An Exploratory Study of the effects of Stress and Fatigue on Irish Farm Safety

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Abstract

Previous literature shows a significant relationship between stress and farm safety. Little research has been conducted on farmer fatigue. This study aimed to explore the relationship between stress, fatigue and farm safety for the first time using an Irish farming sample of 177. Participants completed measures including Farm/Ranch Stress Inventory, Occupational Fatigue Exhaustion Recovery scale and Safety Climate Questionnaire and four qualitative questions. Results indicated no significant difference between farm type and stress experienced. Cattle farmers were found to have higher levels of acute fatigue compared to other and mixed. Results further indicated a significant age difference in organisational environment. Inter-shift recovery was found to significantly predict safety awareness and competency. It was also found that farm related factors and chronic fatigue significantly predicted organisational environment. These findings will contribute to farm safety research; however more research is needed to explore how stress and fatigue impact farm safety.

1. Introduction

Farming is recognised as one of the three most dangerous occupations in the world (International Labour Organization, [ILO], 2015) and is listed as the most dangerous occupation in Ireland, with the majority of workplace accidents occurring on farms (Baker, 2015). Although safety strategies have been applied in the agricultural workplace, farm accidents have continued to rise. A report released in 2014 by the Health and Safety Authority [HSA] recorded 30 Irish farm-related deaths, which amounted to the highest number of farm deaths in the last twenty years. This was the fifth year the farming industry documented the highest amount of Irish workplace deaths (Hussey, 2015). Many factors have been attributed to farm accidents and a report by the HSA (2016) recorded tractors, farm vehicles (26%), machinery, equipment (11%), livestock (21%), falls from heights (21%), drowning, gas (11%), falling objects (5%) and timber (5%) as the main causes of farming injuries and deaths in Ireland in 2015. Similarly studies suggest that farm machinery, farm animals and falls are the main contributors to farm accidents (Dogan & Demirci, 2012). Interestingly research contrary to this suggests that psychological factors such as stress and cognitive and physiological aspects of stress, for instance fatigue are primary underlying causes of farming accidents (Lessenger, 2006). A study by Glasscock, Rasmussen, Carstensen and Hansen (2006) using a sample of 310 Danish farmers found that an increased level of farm stressors, stress symptoms and poor safety behaviours were related to a higher probability of work related injuries and fatalities.

With this in mind, it has come apparent to the author that there are few academic studies in Ireland examining how psychological variables impact on farm safety. Therefore the purpose of this study is to look at the effects of stress and fatigue on Irish farm safety.

1.1 Farm Safety

The Irish farming industry comprises of only 5% of the Irish workforce, with death rates in this industry accounting for approximately 50% of all workplace fatalities in Ireland (HSA, 2013). Statistics from 2014 show that fatality rates for the Irish agricultural industry were the highest amongst all Irish economic industries, which was 23.9 per 100,000, this accounted for 55% of all workplace fatalities for that year (HSA, 2015). The HSA reported 18 farm-related deaths in 2015, an improvement on 2014 figures of 30 deaths (HSA, 2016). Records have shown that both the old and the young are most likely to be killed or injured on the farm, with 11% of farming fatalities being children (HSA, 2015).

These farming fatalities occur every year due to the same oversights or factors. It is thought that risk factors related to fatal and non-fatal farm injuries can be categorised into two groups: firstly, features of the farm environment and secondly, personal characteristics (Dogan & Demirci, 2012). Findings regarding the farm environment have shown that big farms, farms that employ a number of farm hands and farms with high yearly production were related to a higher number of farm-related injuries (Mamady, Zou & Mafoule, 2014). Studies examining personal characteristics of farmers over 55 years of age have found that the more hours spent on the farm, full-time farmers, more experienced farmers and male farmers have a positive relationship with higher injury and death rates (Browning, Truszczynska, Reed & McKnight, 1998).

These factors can all be considered significant when looking at farm accident rates. However most accidents don’t just occur by chance, this is why psychological issues such as stress and fatigue need to be considered as underlying issues.

1.2 Stress

Contrary to the popular belief that a farmer's way of life is generally peaceful, relaxed and healthy, farmers in reality are subjected to a stressful, demanding and risky lifestyle (Kearney, Rafferty, Hendricks, Allen & Tutor-Marcom, 2014). Over the last number of years the demands and pace of the farming industry has increased due to new health and safety regulations, abolishment of milk quotas and unpredictable weather due to climate change amongst other issues. These have caused farmers to experience an increase in both physical and mental stresses (Seanad, 2015).

The HSA has defined stress "as the negative reaction people have to aspects of their environment as they perceive it" (HSA, 2015, pp.7). Farmers are very vulnerable to stress, as indicated by Kallioniemi, Simola, Kymalainen, Vesala and Louhelainen (2009) who found that one third of full-time Finnish farmers are subjected to extreme stress.

A source of stress known as a stressor is a "chemical or biological agent, environmental condition, stimulus or event that triggers stress in an organism" (Kearney et al., 2014, pp.384). Stressors force a person to alter or adjust themselves; this has an effect on both physical and psychological happiness. The body's initial response to stress occurs in the nervous system. The sympathetic nervous system of the autonomic nervous system (ANS) activates bodily resources to respond to stressors. Responses can cause an increase in breathing, perspiration and tightening of blood vessels for the purpose of regulating oxygen and blood through the body so the person can respond quickly to possible threats. When the stressor has been tackled the parasympathetic in the ANS restores the body to normal state, restoring balance and blood pressure to optimum level (Ragin, 2015).

Stressors can either be external (unfavourable physical conditions or stressful psychological environments) or internal (physical or psychological) and can be termed as

acute (short-term) and chronic (long-term) stress (Landow, 2006). Furthermore the purpose of the current research is to enhance stress research by identifying the main stressors that affect Irish farmers and how this stress impacts farm safety.

1.3 Sources of Stress

Previous studies have recognised that there are some stressors that only farmers are subjected to, which are not experienced by people in other professions (Bin, 2008). These stressors which are only agricultural related include harvesting, planting, lambing and calving seasons, machinery breakdowns and livestock and crop prices (Bean & Nolan, 2008).

Human stress responses have a similar physiological base, but each person responds to stress differently which is dependent upon the situation they are in and how they perceive it (Kearney et al., 2014). Walker and Walker (1987) revealed that stress levels differ amongst farmers and are dependent upon the type of farm that is operated. According to Deary, Willock, McGregor and McGregor (1997) mixed farmers and dairy farmers experience high stress, while crop farmers experience the lowest stress levels. Parry, Lindsey, Barnes and Taylor (2005) further report that mixed farmers experience a higher level of stress in comparison to other farm types due to balancing workloads with differing timetables and struggling with the paperwork requirements of a mixed farm. Deary et al. (1997) also state that stress levels vary depending on gender and age. Their findings showed that stress levels were higher for people under 50 and women experienced a higher level of stress than men.

Some situations tend to cause more stress than others; farmers are subjected to both acute and chronic stress. The weather is a major cause of acute stress amongst farmers due to its unpredictability, unseasonal and disastrous consequences, for instance flooding and

dry spells can negatively affect crops and potentially result in the loss of livestock (Hill, 2007). If these weather conditions continue for a prolonged period of time, they will eventually cause farmers to experience chronic stress (Lobley, Johnson, Reed, Winter & Little, 2004). Stepanyan and Blasoni (2005) suggest that stress can be caused by the farmer themselves, noting, modern-day farming is difficult and since unforeseeable events can occur, farmers are susceptible to become worriers. For instance, Lobley et al. (2004) suggests that farmer's emotional attachment to their land may cause stress. This is especially true for a farmer who has land that has been passed down through generations, whom due to the economic climate may have to resort to selling the land to pay their bills. This in turn will cut stress levels associated with financial debt but will add to their emotional stress (Hill, 2007). Multiple studies have emphasised that there are other stressors that are universal amongst farmers and continuously reoccur in research results (Bin, Lamm & Tipplies, 2008; Freeman, Schwab & Jiang, 2008), they are government policies and regulations, economic issues, extreme workload and shortage of skilled workers (Bin, 2008). Stepanyan and Blasoni (2005) further consider workload as a predominant stressor, because it is as much about mental work overload as it is physical heavy workload. Farmers are not only required to do physical labour on the farm, they are also required to manage a business, be a meteorologist, a vet and a mechanic (Hill, 2007). With these stressors in mind, this study aims to identify the levels of stress caused by such stressors and their effects on farm safety within the Irish farming population.

1.4 Consequences of Stress

Farmer's stress may lead to negative consequences such as mental and physical health issues, decline in job satisfaction, reduction in performance, fatigue and the most serious consequence farm-related accidents (Bin, 2008). Thus exposure to stress on a daily

basis may lead to farm-related accidents (Corcoran, 2014). Therefore it is important to understand the significance of persistent stress. When stress levels are raised, farmers tend to make bad decisions and be involved in farming accidents (Tipples, Hill, Wilson & Greenhalgh, 2013).

Studies have identified a direct link between farmer stress and farm safety (Simpson et al., 2004). Elkind and Salter (1994) suggest that stress stops farmers from taking safety precautions. Findings in a recent meta-analysis showed that a statistically significant relationship exists between stress and farm injuries, with a majority of findings implying that stress increases the likelihood of injury (Mamady et al., 2014). Similarly Thu et al. (1997) found that farmers who admitted to having high levels of stress were over three times more likely to experience a farm injury.

Rautianinen et al. (2004) identified that two-thirds of farm-related injuries on Iowa farms were caused by rushing, stress and fatigue. Similar research shows that there are a high number of fatal and injurious incidents amongst farmers and farm employees, in which stress and fatigue are the main causes (as cited by Bin, 2008). Thus the current study aims to make a beneficial contribution and to further explore the relationship between farmers stress and fatigue and how this relationship influences Irish farm safety.

1.5 Fatigue

Fatigue is a serious issue reported by farmers (Lilley, et al., 2012). Unlike stress, fatigue can occur unexpectedly and generally takes a longer period of time to have a significant effect on human well-being and performance (Lubeck, 2014). Caldwell and Caldwell (2003) defined fatigue as “the state of tiredness that is associated with long hours of work, prolonged periods without sleep, or requirements to work at times that are ‘out of

synch' with the body's biological or circadian rhythm" (as cited by Flin, O'Connor & Crichton, 2008, pp. 191).

Fatigue is thought to result from continuous stress. When a person is stressed, a 'stress alarm' comes about. This alarm intensifies sleeplessness and alertness and can ultimately result in a dysfunction to the autonomic nervous system, specifically to the sympathetic nerves (Hockey, 2013). A rise in sympathetic activity can be recognised by increased heart and respiration rates. Such responses can be identified as anticipation for action and result in the body using more energy. The quantity of glucose used to energise the body increases with activity. When the body is in a state of continuous awareness, the energy source is lacking resulting in fatigue, exhaustion and other similar conditions (King & Magid, 2013). If these conditions are continuous, they can cause difficulties to the farmer when carrying out daily activities. Therefore chronic stress can cause long-term, unpleasant physiological consequences resulting in continuous fatigue conditions (Joosen, Sluiter, Joling & Frings-Dresen, 2008).

There are two predominant types of human fatigue, psychological (subjective) fatigue resulting from constant cognitive activities and physiological (objective) fatigue which occurs due to a chemical response that leaves muscles tired. Both types of fatigue can negatively influence farm work performance, cause human error and farm-related accidents (Hockey, 2013). This study aims to further explore the levels of fatigue experienced by Irish farmers. It is anticipated the results will provide a better understanding of fatigue and its impact on farm safety.

1.6 Sources of Fatigue

Fatigue is experienced by everybody; it can be felt as a low mood such as tiredness and exhaustion or unfocused mental state including distraction and distress or as an

uncomfortable physical state for instance muscle and join pains (Hockey, 2013). Farmers are subjected to hectic schedules, working long hours, doing heavy physical and mental labour, they have little time to relax and then have trouble sleeping when they go to bed. This prolonged sequence cause's fatigue (Hadmin, 2014). Fatigue typically decreases after a rest period, however occasionally fatigue is persevering. Persistent fatigue is not short-lived and may have a significant influence on a person's well-being, work performance and daily activities (Joosen et al, 2008).

People react to fatigue in different ways, but the reality is that it can be prevented. Agricultural work is extensive, therefore there are many causes of physiological fatigue, such as dealing with unforeseen circumstances, working long hours, unsettled sleep, particularly during busy seasons and time pressure to meet deadlines (Kondinin Group, 2011). Farmers may suffer from psychological fatigue occurring during decision-making processes, for example, when to sell livestock, when to cut crops, annoyance with the weather, stock and crop prices and breakdown of equipment (Ellingson, 2015). There is little to no published research in the area of farmer's fatigue, for this reason the study will attempt to provide an insight into farmers fatigue and the consequences of it on the farm.

1.7 Consequences of Fatigue

Fatigue has been found to seriously affect an individual's cognitive capacity and processing, impact their motor, social and communication skills and decrease their quality of situational awareness (Flin, et al., 2008). Research by Folkard and Tucker (2003) further suggests that fatigue causes the greatest type of human error. Human errors are directly related to tiredness, carelessness, stress and distraction. Such errors impact a person's judgement and reaction times and decrease their capacity for attention on novel cues in their environment. Additionally, these errors affect a person's retention of information in

conscious awareness and reduce their ability to make decisions when subject to dangerous situations (Dogan & Demirci, 2012). Farmers are generally subjected to hazardous activities and need full awareness to be able to make quick decisions and deal with cognitive challenges effectively, thus these impairments are detrimental to farmers (Elkind, 2008).

Fatigue is considered a cause of farm-related workplace accidents that result in injury or death (Ellingson, 2015). A Canadian census of agriculture carried out in 2001 has identified fatigue as the main recognisable and preventable reason for accidents in construction, transportation and agricultural industries (Lubeck, 2014). Kidd et al. (1996) found that fatigue impacted both psychological and physiological features of an individual and was a significant threat to farm safety. Lamond and Dawson (1999) further state that the severity of fatigue-related impairment to human functioning is similar to having a blood alcohol level of 0.1%. This is a level considered incredibly unsafe for working hazardous equipment and is recognised as being four times more probable to result in work-related incidents than being under the influence of alcohol or drugs.

Fatigue, caused by long working hours has been recognised as a hazard for people working in the agricultural industry. Lovelock et al. (2009) considered the consequences of long hours and fatigue for farm safety and found that long hours causing fatigue, machine breakdowns and time constraints were the most predominant obstacles to farm safety. Kumudini and Hasegawa (2009) found similar results in a Japanese study. According to Zhou and Roseman (1994) the majority of farm injuries occur at specific peak times, for instance afternoons and Saturdays, when fatigue could be at a high.

The popular belief is that only farmers deprived of sleep during peak seasons are at a higher risk of being involved in a farm accident. However the magnitude of pressure is

not the most important factor, rather it is the amount of sleep (Murphy, 2014). Interestingly Choi et al. (2006) found that Iowa farmers who slept less than 7.5 hours per night were 61% more likely to be injured, in comparison with those sleeping for 8.5 hours per night.

Many farm-related injuries and deaths also occur due to distraction. Similarly to road accidents, farm accidents can occur within a split second, due to a momentary lapse of concentration. This lapse of concertation may result from having an inadequate night's sleep, due to being up all night lambing or calving (Hirsch, 2014).

1.8 Rationale

The literature review has identified many studies that have been conducted on farmers stress and fatigue and farm safety. However, most studies appear to have only looked specifically at stress and farm safety. Additionally most of the studies have been conducted outside of Ireland which highlights a gap in the literature. Thus this research paper aims to make a beneficial contribution in exploring the causes and levels of stress and fatigue amongst a sample of Irish farmers and the impact these factors have on farm safety through a combination of both qualitative and quantitative questions. The secondary focus of this research paper is to examine demographic variables for instance age and farm type and how they contribute to levels of stress, fatigue and farm safety perception.

1.9 Hypotheses

1. It is hypothesised that there will be a difference in stress levels experienced across the different farm types.
2. It is hypothesised that there will be a difference in fatigue levels experienced across the different farm types.
3. There will be a significant age difference across all variables.

4. This hypothesis states that stress and fatigue will significantly predict safety climate sub-scales, safety awareness and competency and organisational environment.

2. Methodology

2.1 Participants

One hundred and seventy seven (N=177) participants took part in the study, 153 males (N= 153, 86%) and 24 females (N=24, 14%). The participants were divided into two age groups, under 35 (N=97, 55%) and over 35 (N= 80, 45%). The most frequent category was ‘under 35’. Participants were gained using a mixture of purposive**,** convenience and snowball sampling through an online post on Facebook, email and word of mouth. Eligibility required participants to be over the age of 18 years and work as a farmer.

2.2 Design

This was a cross-sectional, partially correlational mixed design, incorporating both qualitative and quantitative elements. The correlational aspect was used to examine the relationship between, stress and fatigue and safety climate perception. The predictor variables used were stress and fatigue and the criterion variable used was safety climate perception. Survey monkey was used to design the online questionnaire.

2.3 Materials

A self-administered paper and online survey (See Appendix 2) were developed which incorporated demographic and background information including, age, gender and farm type. Three established measures and four open-ended questions were also included in the questionnaire. The three established measures are as follows:

Farm/Ranch Stress Inventory designed by Kearney, Rafferty, Hendricks, Allen and Tutor-Marcom (2014) was used to measure the level of stress experienced by the respondents. The Farm/ranch stress inventory consisted of 28 items with 3 sub-scales. The farm related factor sub-scale had 14 items and measured stress experienced by a farmer

from direct farming issues. Items included, item 15 “Operating hazardous machinery”. Financial factors sub-scale had 9 items and measured farmers stress caused by financial issues. Item included, item 5 “market prices for your crops/livestock”. Social factors sub-scale had 5 items and measured the amount of stress experienced by a farmer from aspects outside the farm environment. Items included, item 6 “Limited social interaction opportunities”. Participants were given written instructions to “rate each item according to how much stress it causes you”. They were requested to respond using a 4-point Likert scale 1 = “no stress” to 4 = “very stressful”. Each sub-scale was totalled and total scores for each sub-scale ranged as follows; farm related factors sub-scale 14 to 56; financial factors sub-scale 9 to 36 and social factors sub-scale 5 to 20. The closer the sub-scales scores were to their absolute minimum total score the less stress experienced from each sub-scales respectively and the closer the sub-scales scores were to their absolute maximum total score the greater the level of stress experienced by each sub-scale respectively. This scale also contained one qualitative question which asked participants to “Please list any other items you find stressful in relation to farming and rate them”.

The author was unable to locate the Cronbach’s alpha for this measurement as it has only recently been developed.

Safety climate questionnaire designed by Milijic, Mihajlovic, Strbac and Zivkovic (2013) was used in this study to measure farmer’s attitudes, beliefs and perception towards the safety climate on the farm. The questionnaire was a 21 item, 7 sub-scale measure of safety climate. However for the purpose of this study the safety climate questionnaire consisted of 12 items and 4 sub-scales. The sub-scales are as follows; Safety Awareness and Competency sub-scale (5 items), measured if participants thought they were knowledgeable of safety rules and how compliant they were of the safety rules, e.g., item 2

"I understand the safety rules in my job"; Organisational Environment sub-scale (3 items), measured how compliant participants were of safety rules, e.g., item 7 "sometimes work pace is too fast to follow safety procedures", Safety Precaution sub-scale (2 items), measured whether participants believed that their job was safe, e.g., item 9 "my job is quite safe" and Safety Training (2 items), measured participants safety knowledge and if they had completed safety training, e.g., item 11 "I am trained in safety knowledge". Participants were given written instructions to "answer each question by circling the number in the box most relevant to you". They were required to respond using a 5-point Likert scale, 1 = "strongly disagree" to 5 = "strongly agree". Scores for each sub-scale were totalled and total scores for each sub-scale ranged as follows; safety awareness and competency sub-scale 5 to 25; the closer the score to 5 the less knowledge and compliant participants were of safety rules, the nearer the score to 25 the more knowledge and compliant they were of safety rules. Organisational environment sub-scale 3 to 15; the closer the score to 3 the greater compliance one had to safety rules and the nearer to 15 the least compliant they were with safety rules. Safety precaution sub-scale 2 to 10; the closer the score to 2 the more the participant believed that their job isn't safe and the nearer the score to 10 the more the participant believed that their job is safe. Safety training sub-scale 2 to 10; the closer the score to 2 the less safety training and knowledge they had received and the nearer the score to 10 the greater amount of safety training and knowledge they had obtained.

The instruments authors reported an internal consistency for each sub-scale; safety awareness and competency (5 items; $\alpha = .77$), for organisational environment (3 items; $\alpha = .86$), for safety precaution (2 items; $\alpha = .66$) and safety training, (2 items; $\alpha = .89$) (Milijic et al., 2013).

Occupational Fatigue Exhaustion Recovery (OFER15) designed by Winwood, Lushington and Winefield (2006) was used to measure work-related fatigue among farmers. The OFER15 consists of 15 items, with 3 sub-scales: Chronic Fatigue (OFER-CF) sub-scale had 5 items and captured mental, physical and emotional components that are characteristics of persistent fatigue. Items include, item 1 "I often feel I'm 'at the end of my rope' with my work". The Acute Fatigue (OFER-AF) sub-scale had 5 items and captured inability or unwillingness to engage in activities outside the workplace as a direct consequence of previous activity. Items include, item 6 "after a typical work period I have little energy left" and the Inter-shift Recovery (OFER-IR) sub-scale had 5 items and measured the extent to which the respondents perceived to have recovered from acute work-related fatigue before the next work shift. Items include, item 11 "I never have enough time between work shifts to recover my energy completely". Participants were given written instructions to "answer these questions in relation to your experience of fatigue and strain at work over the last few months. Please answer each question by circling the number in the box most relevant to you". Participants were required to respond using a 7-point Likert scale 0 = "strongly disagree" to 6 = "strongly disagree". There are five reverse scores in the OFER15, items 9, 10, of the OFER-AF and items 11, 13 and 15 of the OFER-IR, which are recoded (0=6, 1=5, 2=4, 3=3, 4=2, 5=1, 6=0). Scoring is completed for each sub-scale by summing the item responses, dividing by 30 and multiplying by 100, with comparable values between 0-100 produced for each sub-scale. Higher scores on the chronic and acute fatigue sub-scales indicated more fatigue, while a higher score on the inter-shift recovery sub-scale indicated more recovery between work shifts (Chen, 2009).

An internal consistency for the OFER15 sub-scales has been reported; OFER-CF sub-scale ($\alpha = 0.87$), OFER-AF sub-scale ($\alpha = 0.74$) and OFER-IR sub-scale ($\alpha = 0.72$)

(Seaman, 2015). The instruments authors reported internal consistency for the sub-scales as 0.80 to 0.85 (Winwood, Lushington & Winefield, 2006).

This study included 4 qualitative questions, the farm/ranch stress inventory consisted of one qualitative question and there were three other open ended questions. Q1. "When is the most stressful time of year for you on the farm and why?" Q2. "Have you ever been involved in a farm accident? If yes, please give brief details on what caused the accident(s)" Q3. "Do you always comply with farm safety rules and regulations? If no please state what would stop you from complying with them?" These may add some insightful new avenues for further research.

2.4 Procedure

The researcher accessed the population sample by sharing the survey monkey questionnaire link on Facebook, asking Facebook friends to share the link on their profile and invited Facebook friends directly who were eligible to take part in the study. Due to the agricultural nature of the study, the questionnaire was also shared on the Teagasc discussion group Facebook page. The sample was also contacted through email and word of mouth by friends and family. Paper questionnaires were distributed to participants who did not have access to the questionnaire link via email or Facebook.

A cover page (See Appendix 1) attached to each questionnaire informed participants that the questionnaire was anonymous and confidential, participation was completely voluntary and that they had the right to withdraw up and until the time of submission. Extra information included the researcher's college email address and requirements for participation. The participants were asked to complete a questionnaire with demographic and background questions and three measures; the Farm/Ranch Stress

Inventory, the Safety Climate Questionnaire and OFER-15. The last page was a support sheet (See Appendix 3) which offered details of help-lines in case anything in the questionnaire raised any difficult feelings. Participants answered 70 questions which took approximately 10-15 minutes and then submitted the questionnaire to Survey Monkey or posted the paper questionnaire to the researcher. Online responses consisted of 167, while 10 participants responded using paper questionnaires. Responses were recorded into an excel spreadsheet and then transferred into SPSS, were the data was then recoded in SPSS and prepared for later analysis and safely stored in a password protected computer. Paper questionnaires were kept in a lock and key filing cabinet.

3. Results

This section will report the results of the study in three parts; firstly it will outline descriptive statistics, secondly inferential statistics and finally a qualitative thematic analysis.

3.1 Descriptive Statistics

Before running any tests to check for significant relationships a number of descriptive statistics were calculated to achieve a better understanding of the sample and to determine any trends in the scoring of different variables.

The sample consisted of 177 participants, male (N= 153, 86%) and females (N= 24, 14%). The participants were divided into two separate age groups, under 35 years and over 35 years of age. Of the 177 participants, the under 35 age group consisted of 97 participants (55%), compared with the over 35 age group which consisted of 80 participants (45%).

Participants were asked to select the type(s) of farm they worked on; dairy, beef, suckler, sheep and tillage categories were provided. There was also space for the participants to add in other farm types, if they were not listed in the given options.

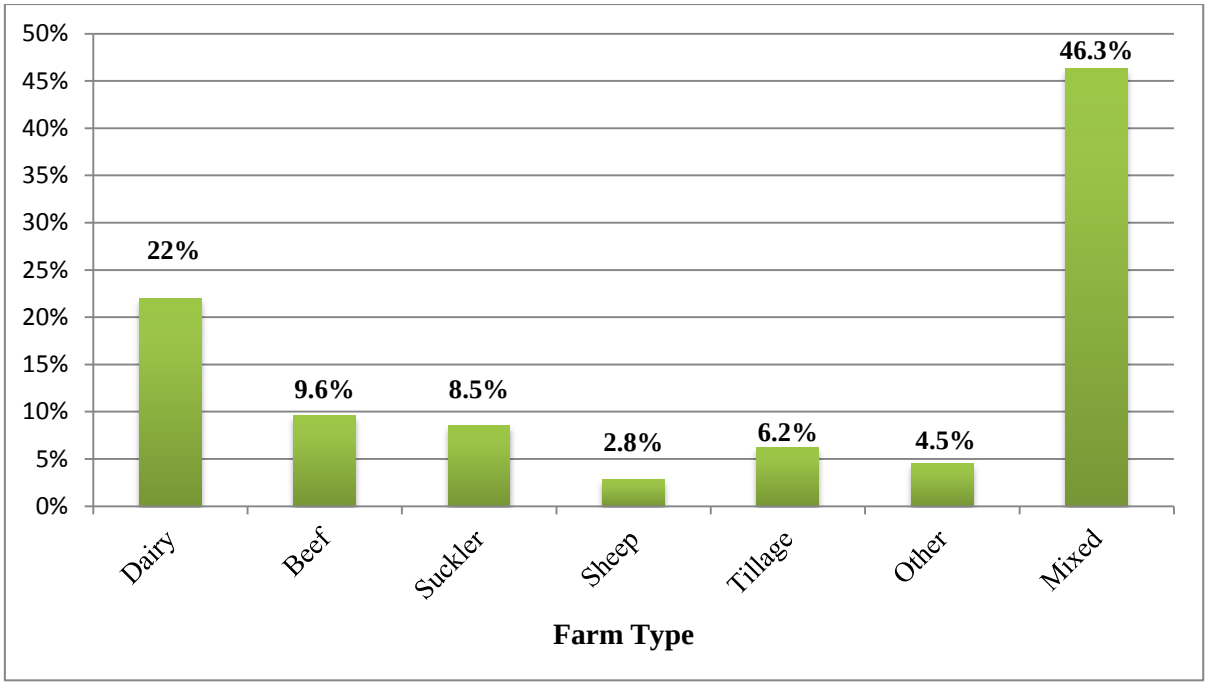

Figure 1: *Original farm types of the participants*

Figure 1 shows the breakdown of farm types. 22% of participants were dairy farmers, 9.6% were beef, 8.5% were suckler, 2.8% were sheep, 6.2% were tillage, 4.5% were other and 46.3% were mixed farmers. It must be noted 'other' included equine, forestry, contracting, pig, poultry and mushroom farming.

For the purpose of this study farm types were regrouped into 3 distinct categories, cattle (dairy, beef and suckler) and included 71 participants (40.1%), other (sheep, tillage, equine, forestry, contracting, pig, poultry and mushroom) and included 24 participants (13.5%) and mixed (any participant who indicated working with more than one farm type were put into this group) and included 82 participants (46.3%).

Participants were asked "When you are fatigued (tired) do you find that health and safety practise is less of a priority?" 101 (57%) participants answered yes, while 74 stated no (42%). Participants where similarly asked "When you are stressed do you find that

health and safety practise is less of a priority?" 110 (62%) participants stated yes, compared to 63 (36%) who said no.

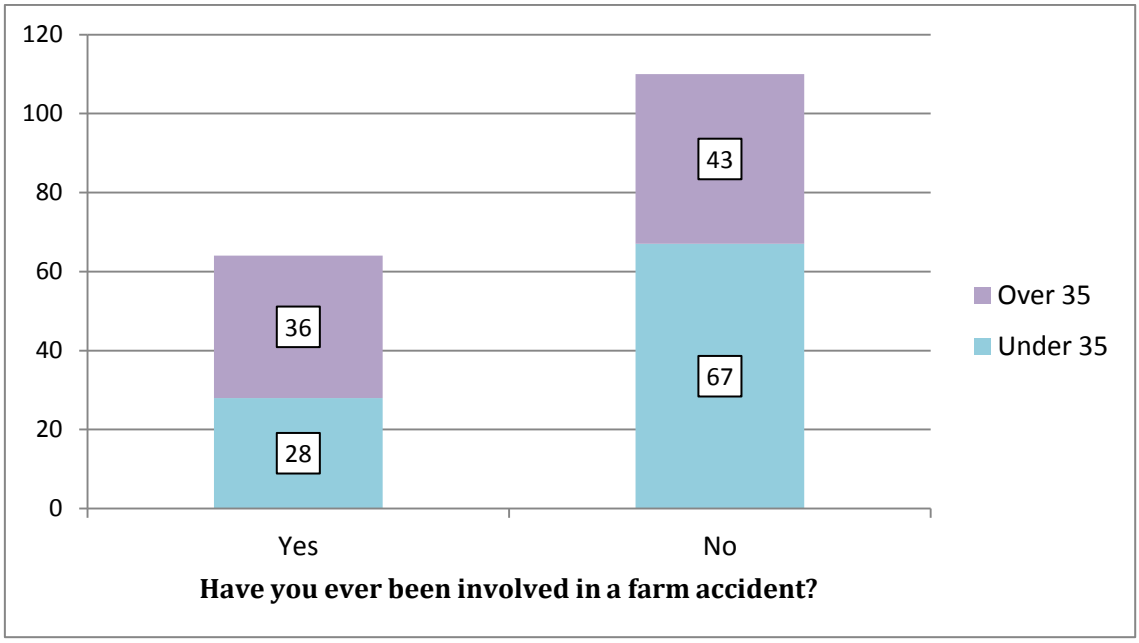

Figure 2 – *Participants involved in a farm accident*

Figure 2 shows the number of participants involved in a farm accident. Results show that 36 participants over 35 years old have been involved in a farm accident compared to 28 participants under 35 years who have.

A qualitative question "Have you ever been involved in a farm accident? If yes, please give brief details on what caused the accident(s)" was asked in conjunction to these results. A thematic analysis identified the main causes of farm accidents amongst the participants. In relation to this question 65 participants answered it. Four themes emerged; Machinery accidents, Livestock, slips, trips and falls and quad accidents (see figure 3).

The most common theme was 'machinery accidents', (25 participants) cited being involved in a machinery accident. Machinery accidents had one sub-theme, 'tractor'. This

theme represented that (11) participants were involved in a tractor accident. One key quote is used to demonstrate this theme, (participant 143) “got caught in pto of tractor 20 years ago, still have arm and working”.

‘Livestock’ was the next theme, (20) participants stated being injured by a farm animal. This theme was split into four sub-themes, bull, heifers, cows and horses, which represented that (7) participants had been attacked by a bull, (4) participants were injured by a heifer, (4) by a cow and (2) participants were injured by a horse. Three key quotes are used to demonstrate this theme, which are as follows, (participant 34) “I was attacked by a bull while moving him in a hurry without enough help”, (participant 75) “got ran over by a horse, breaking 3 vertebrae” and (participant 137) “broken arm from crush injury after heifer caught arm in crush bar. Cracked ribs from kick from cow”.

The third theme was ‘Slips, trips and falls’, (9) participants reported either a slip, trip or fall on the farm causing injury. One key quote was used to demonstrate this theme, (Participant 7) “Fell into open slurry pit”.

The final theme that emerged from the data was ‘quad accidents’, (3) participants reported being involved in a quad accident. One key quote was used to demonstrate this theme, (participant 171) “turned over quad, due to lack of experience”.

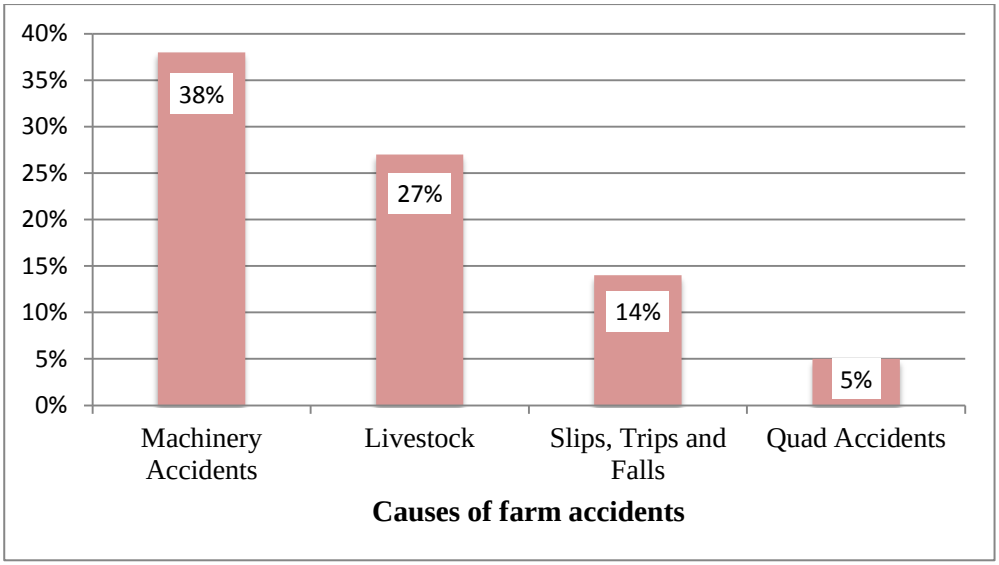

Figure 3: *Main themes representing causes of farm accidents as reported by participants*

Figure 3 shows the four most common types of farm accidents the participants were involved in.

Table 1: *Farm related factors of stress as rated by all the participants.*

Stressor	No stress %	A little stressful %	Moderately stressful %	Very stressful %
Farm accidents and injuries	25.4	39.0	18.6	9.6
The weather	6.8	32.2	33.3	22.00
Seasonal variations in workload	14.7	27.7	29.9	22.00
Concern over the future of the farm	22.00	36.7	19.8	15.8
Not having the manpower to operate the farm	30.5	36.2	21.5	4.5
Government export policy	40.7	32.8	16.4	4.0
Operating hazardous machinery	45.8	31.6	10.7	5.1

Balancing the many roles I perform as a family member and a farmer	21.5	40.7	22.0	9.6
Problems with machinery	16.9	45.2	23.2	9.6
Problems with livestock or crops	14.7	45.2	26.0	9.6
Working with extended family members in the farm operation	37.9	36.2	14.1	6.8
Having too much work for one person	20.9	39.5	23.2	10.7
Dealing with non-relative help	30.5	31.6	19.8	11.3
Outsiders not understanding the nature of farming	23.2	34.5	22.6	13.6

Participants were asked to rate farm related stressors in accordance to the amount of stress each stressor caused them. Table 1 shows that the weather and seasonal variations in workload are considered 'very stressful' by 22% of the sample. While 45.8% of the participants considered operating hazardous machinery as causing 'no stress'.

Table 2: *Means, Standard Deviations, Maximum, Minimum and Cronbach's Alpha scores for the Predictor and Criterion Variables.*

Variable	Mean	SD	Minimum	Maximum	α
Farm related factors	30.74	8.27	15.00	47.00	.89
Financial factors	20.36	6.42	9.00	36.00	.89
Social factors	8.21	2.42	5.00	16.00	.66
Safety awareness and competency	18.62	3.79	5.00	25.00	.83
Organisational environment	9.15	3.23	3.00	15.00	.89
Safety precaution	6.50	1.88	2.00	10.00	.57

Safety training	6.49	1.90	2.00	10.00	.72
Chronic fatigue	40.73	25.45	.00	100.00	.86
Acute fatigue	52.83	21.47	.00	96.67	.77
Inter-shift recovery	55.92	18.83	.00	100.00	.70

This table gives an overview of the means and standard deviations of the calculated totals for each sub-scale of the three variables used, as well as minimum and maximum total scores on each sub-scale. The Cronbach's Alpha (α) for each sub-scale was also included to indicate their internal consistency. A value above 0.7 is deemed satisfactory. All had quite good Cronbach alpha scores expect for safety climate sub-scale 'safety perception' (.57).

3.2 Inferential Statistics

Having ran normality tests for each scale a number of sub-scales appear to be slightly skewed. However due to the nature and powerfulness of parametric testing the author decided against using non-parametric tests as parametric tests are robust enough to withstand violations of parametric assumptions.

Hypothesis 1

A one-way analysis of variance (ANOVA) was conducted to compare if farmers stress caused by (farm related factors, financial factors and social factors) differed across farm types (cattle, other and mixed). There was no statistically significant difference between farm type and farm related factors (f (2, 148) = .54, p = .587), financial factors (f

(2, 151) = .58, p = .561) or social factors (f (2, 157) = .66, p = .521). Therefore the null hypothesis can be accepted.

Hypothesis 2

A one-way analysis of variance (ANOVA) was conducted to compare if levels of fatigue (chronic fatigue, acute fatigue and inter-shift recovery) differed across farm types (cattle, other, mixed). There was no statistically significant difference between farm type and chronic fatigue (f (2, 144) = .18, p = .833) or inter-shift recovery (f (2, 140) = 1.26, p = .287). However there was a statistically significant difference between farm type and acute fatigue (f (2, 142) = 4.47, p = .016). Therefore the null hypothesis can be partially rejected. More specifically Tukey HSD post hoc test indicated that cattle had a higher level of acute fatigue than other (mean difference = 14.12, p = .028, CI (95%) 1.23 – 27.02). Mixed farmers did not differ significantly from cattle or other.

Hypothesis 3

Table 3: *Independent t-test displaying differences between under 35's and over 35's on all Variables – Stress, Fatigue and Safety Climate*

Variables	Group	Mean	SD	t	df	P
Farm related factors	Under 35	30.94	8.89	.33	149	.742
	Over 35	30.49	7.51			
Financial factors	Under 35	19.86	6.41	1.01	152	.315
	Over 35	20.91	6.43			
Social factors	Under 35	8.20	2.62	-.07	158	.945
	Over 35	8.23	2.20			

Safety awareness and competency	Under 35	18.42	3.56	-.66	148	.510
	Over 35	18.83	4.04			
Organisational environment	Under 35	9.65	3.23	2.06	153	.041*
	Over 35	8.59	3.16			
Safety precaution	Under 35	6.34	2.08	1.12	152	.266
	Over 35	6.68	1.63			
Safety training	Under 35	6.26	1.95	1.57	152	.118
	Over 35	6.74	1.83			
Chronic fatigue	Under 35	39.19	25.72	-.74	145	.463
	Over 35	42.28	25.26			
Acute fatigue	Under 35	50.41	20.83	1.39	143	.166
	Over 35	55.35	21.97			
Inter-shift recovery	Under 35	56.67	21.59	.49	131.02	.628
	Over 35	55.14	15.56			

* p significant at .05 level.

Table 3 shows that an Independent t-test found that there was a significant difference between under 35s and over 35s on safety climate sub-scale organisational environment. Under 35s showed to have higher scores on organisational environment compared to over 35s, ($t(153) = 2.06$, $p = .041$). Therefore the null was partially rejected.

Hypothesis 4

A Multiple Regression was used to explore whether three sub-scales of stress (farm related factors, financial factors and social factors) and three sub-scales of fatigue (chronic fatigue, acute fatigue and inter-shift recovery) were predictors of two sub-scales of safety climate (safety awareness and competency and organisational environment).

The results of the regression indicated that one sub-scale of fatigue explained 2% of the variance of safety awareness and competency (R^2 = .02, f (6,104) = 1.29, p = .269). It was found that the overall model was not significant, however inter-shift recovery on its own significantly predicted safety awareness and competency (β = .30, p = .022, 95% CI .01 - .09). (See table 4)

Table 4: *Multiple Regression Analysis of Criterion Variable Safety Climate sub-scale Safety Awareness and Competency with Stress sub-scales and Fatigue sub-scales*

DV	IV	β	P	CI 95%
Safety awareness and competency	Farm related factors	-.05	.748	-.15 to .11
	Financial factors	-.01	.925	-.15 to .14
	Social factors	.09	.509	-.23 to .47
	Chronic fatigue	-.02	.907	-.03 to .03
	Acute fatigue	.07	.623	-.03 to .05
	Inter-shift recovery	.30	.022	.01 to .09

β = Beta Value

Additionally the regression indicated that two of the sub-scale predictors explained 16% of the variance of organisational environment (R^2 = .16, f (6, 108) = 4.52, p < .001. It was found that farm related factors significantly predicted organisational environment (β = .45, p = .003, CI 95% .06 - .29) as did chronic fatigue (β = .33, p = .003, CI 95% .01 - 07). Farm related factors showed the strongest unique contribution of the two predictor variables. Therefore, the null hypothesis was partially rejected. (See table 5)

Table 5: *Multiple Regression Analysis of Criterion Variable Safety Climate sub-scale Organisational Environment with Stress sub-scales and Fatigue sub-scales*

DV	IV	β	P	CI 95%
Organisational environment	Farm related factors	.45	.003	.06 to .29
	Financial factors	-.15	.255	-.21 to .06
	Social factors	-.09	.424	-.45 to .19
	Chronic fatigue	.33	.003	.01 to .07
	Acute fatigue	-.12	.327	-.06 to .02
	Inter-shift recovery	-.06	.585	-.05 to .03

β = Beta Value

3.3 Qualitative Analysis

Participants were asked to answer four open ended questions. Questions were answered with various responses. Participant responses were analysed using thematic analysis (Braun & Clarke 2006), from which certain themes emerged from participant answers.

One qualitative question has already been made reference to in the descriptive section.

Q. 1 - When is the most stressful time of year for you on the farm and why?

In relation to this question 171 participants answered it, from which several themes emerged and were categorised for the purpose of analysis. These themes included spring, harvest time, summer and winter.

The most common theme was ‘spring’, (64) participants cited spring time as the most stressful time of the year. Spring was split into 4 sub-themes and these sub-themes represented that (42) participants reported spring calving, (9) participants reported high work load, (5) participants stated long hours and (4) participants reported lambing as the major causes of stress in spring. The sub-theme calving was split further to another theme, ‘sleep deprivation’, (13) participants reported lack of sleep as a stressor caused by spring calving. Three key quotes are used to demonstrate this theme, (participant 43) “spring calving, long hours and lack of sleep if night calving”, (participant 162) “spring calving, bigger work load” and (participant 94) “springtime because lambing and calving”.

The second most common theme was ‘harvest’, with (20) participants citing harvest time as being stressful. Harvest was split into two sub-themes, time pressure and weather, which represented that (5) participants considered time pressure of the harvest as being stressful and (12) participants cited the weather as a stressor during the harvest. Two key quotes are used to demonstrate this theme (participant 2) “harvest due to time scale” and (participant 24) “harvest time because of Irish weather”.

The next theme that emerged was ‘summer’, (19) participants cited summer as the most stressful time of year. Summer was split into one sub-theme, cutting silage. This theme represented that (8) participants emphasised cutting silage as being stressful, (participant 163) “summer time, when the silage is being cut”.

The fourth category was ‘winter’, (16) participants cited winter as the most stressful time of the year. Winter had one sub-theme, animals in-housing, with (6) participants considering when animals are in-doors as being most stressful, (participant 118) “winter, animals are housed”.

Q. 2 - Do you always comply with farm safety rules and regulations? If No please state what would stop you from complying with them?

In relation to this question 69 participants answered it. Four themes emerged during thematic analysis, time, cost of implementing, impracticality and unsure of rules and regulations.

The most common theme was ‘time’, (26) participants cited time as a reason for not complying with farm safety regulations. Time was split into three sub-themes, rushing to get jobs done, short-cuts and following every rule would cause delay, which represented that (10) participants reported rushing to get jobs done, (5) taking shortcuts and (3) following every rule would cause delay, as the reason why they do not comply with farm rules. Two key quotes are used to demonstrate this, (participant 38) “I suppose being in a rush to get things done you’d take shortcuts” and (participant 173) “take a chance because it would cause a major delay to have everything right”.

The second most common theme was ‘cost of implementing’, (8) participants considered the cost of buying safety equipment and implementing safety measures on the farm as a reason for not complying with rules and regulations, (participant 103) “safety equipment costs more etc.”

The next theme that emerged in the data was ‘impracticality’, (7) participants considered some of the rules being impractical to implement and therefore farmers do not comply, (participant 87) “sometimes it’s not practical to follow the regulations”.

The fourth theme was unsure of ‘rules and regulations’, (3) participants were not familiar with the farm rules, (participants 28) “my lack of knowledge of the rules! Where are they written down?”

Q. 3 - Please list any other items you find stressful in relation to farming and rate them.

In relation to this question 26 participants answered. Several themes emerged, including department of agriculture, compliance with rules and regulations, paperwork and inspections.

The most common theme was the ‘department of agriculture’, (5) participants reported the department of agriculture as causing stress to farmers, (participant 173) “Dealing with incompetent staff in the dept. of Agriculture, very frustrating and very stressful”.

The second most common theme was ‘compliance with rules and regulations’, which represented that (4) participants found trying to comply with general rules stressful, (participant 1) “trying to comply with all the rules and regulations of today’s farming, including records etc.”

‘Paperwork’ was the next theme, (4) participants cited paperwork as causing stress to farmers lives, (participant 116) “Excessive paperwork that seems endless. A lot of it being repetition and no reason why it shouldn’t all be connected to or taken from the available farm packages”.

The fourth theme was ‘inspections’, (3) participants stated farm inspections caused them stress, (participant 35) “department of agriculture inspections, board bias inspections. Basically anybody with a clipboard ticking boxes”.

4. Discussion

The aim of this research was to explore the effects of farmers stress and fatigue on Irish farm safety. While there have been a number of studies examining farm safety world-wide in relation to farmers stress specifically, and farmers fatigue, there is little to no published studies relating to this area of research existing in Ireland. Thus the author's decision to explore this topic arose from the minimal amount of research relating to this area in Ireland.

The findings of this study will firstly be discussed based on the four hypotheses and literature in the area will be made reference to. Secondly limitations and strengths of the study will be considered and finally recommendations will be made for future research and implementations.

4.1 Hypothesis One

The first hypothesis of the current study proposed that there would be a significant difference in the level of stress experienced from the 3 sub-scales of stress; farm related factors, financial factors and social factors across the different farm types cattle, other and mixed. The hypothesis was not supported. This study revealed that there was no significant difference of stress levels experienced from farm related factors, financial factors and social factors across all 3 farm type groups.

These findings were surprising as different farm types have been found to be associated with different levels of stress. Research by Deary, Willock, McGregor and McGregor (1997) identified mixed and dairy farmers as experiencing the highest level of stress. A further study by Parry, Lindsey, Barnes and Taylor (2005) revealed that mixed

farmers experience high levels of stress. Results of the current study do not support findings by Deary et al. (1997) and Parry et al. (2005). It must be considered that the results may have been different if the sample had been evenly distributed within the farm type categories.

4.2 Hypothesis Two

The second hypothesis was an exploratory hypothesis which proposed that there would be a significant difference in the level of fatigue experienced within the 3 sub-scales of fatigue; chronic fatigue, acute fatigue and inter-shift recovery across the different farm types; cattle, other and mixed. The hypothesis was partially supported. This study revealed there was no statistically significant difference between farm type categories and chronic fatigue and inter-shift recovery. However there was a statistically significant difference between farm type and acute fatigue. Cattle farmers were found to have a higher level of acute fatigue than the other two farming categories. However there is no direct previous research in relation to different farm types causing different levels of fatigue.

Previous studies have however identified that farmers do suffer from high levels of fatigue (Kondinin Group, 2011; Ellingson, 2015). Although research concerning fatigue and farm types has not been conducted, this finding to an extent does support previous research that farmers do experience fatigue.

4.3 Hypothesis Three

The third hypothesis proposed that there would be a significant age difference across all three variables; stress and fatigue and safety climate perception. This hypothesis was partially supported.

This study found that there was no significant difference between under 35s and over 35s across the three sub-scales of stress. This finding was unexpected as studies have previously found that stress levels do differ between age groups. Research by Deary et al. (1997) found that farmers under 50 years' old experience more stress. However this current study could not be directly compared to Deary et al. (1997) findings as this study used different age groups. If this current study had included several age groups rather than two, findings may have been more comparable and the study may have produced different results.

This study also found that there was no significant difference between under 35s and over 35s across the three sub-scales of fatigue. This was an original hypothesis; no apparent research had been conducted prior to this study on whether different age groups experience different levels of fatigue. It was surprising that there was no significant relationship found here. Again, if this current study had included several age groups rather than two, findings may have been different.

This study found that there was no significant difference between under 35s and over 35s across three sub-scales of safety climate perception. However a statistically significant difference was found between under 35s and over 35s on safety climate sub-scale organisational environment. Under 35's were found to have a higher score on organisational environment than over 35s.

Once again there was no previous research to direct this hypothesis. The results showed that under 35s have a higher score on organisational environment than over 35s. This means that under 35s consider having too much work and their work environment too fast paced to comply with safety rules.

4.4 Hypothesis Four

The fourth hypothesis of this study proposed that 3 sub-scales of stress and 3 sub-scales of fatigue would significantly predict two safety climate perception sub-scales; safety awareness and competency and organisational environment. These two sub-scales were picked as they had most relevance to the role of farming and could be effected by stress and fatigue compared to the other two sub-scales.

This hypothesis was partially supported. This study found that fatigue sub-scale inter-shift recovery significantly predicted safety awareness and competency. It was further found that farm stress and chronic fatigue predicted organisational environment. This again was an original hypothesis, as no research prior to this study had been conducted investigating whether stress and fatigue experienced by farmers impacted their safety climate perception.

This finding identified farm stress as predicting organisational environment, which in an indirect way supports Elkind and Salter (1994) findings that stress stops farmers from taking safety precautions.

4.5 Additional Results from Qualitative Data

Analysis of a qualitative question in this study - "Have you ever been involved in a farm accident? If yes, please give brief details on what caused the accident(s)" revealed several themes. These themes identified the most common causes of farm accidents reported by the participants of this study. The main themes were machinery accidents (38%), livestock (27%), slips, trips and falls (14%) and quad accidents (5%). These themes are in line with accident trends reported by the HSA (2016), who identified tractors - farm vehicles, machinery - equipment, livestock and falls from heights, as the top four main causes of farming injuries and deaths in Ireland in 2015. These findings are further

supported by Dogan and Demirci (2012), who identified farm machinery, farm animals and falls as the main contributors to farm accidents.

4.6 Limitations and Strengths

A few limitations have been identified within this study. Specifically gender difference of the participants caused a problem, as gender was not distributed evenly; male (153) and female (24). Therefore no comparison could be made between the groups. An even number of male and female participants would make for a better cross gender observation. Secondly the farm types were not distributed equally, for instance dairy farmers (22%) and sheep farmers (2.8%). Thus the author had to make three new farm type groups, which made it impossible to make direct inferences and comparisons of all farm types across the three variables used. Thirdly the self-report questionnaires did not take into consideration the subjective natures of stress and fatigue and its sources. Fourthly the author was unable to find a safety scale that was specifically tailored to the farm environment; therefore some responses may not have reflected what the participants actually felt about the topic. Fifthly age ranges provided to participants were under 35 years old and over 35 years old. These could be considered too wide an age range which may have restricted the findings. Finally, although this study had a large sample (n=177), greater variance in the age groups provided may have given a better indication of the influence of age on farmers stress, fatigue and safety climate perception.

While acknowledging these limitations of this study, several strengths of the study have also been considered. Firstly it must be noted that there are no apparent studies which have explored stress and fatigue and farm safety in an Irish population. Therefore this study sought to fill a hole in academic research and further make a significant contribution to research in the area of farm safety and psychosocial factors. This is considered an

important strength which may encourage additional future research in the area by others. Secondly this study had a large sample size (n=177). Finally the questionnaires were distributed online through Facebook and email and also in paper format. This allowed the researcher to include individuals who didn't have a computer, who were from different areas in Ireland, different age groups and gender.

4.7 Future Research

Future research must take into consideration the limitations of this study. Firstly it is suggested that future research should look at a more representative sample of Irish farmers, which would include a near equal amount of males and females, as this was a major limitation in this study. Past research would suggest that farm stressors impact differently in both males and females (Deary et al, 1997). Further research is needed to explore this more. Secondly an even number of participants in each farm type would allow for a better comparison of levels of stress, fatigue and safety climate perception. Thirdly age ranges provided to participants in this study could be considered too wide, which may have restricted the findings. Different age ranges should be used in future research to obtain a better comparison across groups. Fourthly although qualitative questions were included in this study the use of a qualitative measure in the form of an interview might give a further in-depth indication into the feelings of the participants towards the variables used. Finally, it might be better to use a more relevant questionnaire to measure participant's feelings about farm safety and their compliance with the rules; one that is specifically tailored to farmers.

4.8 Implications

This study was inspired by the 2014 figures, for which the farming industry accounted for 55% of work-related deaths in Ireland (HSA, 2015), this emphasised the fact that farm safety in Irish farming has become a serious issue. This study put emphasis on the serious consequences of stress and fatigue on the farm and for farm safety. These facts and figures are important for future studies and strategies that deal with the issue of farm safety in Irish farming. This research may be considered useful to not only helping people directly and indirectly associated with farming to understand the effects of stress and fatigue on the farm, but it may also be used to understand the effects of stress and fatigue on safety in other occupations.

4.9 Conclusion

The overall aim of the current study was to explore the effects of farmers stress and fatigue on Irish farm safety. Although more research is needed into the area of stress, fatigue and farm safety, the current study found statistically significant differences between farm type and levels of fatigue experienced. Other statistical findings included a statistically significant difference between age and organisational environment. Inter-shift recovery was found to predict safety awareness and competency. Additionally farm stress and chronic fatigue were found to predict organisational environment. These findings suggest that there is a definite relationship between stress and fatigue and safety climate perception.

Despite the limitations discussed, the current study achieved some insight into the areas of farmer's stress, fatigue and farm safety. It is hoped that this research and future research will build on and inform people of the relationship between stress, fatigue and farm safety.

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Appendix 1 – Cover Letter of Questionnaire

Dear Participant,

My name is Karyn and I am conducting research in the Department of Psychology in Dublin Business School. This current research is part of my final year studies and will be submitted for examination.

This questionnaire you have received is inviting male and female farmers, 18 years and older to complete a number of questions in relation to Stress, Fatigue and Health and Safety. Participation involves completing and returning the questionnaire in the envelope provided. The following questions should take about 10-15 minutes to complete. It is important that you answer the questions as honestly as you can, as this will provide for accurate and comprehensive results.

This questionnaire has been granted ethical clearance by the college ethics board. Participation of this research is voluntary and you are under no obligation to take part. Participation is also anonymous and confidential. Therefore responses cannot be attributed to any one participant. The data from the questionnaires will be transferred from the paper into electronic format and stored on a password protected computer. The questionnaires will be securely stored in a locked filing cabinet and following examination the questionnaires will be professionally shredded.

Please note that by completing and submitting the questionnaire that you are consenting to participate in the research and it will not be possible to withdraw from participation after the questionnaire has been received.

If this questionnaire raises any issues or feelings and you need to talk to somebody, please find contact information for support included on the final page.

Thank you in advance,

Karyn Bennett

(student email address)

Appendix 2 – Questionnaire

General Questions:

Please note: You can only complete this questionnaire if you are over 18 and your main occupation is farming. Please tick the boxes most relevant to you.

1. What is your gender?	
Male	
Female	

2. What is your age?	
Under 35	
Over 35	

3. Which of the following best describes your current relationship status?	
Married	
Widowed	
Divorced/Separated	
In a domestic partnership or civil union	
Single, but co-inhabiting with a significant other	
Single, never married	

4. Type of Farm (You can tick more than one box for this question)	
Dairy	
Beef	
Suckler	
Sheep	
Tillage	
Other:	

5. How many years have you worked as a farmer?	
0-5 years	
6-10 years	
11 – 20 years	
21- 30 years	
31-40 years	
40 +	

6. On average how many hours a day do you work on the farm?	
0-3 hours	
4-6 hours	
7-9 hours	
10-12 hours	
12+ hours	

7. On average how many hours sleep do you get per night?	
0-3 hours	
4-6 hours	
7-9 hours	
9+ hours	

8. How many people work on the farm you work on?	
1 (Yourself)	
2	
3	
4+	

9. Have you completed a farm Health and Safety training course?	
Yes	
No	

10. When is the most stressful time of year for you on the farm and why?

11. Have you ever been involved in a farm accident?	
Yes	
No	

If yes, please give brief details on what caused the accident(s)

12. **Do you ALWAYS comply with farm safety rules and regulations?**	
Yes	
No	

If NO please state what would stop you from complying with them?

13. **When you are fatigued (tired) do you find that health and safety practise is less of a priority?**	
Yes	
No	

14. **When you are stressed do you find that health and safety practise is less of a priority?**	
Yes	
No	

Listed below are some of the things that can contribute to farming related stress. Please answer each question by circling the number in the box most relevant to you (**one box for each question**).

Stressor	No Stress	A little Stressful	Moderately Stressful	Very Stressful
1. Distance from shopping centres/school/recreation, etc.	1	2	3	4
2. Lack of close neighbours	1	2	3	4
3. Farm accidents and injuries	1	2	3	4
4. The weather (inadequate/too much rainfall, snow, hail, etc.)	1	2	3	4
5. Market prices for your crops/livestock	1	2	3	4
6. Limited social interaction opportunities	1	2	3	4
7. Seasonal variations in workload (planting season, harvest, calving time, marketing time, etc.)	1	2	3	4
8. Not enough money for day-to-day expenses (purchases, repairs, parts, fence and building maintenance, etc.)	1	2	3	4
9. High debt load	1	2	3	4
10. Working with bankers and loan officers	1	2	3	4
11. Not enough time to spend together as a family in recreation	1	2	3	4
12. Concern over the future of the farm	1	2	3	4
13. Not having the manpower to operate the farm	1	2	3	4
14. Government export policy	1	2	3	4
15. Operating hazardous machinery	1	2	3	4
16. Taxes (high taxes, figuring taxes, etc.)	1	2	3	4
17. Distance from doctors or hospitals	1	2	3	4
18. Balancing the many roles I perform as a family member and a farmer	1	2	3	4
19. Problems with machinery (purchases, repairs, breakdowns)	1	2	3	4
20. Problems with livestock or crops (illness, disease, noxious weeds, rodents)	1	2	3	4
21. Not enough cash/capital for unexpected problems (illnesses, health care, breakdowns, other emergencies)	1	2	3	4
22. Working with extended family members in the farm operation (parents, in-laws, children)	1	2	3	4
23. Having too much work for one person	1	2	3	4
24. Financing for retirement	1	2	3	4
25. Government farm price supports	1	2	3	4
26. Dealing with non-relative help (incompetent help, finding good help,	1	2	3	4

supervising help)				
27. Outsiders not understanding the nature of farming	1	2	3	4
28. Health care costs (direct costs and/or cost of insurance)	1	2	3	4
29. Please list any other items you find stressful in relation to farming and rate them.				

Please answer these questions in relation to your Health and Safety consciousness on the farm. Please answer each question by circling the number in the box most relevant to you (**one box for each question**).

	Strongly Disagree	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
1. I am clear about what my responsibilities are for the workplace safety	1	2	3	4	5
2. I understand the safety rules in my job	1	2	3	4	5
3. I can deal with safety problems in my workplace	1	2	3	4	5
4. I comply with the safety rules all the time	1	2	3	4	5
5. When I am at work, I think safety is the most important thing	1	2	3	4	5
6. Sometimes there is too much work to do without following the safety procedures	1	2	3	4	5
7. Sometimes work pace is too fast to follow safety procedures	1	2	3	4	5
8. Sometimes I have to ignore safety requirements for the sake of production	1	2	3	4	5
9. My job is quite safe	1	2	3	4	5
10. In those dangerous jobs, there are always measures to prevent accidents	1	2	3	4	5
11. I am trained in safety knowledge	1	2	3	4	5
12. Safety training fits my job	1	2	3	4	5

Please answer these questions in relation to your experience of fatigue and strain at work over the last few months. Please answer each question by circling the number in the box most relevant to you (**one box for each question**).

	Strongly Disagree	**Disagree**	**Slightly Disagree**	**Neither Agree or Disagree**	**Slightly Agree**	**Agree**	**Strongly Agree**
1) I often feel I'm 'at the end of my rope' with my work	0	1	2	3	4	5	6
2) I often dread waking up to another day of my work	0	1	2	3	4	5	6
3) I often wonder how long I can keep going at my work	0	1	2	3	4	5	6
4) I feel that most of the time I'm just "living to work"	0	1	2	3	4	5	6
5) Too much is expected of me in my work	0	1	2	3	4	5	6
6) After a typical work period I have little energy left	0	1	2	3	4	5	6
7) I usually feel exhausted when I get home from work	0	1	2	3	4	5	6
8) My work drains my energy completely every day	0	1	2	3	4	5	6
9) I usually have lots of energy to give to my family or friends	0	1	2	3	4	5	6
10) I usually have plenty of energy left for my hobbies and other activities after I finish work	0	1	2	3	4	5	6
11) I never have enough time between work shift to recover my energy completely	0	1	2	3	4	5	6

12) Even if I'm tired from one shift, I'm usually refreshed by the start of the next shift	0	1	2	3	4	5	6
13) I rarely recover my strength fully between work shifts	0	1	2	3	4	5	6
14) Recovering from work fatigue between work shifts isn't a problem for me	0	1	2	3	4	5	6
15) I'm often still feeling fatigued from one shift by the time I start the next one	0	1	2	3	4	5	6

Appendix 3 – Help Sheet

If this questionnaire has raised any issues or feelings and you feel the need to talk to somebody, please find the numbers of some organisations that will be able to help:

You can contact your local GP, which can be found under general practitioners in the Golden Pages

Organisation	Contact Details
The Farm and Rural Stress line	Phone Number: 1800 742 645
Aware Helpline	Phone Number: 1890 303 302 (10am – 10pm) Email: supportmail@aware.ie
Samaritans Ireland	Phone Number: 1850 60 90 90 Email: jo@samaritans.org
GROW	Phone Number: 1890 474 474 Email: info@grow.ie
Suicide Prevention Helpline	Phone Number: 1800 742 745 Email: info@mentalhealthireland.ie
RECOVERY International Ireland	Phone Number: 01 626 0775 Email: info@recovery-inc-ireland.ie
Shine	Phone Number: 1890 621 631

If you have any questions or concerns regarding this questionnaire please contact me via email at (xxxx)