intelligence is a type of intelligence that influences the behaviour of drivers and has drawn the attention of researchers (Smorti et al., 2018). Emotional intelligence which is explained as the capacity of a person to recognise, identify, use, express as well as regulate his own and others emotions (Dugu´e, Sirot, and Dosseville, 2021) has proven empirically to influence driving behaviour. The relationship between emotional intelligence and driving behaviour has obtained great attention in the aspect of risky and aggressive driving behaviour most especially in the context of young drivers (Wright and Silberman, 2018; Watson-Brown et al., 2019; Ersan et al., 2019).

The role of emotional intelligence on driving behaviour is so enormous and therefore the need for this literature review. This reviews aims to present research studies about emotional intelligence on many aspects of life including driving behaviour. Studies suggest that, research on the relationship between emotion and the behaviour of drivers use more experiments or stimulator study method than other methods (Bowen et al., 2020). However, this paper reviews research studies from both experiments and other research methodologies such as survey. Synthesis on the information about emotional intelligence and driving behaviour will enable us to understand the effect of emotional intelligence on the behaviour of drivers. Different viewpoints and recommendations would be put across that would aid in the operation of training in programs on emotional skills development.

Concept and definition of emotional intelligence

The concept of emotional intelligence is associated with both emotions and intelligence (Salovey and Mayer, 1990; Bibi et al., 2020). Emotions are organised responses that crosses the borders of numerous psychological subsystems, comprising cognitive, physiological, experiential, and motivational systems (Salovey and Mayer 1990:196). Emotion can be negative or positive (Makkar and Basu, 2019). Positive emotions are acceptable and gives rise to positive outcome whereas negative emotions are emotions that are unfavourable such as stress, guilt, sadness and fear (Makkar and Basu, 2019). Controlling emotions intended for positive benefits involves being intelligent, which is a measure of the capability to monitor and control a person's mental processes in a way that displays positive reaction to every circumstances (Nightingale et al.,

2018). Intelligence is the ability to receive and process vital data from diverse sources in addition to bringing out meaningful results (Nightingale et al., 2018).

Emotions are great source of data and thus affect decision making and individuals' actions, thinking, behaviour or communication and so the ability to control one's emotions and that of others have a significant impact on one's life (Jan et al., 2019). Salovey and Mayer (1990), brought about the ability model of emotional intelligence as a term, however, it was widely made known by Goleman (1995) in his book termed Emotional intelligence: Why it can matter than IQ (Jan et al., 2019; Makkar and Basu 2019; Nightingale et al., 2018).

There are two main models of emotional intelligence, which entail the trait model and the ability model (Mayer et al., 2008; Mayer and Salovey, 1997; Bar-On, 2006). The ability model which can be traced to Salovey and Mayer (1990) is defined as the ability to monitor one's own and other's emotions, and to discriminate among them and to use this information to guide one's thinking and action (Salovey and Mayer, 1990; Mullen et al., 2018). The ability model stresses actual emotions and the means by which it associates with reasoning (Bili et al., 2020). The ability model stresses emotional intelligence as an intellectual ability that entails the mental processing of information to control a person's emotions and others (Zhoc et al., 2017; Di Fabi and Saklofske, 2021). The ability model perceives emotional intelligence as the ability to recognize accurately, appraise as well as express emotion, generate emotional state; the capacity to comprehend emotional knowledge and emotion as well as the capacity to regulate emotions and stimulate emotional ability coupled with intellectual growth (Mayer and Salovey, 1997). The ability model consist of four dimensions which include; awareness of emotions, emotional facilitation of thought, interpretation and examining emotions, as well as the regulation of emotions (Mayer and Salovey, 1997). The classification of these dimensions are in order of importance such that the most important ones come first.

Trait emotional intelligence originated from Petrides and Furham (2001). It explains the non-cognitive competences of individuals that aids them in their societal world (Petrides and Furham, 2001). Trait emotional intelligence model labels emotional intelligence as a collection of distinct self-perceptions and comprises behavioural disposition that are connected to the personality of a person (Petrides and Furnham 2001). Trait emotional intelligence is a stable, distinct group of emotion connected adaptive and self-perceptions emotional dispositions (O'Connor et al., 2017). Furthermore, trait emotional intelligence consist of a group of personality traits and social skills (Bar-On, 2006). Traits of individuals make up emotions and a person's personality traits. A person's personality relates to traits emotional intelligence. The individual would exhibit these traits in daily working life. Other dimensions of trait emotional intelligence include empathy such as; assertiveness, self-esteem, adaptability for instance problem solving; general mood components, intrapersonal skills and stress management (Bar-On, 2004). Some emotional intelligence traits that can be learned play a key role in the social and professional life of

individuals (Arain et al. 2021). It is thus imperative that measures are put in place to develop individual's emotions.

The concept and definition of driving behaviour

Driving remains a psychomotor ability since it consists of bodily movement and cognitive task. Driving may take several forms. Whichever technique the driver uses is contingent on whichever driver that is concerned, his or her psychosomatic make-up, in addition to his behaviour (Han and Zhao, 2020). Driving refers generally to every behaviour carried out by a driver in relation to the aim of moving from one destination to another which involves the control of a vehicle (Sagberg et al., 2015). Driving behaviour is normally a model selected by the driver when driving which entails the speed with which the driver drives, and the standard distance maintained by the driver (Falahi and Goudarzi, 2015). Driving behaviour is a complex model that shows exactly how a driver controls a car at the setting of driving and environment (Elassad et al., 2020). Driving comprises a specific style or skill used by a driver at a specific given place or time. Individually, a driver may select a particular standard of driving that may consist of a level of speed, or attentiveness on the road when driving (Falahi and Goudarzi, 2015).

Driving behaviour is associated with driving style, or expresses a generally stable manner of driving which consist of a technique of driving (Sagberg et al., 2015). Driving behaviour is thus a method a driver may choose to drive. Driving behaviour includes the method by which drivers regularly drive comprising their extent of mindfulness, and rate of driving (Özkan and Lajunen, 2005). Driving behaviour might involve putting on the wrong or right acts at a specific period. Sagberg et al. (2015:1252) indicate that, the notion of driving behaviour takes account of every bit of activities or actions (overt and covert acts) a driver makes in the course of driving by way of relocating from one destination to another. The style with which a driver drives depends on the particular driver or the circumstance within which he drives (Bowen et al., 2020).

Different drivers may have different motives for driving in certain ways. Some drivers may be driving in a certain manner as a reaction to circumstances; some drivers do so to please others whilst some may just feel happy when they speed or tailgate whilst others may love to drive very slowly. Whatever motive the driver takes, it is imperative to note that, there will always be consequences that could be positive or negative. Chen et al. (2019) also clarify that, driving behaviour is the reaction of drivers to different driving situations. You et al. (2020), explain driving behaviour by categorising it in to mobile phone use, speeding, wrong overtaking, tailgating, and violating traffic lights.

Different scholars have categorised driving behaviour differently. Bernstein and Calamia (2019) classifies driving behaviours in to aggressive driving, perceived aggressiveness, reckless driving, and negative driving connected to emotion. Other researchers have identified broad classification of driving behaviour such as aberrant driving behaviour and positive driving behaviour (Song et al., 2021; Han and Zhao, 2020). Risky driving behaviour is also aberrant driving and includes

errors and violations (Chen et al., 2019). Errors and violations are aberrant since they are behaviours that deviate from normal driving regulations.

Reason et al. (1990) categorised driving behaviour in to violations and errors. The inability to carry out intended activities in order to attain the greatest result describes errors (Chu et al., 2019). Errors thus arise due to several factors such as the drivers' mind or other mechanisms. Errors expose mistakes made by drivers during driving that includes the handling of information, attention, perceptual capabilities, misjudgement, or observation failures (Sârbescu and Maricutßoiu, 2019; Huang et al., 2018). Errors are the failure of planned actions to achieve their intended consequence, which is sub divided in to lapses or mistakes and slips (Reason et al., 1990). Errors that take place due to loss of memory are lapses whilst errors that happen because of attention failure are slips (Özkan and Lajunen, 2005).

Slips and lapses are dangerous errors that could hurt different road users (Stephens and Fitzharris, 2016). However, both lapses and slips signify unconscious divergence from intention (Reason et al., 1990). Errors can also lead to mistakes. Mistakes are intention breakdown (Sani et al., 2017). Mistakes are the actions that deviate from intended actions from satisfactory path towards anticipated goal (Reason et al., 1990). The intention of different drivers vary and it might not be easy for drivers to meets intended targets thus, resulting in mistakes at certain times during driving.

An additional driving behaviour made known by Reason et al. (1990) is violations. Violations are psychological qualities that influence driving. Violations are described as deliberate deviation from non-dangerous driving habit or practices that are supposed to sustain the safe control of possibly harmful system (Mohamed and Bromfied, 2017; Huang et al., 2019; Song et al., 2021). Violations entail operating techniques, norms, rules or codes that are described as social in quality (Reason et al., 1990). In addition, other driving behaviours are positive. Özkan and Lajunen (2005), note that, positive driving behaviours are behaviours that are supportive to other drivers in line with road safety. Drivers who exhibit positive driving behaviours are concerned about other drivers and their environs thus, being polite and giving assistance to other road users (Han and Zhao, 2020). According to Chu et al. (2019:120), the main aim of positive driving behaviour is to assist as well as be kind to road users and to maintain the traffic environment devoid of safety concerns.

Driving behaviour and Emotional Intelligence
Driving is a difficult task that involves the use of muscles as well as connection of the psychological part of a person in driving. Driving is a difficult, intricate, uncertain job that, emotions will be able to have an enormous consequence on (Jeona, 2015). According to Verma et al. (2017), because of the psychological structure of driving, it involves the association between stimulus and response. A psychological feature of individuals, which has a sensitive and countless impact on aspects of people including drivers' behaviour, is emotion. Emotion can occur at any specific point during driving. Scote-Parker (2017) notes that, emotion can manifest

before, during or after driving and specific setting could generate emotions that have emotional impact on drivers' choices during driving.

The degree of emotion as well as state of that emotion for instance, sadness, anger, aids in regulating the efficacy of drivers. Emotion can display in physiological reactions to difficulties and this may take place throughout driving just as other activities (Chen et al., 2019). Various drivers have diverse emotional states that affect their method of driving and the degrees of road accidents that happen (Wang et al., 2019) since differences in driving behaviour can influence drivers' way of driving. Various emotional states may thus influence driving differently. This is because people vary in terms of how they react to situations. Watson-Brown et al. (2019) stated that emotion influences drivers because of its impact on the degree of individual control. The goal, target, or intention of a driver thus, affect the method of driving with the effects therein. Emotion is thus a vital factor that has an effect on driving behaviour (Zhang et al., 2020). Researchers have used various psychological variables on emotion to link up with various aspects of driving behaviour within different countries around the world (Trepáčová et al., 2019; Zhang et al., 2018).

However, the effect of emotion on driving might be contingent on whether emotion is negative or positive. Smorti and Guarnieri (2016) note that, negative emotion is associated with impatience, frustration or anger, is associated with driving. Such negative emotions might likewise cause unsafe driving behaviour. Negative driving behaviour comprises tailgating, running red lights or over-speeding (Scott-Parker, 2017). In addition, harmful behaviour by drivers explains about 95% of road traffic accidents (Zhang et al., 2018) and the means by which drivers are capable of managing their emotion in order to prevent risky driving is very important for the safe arrival of drivers. Emotional control of one's self as well as others is imperative in driving situations.

The capacity of drivers to prevent traffic accidents hinge on the control of drivers' emotional status (M'bailara et al., 2018). A study on 117 taxis drivers in Mashhad in Iran established that, emotional regulation predicts driving errors (Sani et al., 2017) implying that, having trouble in regulating emotion might worsen dangerous driving behaviour. The options of drivers are considerably predisposed to their emotional situations for instance anxiety or fatigue (Pascalidis et al., 2019). Drivers who are in these conditions of driving will definitely not do well in driving as equalled to drivers who turn out to be emotionally stable. Emotionally stable drivers happen to be very cautious in driving and do not involve in undesirable driving behaviours (Sârbescu and Maricuţoiu, 2019) since such drivers are able to comprehend, control and manage their own and others' emotions when they are driving and come in to contact with situations that may be undesirable involving themselves and others.

One key form of emotion that influences work outcomes as well as driving behaviour is emotional intelligence (Hayley et al., 2017). Emotional intelligence performs a function in driving as the mishmash of feelings and intellect aids a person to solve sensitive problems.

Present literature has stressed the position of emotional intelligence in bringing about efficacious outcomes at work (Khosravi et al., 2020). The term emotional intelligence obtained importance in numerous circles of life owing to its impact and significance. According to Liaqat et al. (2021), emotional intelligence is a vital factor affecting the professional performance of people at work. Since the introduction of emotional intelligence, it has gained significance in the life of several people at work (Chermack et al., 2020) such as drivers (Hayley et al., 2017), employees (Balogun et al., 2018), and students (Bibi, et al., 2020; Wang, 2020), affecting their behaviour and output of work (Hayley et al., 2017).

Emotional intelligence is fantastically essential in work situation of drivers as it has an effect on the behaviour of drivers at work (Smorti et al., 2018). Emotionally intelligent persons are capable of communicating properly, interrelating well with individuals as well as being successful at the work environment (Mugha et al., 2017). Emotionally intelligent individuals are capable of regulating their own emotions as well as other persons since emotional intelligence permit such persons to have sound mind to work. The four-branch model of Mayer et al. (1999) as well as Wong and Law (2002) concept of emotional intelligence, with Wang et al. (2020) findings on a study which tested and confirmed an eighteen hour programme for explaining emotional literacy, students capacity to understand and appraise whatever they felt improved. In addition, Wang et al., (2020) study concluded that, emotional intelligence promotes innovation and thoughtfulness, understanding, perception of other individuals' emotion, as well as manage emotions and solve problems. Thus, emotional intelligence training in people can help people deal with stressful situations bothering them and to work effectively in order to increase output. Similar empirical studies have related different dimensions of emotional intelligence to driving behaviour and have used moderators and mediators in their studies. In a lot of the research, diverse outcomes have resulted. Smorti, Andrei and Tromboni (2018) in their survey, have considered the association between trait dangerous driving behaviour and emotional intelligence of Italian university students and used social desirability as a moderating variable that has a contingency effect on driving behaviour and emotional intelligence. Beanland, Sellbom and Johnson (2014) have related personality domain with self-reported aberrant behaviour and concluded that, personality domains such as antagonism, and negative affectivity predicted violations (ordinary and aggressive), errors and lapses. In addition, Zhang et al. (2019) establish that, safety motive has a significant influence on violations, errors, and lapses of drivers.

In addition, the use of experiments such as stimulator study is very common on studies in driving behaviour and emotions. A study by Steinhauser et al. (2018) showed that, negative and positive emotions affect the behaviour of drivers and emotional states such as happiness, calm and anger. Pattern of music and autobiographical imagination within driving stimulator generates negative and positive emotions (Steinhauser et al., 2018). Kadoya et al. (2021), study confirms the effect on emotions on the behaviour of drivers using a biometric device to tract the emotional states of taxi drivers, indicating that, negative emotions such as sadness and anger have significant effect of the behaviour of drivers (Bowen et al., 2020)..

Additionally, Zhang et al., (2020) have explored the effect of emotional state on the behaviour of drivers using stimulator and thus, using thirty-five licensed drivers and have observed and concluded that, drivers who are in emotional states are more dangerous than drivers in neutral states. Arnau-Sabatés et al. (2012) also in their study on emotional abilities and risky driving in a self-reported drivers' attitude, which consisted of fifty-one (51) women plus one hundred and twenty-six (126), recognized that, emotional intelligence significantly correlated with risky driving attitudes. In line with behaviour arising from emotion, emotionally charged drivers make poor choices since emotions affect risk attitude and risk perception that play a part in poor risky driving behaviour as problems in regulating emotion is related to risky driving behaviour (Scott-Parker, 2017).

A stimulator study by Roidl, Freshse, and Höger (2014) indicate an influence of emotion and anger on drivers' behaviour such as strong acceleration ($\beta=0.22$) and increase speed ($\beta=0.31$). Hayley at al. (2017) studied the relationship between emotional intelligence and driving behaviour of 179 adults who had valid drivers' license using a survey that is Swinburne University Emotional Intelligence Test (SUEIT). Hayley at al. (2017) results concluded that, risky driving was associated with higher levels of expression and recognition of emotions ($p < 0.05$: $R^2 = 7.3\%$) whilst emotional control and age predicted negative emotions ($F_{(6, 172)} = 6.41$, $p < 0.05$: $R^2 = 18.3\%$). Studies in general indicate that emotional intelligence plays a key role in the behaviour of drivers by altering their mood and feelings.

Conclusion

This review looks at the effect of emotional intelligence on driving behaviour. This paper consist of five sections. The first section introduces the topic, following from that is the abstract, which summarises the paper. Concept and definition of emotional intelligence as well as the concept and definition of driving behaviour proceeds the abstract. The review then looks at emotional intelligence and driving behaviour. The role of emotional intelligence is explicit in the literature review. The review reveals that drivers in emotional states are more dangerous on the road than individuals who are not. In terms of methodology, many of the literature reviewed were empirical studies. Whereas some researchers used survey with self-reported questionnaire, others made use of experiment consisting of stimulator study.

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