

Driver's indirect aggression and stress level's effect on driving behaviour

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Declaration

Declaration

'I declare that this thesis that I have submitted to Dublin Business School for the award of BA (Hons) Psychology is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted for any other degree.'

Signed: Adam Flood

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Abstract

This study examined the relationship between stress and indirect aggression on driving behaviours. These variables were investigated as there was lack of research to examine this. Gender, and age were also examined in other analyses. A total of 84 participants completed the questionnaire and results of the questionnaires were investigated. The study was a cross-sectional, correlational study, which used survey research to examine the hypotheses. The results of a Pearson's r correlation determined no significant result of the relationship between stress and indirect aggression on driving behaviours. Of the two independent samples T-tests that were run, one was found to be partially significant, with use of malicious humour (a sub-scale of indirect aggression) being identified to be higher in males than in females.

1. Introduction

Driving is a part of life for many people, whether it is being a passenger while someone else drives or actually driving oneself. It is a necessity for some people who may live where there is lack of public transport and also for the freedom, and also accessibility to places which may be difficult to get to without use of a vehicle. The process of obtaining a vehicle and the credentials to legally drive is not quick or easy, with the potential driver having to wait till they are 16 years old to complete the theory test and then waiting till they are 17 years old to drive with a provisional driver.

Numbers of individuals receiving their full licenses has been rising since 2009 with numbers rising substantially since 2013 by forty thousand to fifty thousand every year since 2013 (2016 - 2,570,871) (2017 - 2,620,014). Compared to maximum rises in numbers of full licenses from 2009 - 2013 being twenty thousand (2012 - 2,413,936) (2013 - 2,414,293). While provisional licenses have been rising steadily since 2013 with a slight drop in 2017 of three thousand less than 2016 (2016 - 249,657) (2017 - 246,148) (CSO, 2018).

With this rise in drivers there has also been a rise in instances of road rage. In responses to a survey of over 4000 Irish motorists by the AA, it was found that 31.2% strongly agreed that motorist behaviour had worsened in the last few years. A further 35.21% of those surveyed partially agreed that this was the case (Aldworth, 2018). A survey by the AA in 2011 of 10000 drivers who had admitted to road rage behaviour in the past three years found that 50% of drivers had excessively beeped their horn with 48.1% admitting to making rude

gestures at other drivers. 20% admitted to deliberately tailgating to show frustration. 19.1% admitted to rolling down their window and shouting at another driver and 5.3% admitted to getting out of their car and confronting another driver (O'Neill, 2011). This survey also found that male drivers were more likely to lose their temper when compared to female drivers, with 22.5% of male drivers admitting to rolling down their window to shout at someone when compared to female drivers at 12%. This data shows how common road rage is and the differences between Irish male and female drivers. The importance of research into what causes these behaviours and statistics behind these behaviours to reduce the frequency of the behaviours. Stress, indirect aggression, and driving behaviour have been chosen for this study.

1.1: Behaviour

Behaviour is all of what a living organism does, even thinking and feeling. This behaviour produces a consequence, depending on what type of consequence occurs, the behaviour can be strengthened or weakened. These consequences serve to build a behaviour repertoire. This theory was mainly supported by B.F. Skinner who proposed the natural-science perspective to human behaviour. Stating that behaviour was decided by observable and measurable processes. Behaviourism saw genes as playing a minor role in outward behaviour, with behaviour also being manufactured by environment. This view of behaviour rejects that behaviour is determined by thoughts, intentions, and feelings. Skinner broke these selection of behaviour over consequences down into three sections, the first is related to reproduction and survival for genes selection over generations, the second is the selection by operant conditioning or what is learned over the organisms life cycle, and finally the selection for behaviour patterns which is related to practices, traditions or rituals which endure beyond life cycle of single organism (Skinner, 1963).

Some of Skinner's most important work was on operant conditioning, which discussed self-control, thinking and social behaviour. From this work Skinner theorised that punishment is not effective for behaviour control and stated that positive reinforcement was a much more beneficial way of changing behaviour. Skinner then also wrote at length about teaching and learning and theorised that academic performance of students could be significantly improved by the use of personalised positive reinforcement.

1.2: Indirect Aggression:

Indirect Aggression is the use of behaviours such as gossiping, social exclusion and spreading rumours causing the victim's social status or self-esteem to be damaged.

Aggression is usually viewed in terms of direct-aggression with it being shown verbally or physically such as insults and punching or hitting.

This differentiation between direct and indirect aggression was investigated in a number of studies such as (Vaillancourt et al., 2002) and (Crick & Grotpeter, 1995). A study by Card et al., (2008) found that correlation between direct and indirect aggression to be very high with this correlation being higher among males rather than females. Card et al., (2008) also found in a meta-analysis that direct and indirect aggression are separately associated with different psychological disorders or problems. With direct aggression being associated with conduct and ADHD problems, whereas indirect aggression was more associated with depression and anxiety with gender not moderating these associations. However, as this study is not longitudinal and because of this, does not show enough evidence to assume developmental association of the different types of aggression with psychological disorders.

A study by Lundh et al (2014) which looked into direct and indirect aggression in adolescents and its associations with psychological difficulties. This study required participants to answer questionnaires as part of a two-wave longitudinal study with a one-

year interval. This study found that boys and girls mismatch in their tendency to engage in direct or indirect aggression. The study does confirm Card et al.'s (2008) study with results finding that indirect and direct aggression show higher correlations in boys than in girls. This study also found that boys and girls faced different developmental ramifications from direct or indirect aggression. With the study concluding that direct aggression was specifically related with conduct problems in boys, whereas indirect aggression was specifically related with conduct problems in girls. This study however does not take reactive and proactive functions of aggression into account, which is important to decipher whether the aggression is malicious or just from reaction to aggression from an outside source.

1.3: Stress:

Studies into the area of stress usually look into where stress comes from, whether it is a result of work, college, friends, relationships and so on. Stress does not necessarily have to come from stressful life experiences but can also be experienced during daily life (Turner et al., 1995).

Stress is also not experienced or coped with in the same way with every individual, cognitive and physiological responses differ from person to person who experience stress.

Stress is also relevant in terms of social roles, with occupying a role determining a range of possible stressful experiences due to being vulnerable to stressors and averts other stressors (Aneshensel & Pearlin, 1993).

With stress comes coping, coping is the behavioural and cognitive process used to manage particular external and internal requirements that have been processed to take too much or over use the resources of the individual (Lazarus & Folkman, 1986). The process of coping comes with two main functions, regulating stressful emotions and the changing of the

person-environment relation that is creating the distress (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

Coping can be used in either a problem-focused way, by using behavioural and cognitive attempts to alter or eliminate the stressful situation. Or coping can be done in an emotion-focused way, this involves attempting to control emotional responses to the stressful situation (Folkman & Lazarus, 1980).

1.4: Driving Behaviour

Driving behaviour can be categorised mainly by exposure, driving style, and driving skills (Laapotti, 2003). Exposure is the degree in which a driver presents him/herself to traffic and the likelihood of being involved in an accident. This exposure is broken down into quantity (amount of driving) and quality (e.g., where, when, why, road conditions, weather, all of these are factors in which the driving was taking place) (Laapotti, 2003).

Driving style involves individual driving habits, (e.g., the way a driver decides to drive (Elander, West & French, 1993). This is usually measured by the driver behaviour questionnaire by Reason, Manstead, Stradling, Baxter, and Campbell (1990). The DBQ aims to define the differences between violations and errors, and was also extended in 2006 to include driver behaviours (Özkan & Lajunen, 2005). Errors in terms of the DBQ are “failure of planned actions to achieve their intended consequences that can involve the unwitting deviation of action from intention (slips and lapses) or departure of planned actions from some satisfactory path toward a desired goal (mistakes)”. Violations are referred to as “deliberate deviations from those practices believed necessary to maintain the safe operation of a potentially hazardous system”.

Driving skills highlight maximum level of driving ability, what skills a driver can do rather than the skills they generally use (Elander et al., 1993). These skills can be put into two categories, defensive driving and technical driving skills (Spolander, 1983).

1.5: Stress and Driving

Driving stress alludes to responses which work in conjunction with perception and evaluation of driving as dangerous or challenging in relation to the driver's skill of driving (Gulian et al., 1989). Driver stress can occur even while performing innocuous driving tasks. It is hypothesised by some researchers that stress is exacerbated by being in a car, due to not having the ability to outlet this stress, as we cannot use our flight or fight responses. Due to this lack of outlet the result is road rage (Kennar, 2012). An investigation into the numerous studies of acute physiological stress responses to driving were undertaken in 2017. This investigation found through analysis of quantitative research that driving over a long period of time elicits a stress response, but with insufficient evidence being found to draw the same conclusion for short term driving. This conclusion was drawn from analysis of 28 manuscripts with the strongest evidence being increases in urine catecholamine and cortisol during driving for long hours (Antoun et al., 2017).

A study of the effects of stress on the driving abilities of paramedic students investigated driver performance through use of a driving simulator. The students had to perform the driving ability assessment, they were then exposed to a stress inducing medical scenario, they then repeated the driving assessment. The number and types of errors were recorded and compared. The results found that there was no increase in overall error rate before and after the stress inducing scenario. But increases in critical driving errors were demonstrated by participants. These included failures to use a seat belt, failure to stop at red lights and stop signs, and loss of control of the vehicle. This study shows evidence of being exposed to stressful scenarios results in critical driving errors (Duncliffe et al., 2018).

1.6: Gender

Men are reported as being much more aggressive drivers than women. A study by David Shinar & Richard Compton used an observation design to determine aggressive behaviour, individual differences and congestion. Measurements of aggressive driving were honking of horn, the length of the use of the horn, cutting into other lanes in front of other vehicles in multi-lane or passing lane instances, and passing by using the shoulder and cutting in. This study found that males were approximately twice as likely to commit aggressive behaviour while driving compared to females. This study is flawed in a way as it is from the group's perspective who are looking for aggressive behaviour and may be generalising some behaviour as aggressive when it may not be. This study is also flawed by its use of speculation in analysis of the findings, such as when trying to decipher why passenger vehicles cut across lanes more than commercial vehicles the author suggests it could be due to the larger size of commercial vehicles (Shinar et al., 2004).

A study of gender effects in young road users on road safety attitudes, behaviours and risk perception by Cordellieri et al., (2016) examined road safety attitudes of 2681 young drivers through use of questionnaire. Females were found to be less involved in alcohol-related crashes and speeding-related crashes. The study also highlighted that men and women have the same perception toward risky or dangerous driving situations, however women only showed concern toward perceived risk, compared to men who did not show concern toward perceived risk.

1.7: Age

Driving behaviour in terms of age has been investigated through multiple studies. One study which investigated mental workload when driving in a simulator, and the effects of age and driving complexity. This study used reaction times to measure the workload of the

participants. This study used two groups, one group was age range of 20-29 and the other was 60-69. This study used a sample from Korea and a sample from the USA. These groups were required to drive on average more than twice a week. With this study finding that younger drivers had faster reaction times when compared to older drivers in the study with this effect being exacerbated by more complex situations such as overtaking. The study found that younger drivers administered less performance errors than the older drivers also. This study can be critiqued however as the situation was without distraction due to the use of a simulator instead of a real driving situation. This study can also be critiqued as participants would be attempting to drive to the safest and best of their ability due to the environment in which the driving was being performed (Son et al., 2010).

Indirect aggression in terms of age studies are mainly investigated in children with Björkqvist et al., (1992) developing both theory of direct and indirect aggression. This theory stated that through cross-sectional evidence that from eight to eleven years old indirect aggression increases with indirect aggression then decreasing until eighteen years old. A review of indirect, relational, and social aggression by Archer et al., (2005) reviewed age differences in indirect aggression with a study by Walker, Richardson and Green (2000) finding that direct aggression was less common in an older age sample of ages 55 to 89 than in samples of young adults such as a study by Green et al., (1996). With the age range showing decline of indirect aggression with age. With this review also finding that indirect aggression occurs at every range studied so far (Pre-school to old age) (Archer et al., 2005).

A study was examined which investigated age and gender differences in risky driving, this study used a phone survey of 504 teen and 409 adults in Alabama to examine relationships among risk perception, positive affect, and risky driving. Results of this study found that teen drivers were consistently more likely to report both enjoying risky behaviours, and also perceiving the behaviours as less risky than older counterparts. This

study did use a convenience sample of targeted households which were likely to have teenagers, which would not be a true representation of teen drivers. This sample is also only from one state, which could skew results as driving laws and enforcement may not be as well enforced as in other states (Rhodes et al., 2010)

1.8: Rationale

Driving behaviour is important to this study as the driving behaviour survey will be used to determine how dangerous or how experienced/inexperienced the individual is. This survey will give a considerable amount of information which can be compared to the demographic of the individuals taking the survey. For example, to determine whether younger drivers with more driving experience are more dangerous than older drivers with less experience. It will also be used to compare driving situations and what driving behaviours young drivers use the most and which situations occur the most or least.

Indirect aggression is important to this study as research is lacking in this area with most studies relying on direct aggression instead of indirect. With most studies of indirect and direct aggression being undertaken in recent years.

With a cultural shift in Ireland putting emphasis on talking about issues and mental health. Websites like spunout.ie being established in 2004 and alustforlife.com being established in 2015, these websites focus on providing support to those feeling emotional distress, stress, anxiety, suffering from bullying. Indirect aggression is hard to measure as it is done through spreading rumours or gossiping rather than using direct aggression like hitting, physical insults and so on. The emphasis on mental health will allow people of all ages to talk about being victims of indirect aggression or examples of them using indirect aggression.

The aim of this study in terms of indirect aggression is to determine whether indirect aggression is more prominent in women as men are seen to be much more aggressive in a

direct sense of the term. Indirect aggression and stress will also be compared to the driver behaviour scale to determine whether indirect aggression scores and stress correlate to driver behaviour scores.

These areas are of interest as insurance companies will give cheaper insurance to young female drivers as compared to young male drivers, part of the difference being due to young male drivers being perceived to be much more aggressive and reckless than female drivers (Buzzacchi et al., 2005)

Another area of interest will be whether those who score high on certain questions of the driver behaviour survey as compared to their scores on the indirect aggression scale.

The aim of the study in terms of stress is to determine whether stress and indirect aggression have a relationship with scores on the driving behaviour survey. The scores on the perceived stress scale will be compared to scores on questions such as “I have trouble merging into lanes” on the driving behaviour survey, as this situation is perceived to be stressful by new and inexperienced drivers.

1.9: Hypotheses

Hypothesis 1: There will be a significant relationship between stress and aggression on driving behaviours.

Hypothesis 2: There will be a significant difference between gender on aggression.

Hypothesis 3: There will be a significant difference between scores in the driving behaviour questionnaire and age.

2. Method

2.1: Participants

The sample was a total of eighty-four (N = 84) participants took part in the study. This sample was comprised of primarily female participants (N = 49, 58.3%) with thirty-five male participants (N = 35, 41.7%). Anyone over the age of 18 was invited to take part in the study. The age range was 18-55 years old. This sample contained participants with either a full driving license (N = 66, 79.5%) or provisional driving license (N = 17, 20.5%). The population sample was a convenience sample sourced through social media and the general public. Participants were recruited through purposive and snowball means, as the survey was published online which then resulted in several people who saw this, also sharing the link to their contacts. It was explained that participation in the questionnaire was voluntary, with no incentives for participation, and that withdrawal from the study for any of the participants was possible at any stage, before submission of the questionnaire. The questionnaire was confidential, and responses given were anonymous. Due to this it was explained to the participants that once submitted, responses could not be withdrawn as responses could not be attributed to any individual participant. The inclusion criteria were that the participant should be able to comprehend the survey and the exclusion criteria was that the participant was over the age of 18 years. The rate of questionnaires returned was approximately 100% (84 of 84).

2.2: Design

The design used in this research was a quantitative, cross-sectional, correlational study using survey research to examine the relationship between stress and aggression on driving

behaviours. Though other hypotheses are of quasi-experimental design. It used nominal, ordinal and scale data levels of measurement. The correlational aspect of this research is employing the same group of participants when analysing each variable. The quasi-experimental element is involved in factors involving naturally selected groups, such as gender, and does not have manipulation over the independent variables. The predictor variables for the main research hypothesis are perceived stress, and indirect aggression. The criterion variable was driver behaviour survey scores. Independent variables used for examining further hypotheses are gender and age. The dependent variables are, social exclusion behaviours, use of malicious humour, guilt induction techniques, anxiety-based performance deficits, exaggerated safety/caution behaviour, and hostile aggressive behaviour. Hypothesis 1 predicts that there is an inverse correlation between perceived stress and indirect aggression on driver behaviour. This is considered a one tailed hypothesis.

Hypotheses 2 and 3 predict there will be a difference between gender on indirect aggression and that there will be a difference between age and driver behaviour. These are considered a two tailed hypothesis as it does predict there will be a difference but does not assume which direction will occur. The data for these variables was collected using self-reported measures.

2.3: Apparatus

Apparatus was required to create and distribute the survey. Google forms was required to create and distribute the survey. Software required was IBM SPSS 25 and Microsoft Excel.

2.4: Materials

“Google Forms” was used to create the online survey, and also to distribute the survey. The layout consisted of a cover page which included information, and also requested consent. The cover page also included contact information for the researcher and supervisor of the

study should there be any questions. There were 5 pages to complete with the first section used to obtain demographic data of the sample such as gender, age, and type of driving license. Gender could be Female, Male, prefer not to say or other. Age was a short answer text answer to fill in how many years old the participant is. Type of driving license could either be full license or provisional license.

The first questionnaire used was the Perceived Stress Scale (PSS, Cohen, 1983) this consisted of 14 questions. This questionnaire asked participants to disclose their thoughts and feelings from the previous month on a five-point Likert scale (0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often, 4 – most often). Scores were reversed for the positively worded items (4, 5, 7 & 8) e.g. 0=4, 1=3, 2=2, 3=1, 4=0 and added together with original scores. The total score has shown evidence to reliably predict feelings of stress experienced by a person having high internal consistency with alpha scores ranging from .84 to .86. The retest reliability was .85 after two days and .55 after a six week period (Cohen et al, 1983).

The second questionnaire used was the Indirect Aggression Scale - Aggressor version (IAS-A, Forrest et al, 2005) this consisted of 25 questions. The questionnaire asked participants to disclose when they have used the behaviour against another person in the past 12 months on a five-point Likert scale (1 – never, 2 – once or twice, 3 – sometimes, 4 – often, 5 – regularly). This questionnaire contains three sub scales of use of malicious humour, social exclusion behaviours, and guilt induction techniques. These scores were then added together to determine levels of indirect aggression used in the past 12 months. The total score has shown evidence to reliably display indirect aggression levels of a person having high internal consistency with alpha scores ranging from .81 to .84 (Forrest et al, 2004).

The third questionnaire used was the Driver Behaviour Survey (DBS, Clapp et al, 2011) this consisted of 21 questions. This questionnaire asked participants to disclose how frequently they perform each driving behaviour during situations that result in anxiety,

tension, or discomfort on a seven-point Likert scale (1 – never, 2 – very infrequently, 3 – infrequently, 4 – sometimes, 5 – frequently, 6 – very frequently, 7 – always). With higher mean scores indicating greater frequency of anxious behaviour. This questionnaire contains three different sub scales of anxiety-based performance deficits, exaggerated safety/caution behaviours, and hostile aggressive behaviours. All three scales showed good to excellent internal consistency ($\alpha = .85-.93$) and good test – retest reliability between post treatment assessments ($r = .80-.85$).

The final section was a debrief page which included support resources for participants. This page also thanked participants and explained what the questions asked aimed to investigate.

2.5: Procedure

Research began once it was first approved by the ethics board at Dublin Business School. Once approved a survey was created using Google forms. Creation of the survey required gathering the questionnaires to be used and organising an appropriate layout for each. A pilot study was completed to give rough estimates of completion time and to ensure no errors were present and that the layout was correct. Once the survey was created a link was posted to Facebook, and also sent via WhatsApp and iMessage, which included a short description of what the link was regarding. Once participants clicked the link, they would be sent to Google forms and presented with the cover sheet. The cover sheet providing the participant with a detailed explanation of the study. Anonymity of each participants responses was confirmed, and that the responses would be on a password protected computer and would be encrypted before being destroyed once analysis had been completed. Participants were then informed once responses had been submitted it could not be retracted as the responses are anonymous. The next section of the questionnaire asked for consent, with the participant

then being taken to the survey if they consented. There were 64 questions asked in total. Completion of the survey took 5-10 minutes. Once completed participants received contact details of 3 organisations that can provide support services if the questions included in the survey caused negative feelings. These services included AWARE, Samaritans, and Spunout. These organisations provide support services for emotional distress. Following a brief amount of time, the survey was taken offline, and the responses were downloaded to an Excel file. This Excel file was then coded and transferred to IBM SPSS 25 for further coding and analysis.

2.6: Ethical Considerations

This study was approved by the ethics board at Dublin Business School. Participants of the study were briefed prior to the study. No harm or distress was expected to occur to participants. This detailed assurances that information and responses were completely anonymous with no access to the data collected other than the researcher and supervisor of the study. The data would be password protected. Deception or incentive was not involved in this study. If participants felt distress or anger due to answering any questions, organisations which provide assistance for these issues were included with their contact information. The researcher and supervisor's contact information were also provided in the event of further questions.

3. Results

3.1: Introduction

This section includes the results and summaries of the tests used to examine all three hypotheses. To begin a validity check was performed for the DBS, PSS, and IAS using a Cronbach's alpha to check reliability across all three. This found Cronbach's alpha to have a value of .98 for DBS, a Cronbach's alpha of .74 for PSS, and a Cronbach's alpha of .89 for IAS. These scores prove satisfactory reliability in all three measures. This study had an age range of 18-55, a total of 84 participants completed this study. With 49 (58.3%) female participants and 35 (41.7%) male participants. Of the 5 age categories, group 3 (22 years old) had the largest number of participants. With this group consisting of 25% of the total sample. With the next closest age group consisting of 21.5% of the total sample.

Measure	Cronbach Alpha Reliability Score
Perceived Stress Scale (PSS)	.738
Indirect Aggression Scale (IAS-T)	.891
Driver Behaviour Survey (DBS)	.977

3.2: Descriptive statistics

Standard deviations and means were computed for each of the variables; age, gender, use of malicious humour, social exclusion behaviours, guilt induction techniques, stress, anxiety-based performance deficits, exaggerated safety/caution behaviours, hostile/aggressive behaviours.

3.3: Inferential statistics

Hypothesis 1: There will be a significant relationship between stress and indirect aggression on driver behaviour.

A bivariate correlation was used to investigate this hypothesis. Pearson's r was undertaken to investigate the relationship between stress and sub scales of indirect aggression on indirect aggression. This relationship was found to be insignificant.

Hypothesis 2: There will be a significant difference between gender on indirect aggression.

An independent samples t-test was used to investigate this hypothesis. This t-test found that there was no overall significance to the hypothesis, however there was significance found in the sub scales. Malicious humour of males ($M=18.62$, $SD=6.15$) and females ($M=15.45$, $SD=4.77$) ($t(81) = -2.64$, $p = .010$, $CI (95\%) -5.56 > -.78$). Results indicate that males were found to have higher levels of use of malicious humour than females. Therefore, the null can be partially accepted.

	F	Sig.	t	df	Sig. (2-tailed)
Social Exclusion	2.9	.092	1.52	81	.133
Malicious Humour	.398	.530	-2.63	81	.010

Guilt Induction Behaviours	.7	.406	-.089	81	.929
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Hypothesis 3: There will be a significant difference between age on driver behaviour.

An independent samples t-test was used to investigate this hypothesis. This t-test found that there was no significance to the hypothesis. Meaning the difference was insignificant between age on driver behaviour.

4. Discussion

4.1: Findings

The aim of this study was to investigate perceived stress and indirect aggression levels and their effect on driving behaviours. This study also investigated differences of gender on indirect aggression and also the difference of age on driving behaviour. This was found by obtaining results from a sample of provisional or full licensed drivers. These variables were examined from results of a survey which consisted of demographic questions such as age, gender, and type of driving license the participant has. The indirect aggression scale (Forrest et al., 2005), the perceived stress scale (Cohen, 1994), the driver behaviour survey (Clapp et al., 2011) were used in this study. Analysis was run on the hypotheses of this study and the results are discussed below.

Hypothesis 1 – There will be a significant relationship between stress and indirect aggression on driving behaviours.

This hypothesis aimed to establish whether stress and indirect aggression levels correlated to driving behaviour. The results of a bivariate correlation found that there was no significance to this hypothesis that stress, and indirect aggression correlated to driving behaviour. Therefore, the null hypothesis is accepted.

Hypothesis 2 – There will be a significant difference between gender on indirect aggression.

This hypothesis aimed to establish whether there was a difference of indirect aggression levels between male and female participants. The results of an independent samples t-test

found that there was no significant difference in gender on indirect aggression levels, however one sub scale was found to be significant. Use of malicious humour was found to be higher in females when compared to males, therefore the null hypothesis is partially accepted.

Hypothesis 3 – There will be a significant difference between age and driving behaviour.

This hypothesis aimed to establish whether there was a difference between ages on driving behaviour. The results of an independent samples t-test found that age did not have any significant difference on driver behaviour. Therefore, the null hypothesis is accepted.

4.2: Comparisons with previous research

As part of the introduction and literature review, the main grounds for the study were outlined. This introduction and literature review included relationship between stress and indirect aggression levels on driving behaviour. Age and gender were also discussed.

Hypothesis 1

Analysis of results presented by hypothesis 1 with literature reviewed from the introduction of this study such as Antoun et al, (2017) in which this study found evidence of stress being present during driving for long hours. The present study did not find evidence to support this, with perceived stress being insignificantly correlated with driving behaviour. Therefore, the hypothesis was rejected. Although a study from Hennessy et al, (2001) found that those with higher stress were found to engage in violent driving behaviours, and mild driver aggression. A study from Duncliffe et al., (2018) also identified increases in critical driving errors after exposure to a stressful scenario. These errors included failure to use a seatbelt, loss of control of the vehicle, and failure to stop at red lights and stop signs. Indirect

aggression was also insignificantly correlated with driving behaviour but due to lack of research this could not be compared and contrasted.

Hypothesis 2

Analysis of results presented by hypothesis 2 with literature reviewed from the introduction of the present study found studies such as Shinar et al, (2002) which presented males to be twice as aggressive while driving than females, this study however did use direct aggression rather than indirect which may skew the results in comparison with the present study. The present study did accept the null partially for hypothesis 2 as the main hypothesis was rejected, although the sub scale of indirect aggression, use of malicious humour was found to be significant. The significance of use of one of the sub scales of indirect aggression is reinforced by a study by Card et al., (2008) which found indirect aggression and direct aggression to correlate higher in males than females. A study by Lundh et al, (2014) which investigated direct and indirect aggression in adolescents and its associations with psychological difficulties. The result of this study identified that indirect and direct aggression showed higher correlation in males than in females. This study found that male and female adolescents mismatch in their tendency to engage in direct or indirect aggression. With the present study finding no apparent difference in indirect aggression scores apart from use of malicious humour it can be stated that this study does not support findings from the present study due to the lack of mismatch in tendency in the present study.

Hypothesis 3

Analysis of findings presented by hypothesis 3 with literature reviewed from the introduction of the present study. Hypothesis 3 was rejected as there was no significant difference in age and driver behaviour. The literature presented in the introduction of the present study included a study in which a driving simulator was used to investigate the effects

of age and driving complexity on mental workload. This study used reaction times to measure mental workload. It was concluded from this study that younger participants had faster reaction times when compared to older drivers and this effect being amplified in complex situations such as overtaking (Cantin et al., 2009). A study which investigated age and gender differences in risky driving of a sample from Alabama found that teen drivers were consistently more likely to report both enjoying risky driving behaviours and also perceived these behaviours as less risky than perceptions of older drivers in the study. A study from Hatfield et al, (2008) found that younger drivers demonstrated higher risk propensity and stronger motives for careless or unlawful driving such as drink-driving and speeding when compared to an older sample. A study by Son et al., (2010) investigated an older sample of 60-69 year old's, and a younger sample of 20-29 year old's. This study used a sample of drivers from the USA and a sample from Korea with drivers being required to drive at least twice a week to take part in the study. This study used a driving simulator to measure the driving behaviour of the sample. This study identified that younger drivers had faster reaction times when compared to older drivers, and this effect being amplified by more complex driving situations such as overtaking. With the study also finding that younger drivers performed less performance errors than older drivers. This study does not coincide with findings from the present study, as this study presents differences between older and younger drivers, whereas the present study did not identify any significant differences in age and driving behaviour.

4.3: Implications

This study presented results which were not overly significant for the research hypotheses. The first hypothesis was anticipated to present a correlation of stress and indirect aggression on driving behaviour, but this was not proven from this specific research. Previous

research which does support this hypothesis and research which rejects this hypothesis have not necessarily been affected by the findings from the present study.

Hypothesis 2 which investigated the difference between indirect aggression and gender was not found to be significant overall, but this hypothesis did show some evidence. This was anticipated to show noticeable difference between gender on indirect aggression which would coincide with the majority of previous research. Use of malicious humour was found to be more prevalent in males when compared to females in the sample. Whereas the other sub scales of indirect aggression, social exclusion behaviours and guilt induction techniques were found to be insignificant. This finding does not support or refute previous research, but it does provide some evidence of differences in indirect aggression and gender. This finding of one sub scale being significant is unexpected, however it is interesting as it may be different sub scales of indirect aggression which may show further significance in gender.

Hypothesis 3 which investigated the difference between age and driving behaviour was found to be insignificant. This hypothesis was anticipated to show difference between age and driving behaviour, which would coincide with previous research, however this was not the case. Previous research which may have supported or refuted this hypothesis will not be affected by this study necessarily, as findings were insignificant.

4.4: Strengths and weaknesses

A strength that can be derived from this research is that the study attempted to investigate a gap in research with indirect aggression's effect on driver behaviour not being the subject of many studies currently. Although this hypothesis as a whole was rejected, the significance of use of malicious humour is intriguing. The other two hypotheses were exploring previous research and whether the present study coincided with previous findings, such as differences in indirect aggression between genders and differences in driver

behaviour between ages. These were found to be insignificant, but this could be investigated further to determine reasons for this insignificance as there are many studies which show significance in these hypotheses.

The use of online sampling for the current study to access participants was very quick and efficient, but also did cause some weaknesses to the current study. The age range from the current study was 18-55 years old, but majority of the respondents fell to the lower ages causing the older ages to not be represented properly which may have skewed results. This could be due to the link being posted on social media which may have caused younger respondents.

Gender of the sample accessed was another weakness as the study aimed to obtain equal numbers of male and female respondents, or at least as close to equal as possible. However, the sample included more female than male respondents. This did not spoil the study but ideally the sample would be made up of equal numbers of male and female respondents.

A weakness of the study is the use of the self-reported measure of the driver behaviour survey as previous studies suggest drivers perceive themselves to be much more superior drivers than they actually may be. Due to the self-report nature of the driver behaviour survey the results may have been skewed to be much better than if the driver behaviour was observed by an outside party. The self-reported nature of the indirect aggression scale is also another weakness as the questions involved in the questionnaire are related to bullying which may cause participants to reconsider answering truthfully as they may feel ashamed about previous actions of indirect aggression.

The study may have also benefited from being longitudinal to determine whether self-reports may change if the survey was completed after driving or after a period of time in which the respondents may have been driving with knowledge of how they reported

themselves originally and then after the period of time to determine what change, if any there is.

The study may have also benefited by use of a control group of non-drivers which could then be compared to drivers to determine the difference in indirect aggression and stress levels. And whether this was significantly different to the results of the driver sample.

4.5: Future directions

This research has presented interesting results in terms of indirect aggression which had not been investigated sufficiently. The area has not provided ground breaking results in terms of driving behaviours and stress and indirect aggression's effect on driving, and could benefit from a more detailed approach especially for the significant sub scale of use of malicious humour. This could also benefit from examination of use of malicious humour on different situations, to obtain a much more significant area for use of malicious humour as a relevant and recognised measure.

This study could benefit from further research which uses a longitudinal approach, which could reduce the effect of this study's possible higher scoring of self-reported measures by participants. This could be possible by using analysis from another party through use of onboard camera's in cars. Self-reported indirect aggression also may have caused lower self-reported scores, and this could prove difficult to determine indirect aggression through other means. Further research could provide more significant results also through a more broad and bigger sample of ages and also of gender, with a higher number and broader range of older participants it could effect results gathered by the current study. With equal numbers of male and female participants or close to equal would result in better comparison.

Future studies could benefit from use of multiple sampling techniques, if online and paper responses were used it could provide a better sample with broader range. This study

could provide more substantial results with a more exact sample as the present study is quite broad with it being open to all ages.

4.6: Conclusion

This study did provide partial support to previous research, and also provided research which did not support or refute previous research. The present study attempted to find a correlation between indirect aggression and stress on driving behaviour, but it failed to be significant in this study. Indirect aggression was investigated to determine its relationship with gender, but this also failed to have a significant effect. However, there was support to studies which state that males have higher levels of indirect aggression with malicious humour being found to be significantly higher in males than in females. This was found through use of an independent samples t-test which identified the relationship. This finding is interesting and should be investigated with future research but potentially using different measures and possibly different sampling techniques than what was used by the present study. The present study also investigated the difference in driving behaviour on age, but this was also found to be insignificant, therefore does not support or refute previous research. Overall this study did not provide substantial results to further investigate, however it did provide a partial result which may require further analysis and investigation in future research.

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Appendix A – Cover Sheet

My name is Adam Flood and I am conducting research which will form the basis for an undergraduate thesis. You are invited to take part in this study that explores stress and aggression's role in driver behaviour. This study is being conducted as part of my studies and will be submitted for examination and possibly publication.

If you are between the age of 18 and 25 years old and drive with either a provisional or full driver's license, you may take part in this study. Taking part in this survey involves completing and submitting the anonymous survey attached. This survey has questions which may cause negative feelings, but has been used many times in research applications. Contact information will be provided for support services if the questions cause difficult or negative feelings on the final page.

Participation is voluntary and there is no obligation to take part. Participation is anonymous and confidential. Meaning responses given will not be attributed to any single participant. This also means withdrawal will not be possible after the questionnaire has been collected.

Data from the questionnaires will be recorded in electronic format and also stored on a USB as well as computer folder, which will both be password protected and encrypted before being incinerated.

By completing and submitting the questionnaire you are consenting to participate in the study, this is important to know.

Should you require any further information about the research, please do not hesitate to contact me via email at XXXXXX@mydbs.ie. My supervisor can also be contacted at XXXXX@dbs.ie.

Thank you for taking the time to complete this survey.

Appendix B – Questions

Section 1:

Do you wish to take part in the questionnaire and agree to the above terms? By clicking Yes, you consent that you are willing to participate in this research.

- Yes
- No

Section 2: Demographic Information

Please indicate your gender

- Female
- Male
- Prefer not to say

How old are you?

What type of driving license do you hold?

- Full license
- Provisional license

Section 3: Behaviours and Attitudes

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month.

In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
2. In the last month, how often have you felt that you were unable to control the important things in your life?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
3. In the last month, how often have you felt nervous and “stressed”?
 - Never
 - Almost never
 - Sometimes

- Fairly often
 - Very often
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 5. In the last month, how often have you felt that things were going your way?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 6. In the last month, how often have you found that you could not cope with all the things that you had to do?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 7. In the last month, how often have you been able to control irritations in your life?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 8. In the last month, how often have you felt that you were on top of things?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 9. In the last month, how often have you been angered because of things that were outside of your control?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often
 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
 - Never
 - Almost never
 - Sometimes
 - Fairly often
 - Very often

Section 4: Behaviours and attitudes

Instructions: The questions in this scale ask you about your use of the specific behaviour during the last 12 months.

In each case, you will be asked to indicate by circling how often you have used the behaviour.

1. Used my relationship with an individual to try and get them to change a decision
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
2. Used sarcasm to insult someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
3. Tried to influence someone by making them feel guilty
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
4. Withheld information from someone that the rest of the group is let in on
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
5. Purposefully left someone out of activities
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
6. Made other people not talk to someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
7. Excluded someone from a group
 - Never
 - Once or twice
 - Sometimes
 - Often

- Regularly
- 8. Used someone's feelings to coerce them
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 9. Made negative comments about someone's physical appearance
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 10. Used private in-jokes to exclude someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 11. Used emotional blackmail on someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 12. Imitated someone in front of others
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 13. Spread rumours about someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 14. Played a nasty practical joke on someone
 - Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
- 15. Done something to try and make someone look stupid
 - Never
 - Once or twice
 - Sometimes
 - Often

- Regularly
16. Pretended to be hurt and/or angry with someone to make them feel bad about him/herself
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
17. Made someone feel that they don't fit in
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
18. Intentionally embarrassed someone around others
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
19. Stopped talking to someone
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
20. Put undue pressure on someone
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
21. Omitted someone from conversations on purpose
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
22. Made fun of someone in public
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
23. Called someone names
- Never
 - Once or twice
 - Sometimes

- Often
 - Regularly
24. Criticised someone in public
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly
25. Turned other people against someone
- Never
 - Once or twice
 - Sometimes
 - Often
 - Regularly

Section 5: Driver Behaviour

Below is a list of behaviours that may or may not be relevant to you in these situations. Based on your personal experience, please indicate how frequently you perform each of these items when a stressful driving situation occurs which makes you nervous, anxious, tense, or uncomfortable. Please indicate what you generally do, not what you think you should do.

1. I lose track of where I am going
 - Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
2. I yell at the driver/drivers who made me nervous
 - Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
3. I slow down when approaching intersections, even when the light is green
 - Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
4. I have trouble staying in the correct lane
 - Never
 - Very infrequently
 - Infrequently

- Sometimes
 - Frequently
 - Very frequently
 - Always
5. I drift into other lanes
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
6. I forget to make appropriate adjustments in speed
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
7. I let the driver who made me nervous know that I am upset
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
8. I maintain a large distance between myself and the driver in front of me
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
9. I forget where I am driving to
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
 - Always
10. I make gestures at the driver/drivers who made me nervous
- Never
 - Very infrequently

- Infrequently
 - Sometimes
 - Frequently
 - Very frequently
11. I try to put distance between myself and other cars
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
12. I maintain my speed in order to calm myself down
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
13. I try to stay away from other cars
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
14. I have trouble finding the correct lane
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
15. I pound on the steering wheel when I'm nervous
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
16. I decrease my speed until I feel comfortable
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
17. I honk my horn at the driver who made me nervous
- Never

- Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
18. I try to find ways to let other drivers know that they are making me nervous
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
19. During bad weather, I drive more cautiously than other vehicles on the road
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
20. I swear/use profanity while I am driving
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently
21. I have difficulty merging into traffic
- Never
 - Very infrequently
 - Infrequently
 - Sometimes
 - Frequently
 - Very frequently

Appendix C – Debrief Sheet

Section 6: Thank you

This research project aims to understand more about how young drivers can be affected by aggression and stress while driving. More specifically indirect aggression and its effect on different demographics, such as male or female and correlations patterns with age. The main goal is that these findings will allow us to reduce aggression while driving and to find why this aggression occurs in young drivers. During data analysis group level responses are only of interest and it will not be possible to assess personal responses of individuals. Answers provided are of the participant's own feelings or behaviours and there are no "right" answers.

Thank you for participating. We hope the questions or material provided did not evoke distressed or aggressive feelings, however if the materials or questions have, here are some organisations you can contact.

AWARE

1800 80 48 48

www.AWARE.ie

Samaritans

1850 60 90 90

Spunout

Spunout.ie