

A Three Week Intervention in Secondary School Girls to Promote Active Transport and
Observe the Changes after the Intervention

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ABSTRACT

Background: 80% of 13-15 year olds do not participate in 60 minutes of moderate activity on a daily basis (Hallal et al. 2012). Active travel may be a way of tackling this and encouraging adolescent girls to participate in more physical activity and meet the recommendations. The purpose of this study was to assess the short term impact of a 3 week active travel intervention on walking and cycling for transport. In addition, compare their attitudes towards active travel to school and other places. The research shows that adolescent girls do not do enough physical activity and do not meet the recommended daily guidelines. There may be a better chance of adhering to physical activity by participating in active travel. There are few examples of effective active transport interventions with adolescent girls internationally. This study looked at what effect the intervention had on walking and cycling to and from school, weekly active travel minutes and the attitudes of the students towards walking and cycling to and from school.

Methods: This was quasi-experimental study consisting of an intervention (n=25) and control groups (n=21) of adolescent girls. All participants completed a survey that measured usual travel to school, weekly minutes of active travel and active travel immediately before and after the intervention. The intervention was delivered in 3 weekly classes during January 2014 and covered the following topics; walking and cycling as a mode of transport, how easy and fun active travel can be and whether the town was walkable and cycleable.

Results: The results showed that there was a 58% increase in walking minutes in the intervention group, although this did not reach statistical significance. There was no change in mode of travel to school. The key attitudes that were the greatest at baseline were the distance to travel to school and the amount of belongings they had to carry to school.

Conclusion: School-based active travel intervention targeting adolescent girls in smaller provincial towns should focus more on walking for transport.

1.0 INTRODUCTION

The purpose of this study was to investigate the effect of a three week intervention in secondary school girls to promote active transport and observe the changes after the intervention. This was done by entering a school and presenting the students with an intervention on active travel and measuring the levels of active travel and attitudes towards active travel immediately before and after the intervention.

Active travel is defined as “various modes of travel such as walking, cycling, and skateboarding, and has been identified as an important source of physical activity for young people”, (Lubans et al. 2011 pg 1). For the purpose of this intervention walking and cycling were the main focus and all others forms were acknowledged. Active travel is not just associated with young people or as a mode of transport to and from school. Active travel can also be used as a mode of travel to other places such as shopping, cinema, work and meeting with friends.

Active travel has many benefits which include reduced body mass index, improved concentration levels and reduces the risk of diabetes, coronary heart disease, cancers and other reducing life expectancy diseases, (Tremblay, Inman &Willms 2000, Brownson, Eyler, King, Brown, Shyu and Sallis, 2000, Goran et al. 1999, Faulkner, Buliung, Flora and Fusco 2009, Moodie et al. 2011).

Unfortunately there are limited studies on active travel in Ireland. In Australia and Canada there is plenty of research and intervention to promote active travel. If these could be implemented in Ireland the obesity epidemic may be reduced. Research shows that those who travel actively participate in more physical activity; this in turn may decrease obesity as a whole, (Riddoch et al. 2004, Sproston and Primatesta 2003, Rissel, 2009, Moodie et al. 2011).

Therefore the purpose of this study, increasing the knowledge of active travel and ways to take part in active travel were included in the intervention. Looking at the attitudes held by the students and trying to change these attitudes by demonstrating different opinions on the subject of active travel were also used. These attitudes and active travel levels held by the

student who received the intervention were compared to a control group who did not receive any intervention or knowledge of active travel.

2.0 LITERATURE REVIEW

2.1 The Health Benefits of Physical Activity and Active Travel

There are many benefits of physical activity. These include improvement of brain function in children, high energy and improved concentration levels, high self-esteem levels, increased educational performance, reduction in the risk of diabetes and coronary heart disease and other health problems in later life, (Tremblay, Inman & Willms 2000, Brownson, Eyler, King, Brown, Shyu and Sallis, 2000, Goran et al. 1999, Faulkner, Buliung, Flora and Fusco 2009). Physical inactivity can cause both chronic and acute disorders. These include diabetes, hypertension, cancer, osteoporosis, obesity, depression and cardiovascular diseases, (Warburton, Nicol and Bredin, 2006, Bouchard, Blair and Haskell, 2007). Sallis (2000) showed that as children reach their teenage years their level of physical activity drops and once they reach the age of 14 and 15 they are not meeting the health-related guidelines. These guidelines are 60 minutes of activity daily. (ACSM, 2014, Brownson, Eyler, King, Brown, Shyu, and Sallis, 2000). Adolescent girls experience a severe drop in physical activity as they get older. However, those who travel actively participate in more physical activity, (Riddoch et al. 2004, Sproston and Primatesta 2003, Rissel, 2009, Moodie et al. 2011). Active transport may be a way of including physical activity time as children and adolescents commute to school. Research also shows that general body mass index (BMI) and obesity levels are lower in those who participate in active travel, (Moodie et al. 2011, Bassett et al. 2008, Lubans, Boreham, Kelly and Forter 2011).

Moodie et al. (2011) examined the effectiveness of the TravelSMART schools active transport programme as a way to prevent obesity. The programme comprised of information workshops for students and professional training for participating teachers. The results showed a reduction in the BMI scores of the students and it was cost-effective. Likewise Bassett et al. (2008) showed that countries that have low BMI scores were more likely to have high levels of active travel. They found that the USA active travel levels were the lowest at 10% compared to Latvia's 35%. USA had the highest levels of obesity in comparison to any of the other countries.

Overall each of the three studies shows that with active travel, physical activity levels increase, obesity levels reduce, and it is a cost effective way of partaking in physical activity. However, Lubans et al. (2011) found that not all aspects of physical activity are addressed. Even though active travel has a close relationship with health-related fitness it does not tick all the boxes. Flexibility and muscular fitness are not associated. Although there are many benefits associated with physical activity and active travel, participation levels are very low in adolescent girls.

2.2 Physical Activity and Active Travel Trends in Adolescent Girls

Research shows that the daily guidelines for physical activity are not being met by teenagers and more noticeably adolescent girls, (Corbin, Pangrazi, and Le Masurier, 2004, Hallal et al. 2012). Hallal et al. (2012) state that 80% of 13-15 year olds do not participate in 60 minutes of moderate activity on a daily basis. Out of the 105 countries surveyed, 80% males in 56 of the 105 countries did not reach 60 minutes per day. In comparison 95% of females in 100 of the 105 countries did not reach 60 minutes per day. These figures show a worrying trend towards physical inactivity. Hallal et al. (2012) showed that in 2009 physical inactivity was the 4th highest reason for over 3 million deaths. These 3 million deaths could have been reduced by participating in daily physical activity daily. Incorporating active travel into the daily routine may be a way to include 30 minutes of extra exercise.

Wong, Faulkner, Buliung and Irving (2011) showed that 23% of secondary school and 38% of elementary school children walk to and from school every day. They also state that 32% of secondary and 47% of elementary school children cycle to and from school. These figures were highest in the USA, followed by Australia, while Europe's figures ranked lowest. The research conducted by Wong et al. (2011) highlights that secondary school children's levels of active travel are considerably low.

According to the Active Transport in Young Adults - Students Travel Survey by Giles - Corti, Cheriachan and Young (2002), only 18% of young people walk to school on a regular basis in Australia. Out of that 18%, 25% of females and 21% of males walk as a mode of transport. The other 54% used other modes of transport such as cars, buses or trains. Out of that 54%, 30% of the students had their own car and drove to and from school. This was the

most popular mode with walking second at 18%. Females found walking to be a preferred mode of transport to and from school. When we look at the figures in Ireland, 26% of 18-24 year olds walk to school or college (CSO 2009). According to the CSO (2009) 16% of females walk and less than 1 % cycle as a mode of transport. These figures are lower than international figures. In Australia 18% of females, in the USA 38% and overall 5% walk as a mode of transport (Giles-Corti, Cheriachan and Young 2002, Faulkner et al. 2009, Wong et al. 2011, Hallal et al. 2012). Although physical activity and active travel participation levels are very low in adolescent girls, will increasing active travel levels contribute to physical activity levels?

2.3 Contributions of Active Travel to Physical Activity Recommendations

Research shows that those who travel to school by foot or cycle are more physically active, (Faulkner, Buliung, Flora and Fusco, 2009, Cooper et al. 2005, Cooper, Page, Foster, Qahwaji, 2003, Duncan, Duncan and Schofield, 2008, Van Sluijs et al. 2009). Faulkner, Buliung, Flora and Fusco (2009) state that active transport, physical activity levels and body weight of children and youth are all connected. Their study examined school children aged between 5 and 18 years. Their BMI, weight and physical activity were measured. The results supported their hypothesis that active transport increases total physical activity levels in children aged from 5 to 18 years. They found that those who actively travelled to school were more physically active than those children who didn't. When Van Sluijs et al. (2009) looked at active travel and children's physical activity they also found that children who travelled to school by foot or cycled were more physically active, but only 43% did so. Cooper et al. (2005) found that girls were more likely to walk and cycle to school. This was associated with increased physical activity levels. They suggested that increasing cycling levels in girls maybe a method to increase physical activity levels as it did with their male counterparts.

Duncan, Duncan and Schofield, (2008) also show results like Van Sluijs et al. (2009) and Faulkner et al. (2009). They conducted a study on physical activity and active transport levels on school girls aged between 5 and 16. Their results showed that steps counted on week days were more than at the weekend. 45% of the participants used active travel to get to and from school and these participants took roughly 1000 more steps on a daily basis. These steps

were taken in the 20 minutes it took to travel between the school and the home. This can make up 20 minutes of the 60 minutes recommended daily guidelines, (ACSM, 2014, Brownson et al. 2000, Corbin, Pangrazi, and Le Masurier, 2004). Although active transport contributes to physical activity levels there are many correlates of active travel, especially in adolescent girls.

2.4 Correlates of Active Travel in Adolescent Girls

The main correlates of active travel include environment, psychological and social factors, (Bauman et al. 2012, Garrard, 2009).

2.4.1 Environmental Factors

The environmental correlates of exercise found by research, are traffic speed and volume, distance from home to destinations (i.e. school and shops) and recreational facilities, (Bauman et al. 2012, Garrard 2009). Research shows that the design of the neighbourhood, the transport in the area, the social environment and the aesthetics of the area were all correlates of active transport, (Evenson et al. 2004, Bauman et al. 2012, Saelens 2008, Panter 2010, Humpel, Owen 2004, Van Cauwenberg 2011, Hume et al. 2008). Recreational facilities were found to be a major correlate of active travel by adolescent girls, (Humpel 2003, Boles et al. 2011, Owen 2004, Saelens 2008, Van Cauwenberg 2011, Bauman et al. 2012, and Evenson et al. 2004). Hume et al. (2008) conducted a study in Melbourne, Australia on 188 adolescents aged 14 to 18. They were asked to describe their perceptions of the environment both physical and social for walking and cycling to and from school. Following this there were a series of interventions implemented including safe cycling and walking training for the children, improvements to traffic lights and pedestrian lights and the introduction or improvement of cycle lanes. Two years later the participants were measured in the exact same way as before. Their results showed that the parents who found their neighbourhoods to be safe were more likely to allow their child walk or cycle to and from school. The parents who found that there were inadequate traffic lights or cycle lanes were more likely to allow their child to walk and cycle to and from school following the interventions. They highlighted that the physical environment was the main factor which inhibited children to participate in active travel. It was found most parents do not trust their

surroundings but after the two year period and the interventions their perceptions of these areas changed.

Evenson et al. (2004) also observed that adolescent girls who found it safe to walk, cycle or jog to school were more likely to participate in physical activity than those who didn't find it safe. Their participants were asked about facilities located near their school and homes and if these facilities were used. They discovered if the area was presented well, i.e. has no rubbish and has greenery and shrubberies, adolescent girls were more likely to partake in physical activity and active travel. Those who had recreational equipment or walking and cycling trails near their homes and neighbourhoods participated in physical activity and active travel more often than those who didn't. If an area of interest was located nearby, girls were more likely to walk to it. Overall physical environment has a huge impact on the physical activity and active travel patterns of female students. The results also showed that safety, the environment, and facilities were all linked with the levels of active transport. If a participant found that the environment was nice and safe and the facilities were of a high quality, their levels of active transport would increase. If on the other hand they found that the environment was unsafe and unfriendly and there were not adequate facilities their levels of active transport would decrease. Bergstrom and Mangusson's (2003) and Bauman et al. (2012) showed that weather effected whether adolescent girls were participating in active travel. Cycling paths and road conditions were also another factor but not as significant as weather.

2.4.2 Psychological Factors

Research shows that confidence in the ability to cycle or walk to school is the main factor that prevents children and especially adolescent girls from walking and cycling to school (Miller, Redmond and Vaux-Bjerke, 2013, Garrard 2009). They found that boys had more confidence than girls in their ability to walk to school. Parent's confidence levels in their child's ability to walk to school were higher than that of the child. Perceived competence in the girl's ability to walk and cycle to school was also another correlate, (Bauman et al. 2012, Sallis 2000, and Biddle 2005). Self-efficacy and attitude towards cycling were also determined as correlates of active travel to and from school, (Bauman et al. 2012, Sallis 2000, Biddle 2005, Van Der Horst 2007, and Uijedewilligen 2011). The value of the health status to the individual was established to be a correlate by Sallis (2000) but was not as important as

self-efficacy, attitudes and confidence in ability. In the UK, Lorenc et al. (2008) conducted a study on attitudes to walking and cycling among adolescent girls and parents. They noticed that the main reason for reduced participation levels in active travel was due to a fear of the environment and safety of themselves and their children. They also proved that the parents group wanted to encourage their children to develop an independent lifestyle towards travel choices but found it difficult. They confirmed that parents did not trust the environment around them for their children to travel actively.

Being physically active was considered an important correlate to whether adolescent girls were actively travelling to and from school, (Bauman et al. 2012, Sallis 2000, Biddle 2005, Van Der Horst 2007, Edwardson 2010, and Craggs 2011). Most research found that smoking had an inverse relationship with active travel, (Bauman et al. 2012, Sallis 2000, Biddle 2005, Van Der Horst 2007, Edwardson 2010, and Craggs 2011).

2.4.3 Social Factors

The research on social factors shows that parental role models were a major correlate of active travel, (Bauman et al. 2012, Sallis 2000, Biddle 2005, Van Der Horst 2007, Edwardson 2010, Craggs 2011, and Uijdewilligen 2011). The main social factor that influenced whether adolescents participated in active travel was whether there was support from family and friends for physical activity, (Bauman et al. 2012, Sallis 2000, Biddle 2005, Van Der Horst 2007, Edwardson 2010, and Garrard 2009). They established that if the adolescent girls had the support of their parents and peers they were more likely to participate in physical activity and active travel. Research also discovered that if the parents were physically active or travelled actively, their children were also more likely to travel actively. General support was a greater correlate than family support to participate in physical activity for adolescent girls. The researcher shows that if the adolescent girls' peers approved their choice to walk and cycle to school they were more inclined to participate in active travel. (Sallis 2000, Biddle 2005, Van Der Horst 2007, Edwardson 2010, Bauman et al. 2012, Craggs 2011).

According to Su et al. (2013) there is very little literature on the influences of whether children walk to school or not. They had over 4,000 participants in their study and looked at their walking habits. Su et al, (2013) illustrated that 20% of children walked to school on a

daily basis. They also portray that the distance between school and home was a major factor in the chances of the child walking to school. Su et al. (2013) also proved that gender and age had no effect on whether children walked or cycled to and from school. Although Su et al. (2013) found that age had no relationship; they did find that as children got older the likelihood of using active travel increased. This shows that if children are taught from a young age to walk and cycle to school safely they are more likely to participate in active travel as they get older. The studies above show that there are many correlates of active transport in adolescent girls

2.5 Interventions to promote active travel in adolescent girls

There are many interventions that have taken place to try to promote active travel in adolescent girls. These studies are outlined below and a summary is provided at the end of the section

Mackie et al. (2010) conducted an intervention study in schools in Auckland, New Zealand to try to promote active travel. Their intervention involved attending the schools and conducting an assessment on the level of active transport and the infrastructure in the school. Following the assessment, the researchers developed three interventions for the schools.

Intervention 1 involved making the school safe and attractive to develop cycling networks. This was implemented by identifying quiet streets, roads and short-cuts along with the development of safe cycling paths across the dangerous and busy roads. It also included sharing the pathway with pedestrians with different speed zones.

Intervention 2 involved providing cycling training, secure bike storage and slow zones. This was implemented by encouraging slow zones around the school and the streets, training the students in cycling and cycling safety and providing skills that are safe.

Intervention 3 involved promoting the benefits of cycling to school and active travel, as a whole, to students, parents and drivers. This programme is aimed at working upstream and encouraging safe cycling and driving for future generations.

The results showed that providing safe cycle networks and tracks around the schools increased the levels of cycling in all the schools. Parental consent for children to cycle to

school was another major factor to children cycling. Mackie et al. (2010) found that parents found cycling to school was too risky for their child and would not let them participate. After the interventions were implemented there was a greater preference given to promoting active travel in schools. However, there was an increase in the need for leadership in promoting the programmes to increase the levels of active travel.

In comparison to Mackie et al. (2010), in the UK 208 schools were asked to take part in the UK Travel to School Initiative Programme, (Atkins 2010). These schools were asked what initiatives they had operating in the school. They found that:

- 139 schools had a walk to school week,
- 78 had walk on Wednesday (WOW) days,
- 68 had pedestrian training days,
- 45 schools had the walking bus initiative,
- 20 schools had a reward scheme,
- 23 schools had either park and stride, starwalker or walking to school diaries.

Atkins (2010) found that the walk to school weeks and WOW days were the most common programmes used. Primary schools were more likely to participate in initiatives than secondary and schools for those with disabilities. Walking to school week was the most popular initiative used by the 15% of secondary schools that participated and the walking bus was the most popular for those in schools with people with disabilities.

Wen et al. (2008) also carry out a study which looked at ways to promote walking in schools across New South Wales in Australia. Wen et al. (2008) performed interventions in 61 schools. These interventions involved different programmes for teachers and staff to develop their knowledge of active travel. They also received information to distribute to their class and parents. Parents also received monthly newsletters updating them on the progress of the intervention. The teachers were supplied with the resources needed to enhance the teaching of active travel to the students. A strategy using pedometers was used in some schools to increase the amount of steps taken to increase active travel. The local county councils were also educated by Wen et al. (2008). They were given resources to assess the walkability and safety of the area around the schools and information on how to further improve the infrastructure and reduce the barriers to active travel. A programme called a Travel Access

Guide (TAG) was supplied to each school to encourage both schools and county councils to improve and increase active travel. The results showed that active transport increased by 5 % and there was an 8% decrease in those who used cars as a mode of transport.

An intervention was conducted by Mackie (2009). He used teacher filled surveys to gather information on active travel routes and levels in the school. The researchers then had focus groups with approximately 13-17 students. They discussed active travel as a whole, looking at the barriers to active travel and the environment around the school for actively travelling to school. Following this they made recommendations based on the feedback which included mapped safe walking/cycling routes, secure bike storage, cycling training, bike buddy system, cycling officer, low-speed zones and cycle trains. The results of these interventions showed that the figures of those who took part in active travel increased by 13% from 9% to 22%.

McKnee et al. (2007) conducted a study which looked at a school-based intervention on active transport. The intervention lasted a period of 10 weeks. It was a whole school approach and both teachers and parents were involved in the study. All teachers received a resource guide to help deliver the programme in the school. The guide included many programmes to promote active travel. The parents also received a home resource pack to encourage active travel by the whole family. The results showed a 38% increase in active travel in the intervention group.

Table 2.1: Summary of Interventions

Author	Subjects	Methods	Intervention	Results
Mackie et al. (2010)	Schools in Auckland, New Zealand	Assessment of AT (Active travel) levels, Infrastructure	<ol style="list-style-type: none"> 1. Safe school approach 2. Providing training 3. Providing benefits of Cycling 	<ol style="list-style-type: none"> 1. Increased cycling levels 2. Preference given to promoting AT in schools.
Atkins (2010)	373 schools in the UK	Asked about initiatives in schools	<p><i>Walk to school</i></p> <p>The walk to school week involved promoting walking to school for a full week in the school.</p> <p><i>Walk on Wednesday's (WOW)</i> initiative is when the children walk to and from school on Wednesdays.</p>	<ol style="list-style-type: none"> 1. All initiatives increased AT levels 2. Primary school more initiatives than secondary schools

			<p>The initiative is used to try to increase children and adolescences walking to school on a daily basis.</p> <p><i>Pedestrian training days</i> were developed to train children and adolescences about safely walking to and from school and to become more aware of the dangers of walking and how to avoid these dangers.</p> <p><i>Walking Bus</i> is an initiative to encourage students to walk to school by pretending to be on a bus. There is a conductor and a driver (parents and teachers) and the children walk in pairs resembling the layout of a bus</p>	
Wen et al. (2008)	61 schools	Interventions for both teachers, parents and students	<ul style="list-style-type: none"> • Information programme for teachers • Information supplied to parents and students • Pedometers for students • County council were educated • Travel Access Guide (TAG) programme given to all schools 	<ol style="list-style-type: none"> 1. 5% increase in active travel 2. 8% decrease in use of car as a mode of transport
Mackie (2009)	Teachers in secondary schools Group of 13-17 students	Surveys filled in by teachers about active travel routes Focus group of students	<ul style="list-style-type: none"> • Mapped safe walk/cycle routes • Bike storage areas • Cycling training • Bike buddy system • Low –speed zones • Cycle trains • Cycling officer 	13% increase in active travel
McKnee et al. (2007)	Schools in UK	All teachers, parents and students were involved	<ul style="list-style-type: none"> • Lasted 10 weeks • Resource guide given to each school • Home pack given to parents 	38% increase in active travel levels

All the interventions above show that different methods can be used to increase active transport but there is very little research on intervention for adolescent girls only. Therefore this study aims to find if a 3 week intervention can change the attitudes and levels of active travel in teenage adolescent girls.

2.6 Conclusion

This chapter looked at active travel benefits and barriers. It found that active travel and health are closely related. Active travel helps reduce obesity, coronary heart disease, diabetes and is a way of maintaining good general health. It also found that adolescents were less likely to participate in active travel as they get older. Boys are more likely to cycle than girls but girls are more likely to walk. It shows that primary schools are more likely to travel actively and secondary school children are more likely to drive or be driven to school. It also found that children that are dropped to school are more likely to be less physically active.

This chapter also looked at the correlates of physical activity and active transport which are mainly the physical environment, psychological and social factors. It also illustrated the recommendation for children and activity. Most children do not meet the daily guidelines of 60 minutes of moderate or vigorous exercise per day at least 5 times a week. Interventions that have already taken place in Australia and the UK show that active travel can be increased with the use of an intervention. However, there are limited studies on short-term interventions with adolescent girls only.

2.7 Rationale and research questions

2.7.1 Rationale:

The research presented above shows that adolescent girls do not do enough physical activity and do not meet the recommended daily guidelines. There may be a better chance of adhering to physical activity by participating in active travel. This study examines the potential for a short-term school-based intervention to influence attitudes to and participation levels in active travel. Physical activity levels in adolescent girls are much lower than that of their male counterparts and only one third of children reach the daily guidelines of 60 minutes of moderate activity per day (Ortlieb et. al 2013). There are few examples of effective short-term active transport interventions with adolescent girls internationally. Therefore, the purpose of this study is to assess whether a short-term intervention can change active travel behaviours and attitudes in adolescent girls.

2.7.2 *Research Questions:*

What effect did the intervention have on:

1. Walking to and from school
2. Cycling to and from school
3. Total weekly minutes of active travel
4. Students attitudes to walking for transport to and from school
5. Students attitudes to cycling for transport to and from school

3.0 METHODOLOGY

3.1 Research Design

The research design that was used was a quasi-experimental study consisting of an intervention and a control group in adolescent girls. The intervention group received 3 weeks of active travel workshops and completed a self-reported questionnaire before and after the intervention was presented.

3.2 Study Population and Sampling

For the purpose of this intervention, the sample of students was selected using non-probability, convenience sampling. The intervention took place in the Ursuline Secondary School, Thurles Co. Tipperary. The population was recruited by contacting the school to organise a meeting with the principal to seek permission for the intervention to take place in the school. The purpose and intervention protocol were explained and a copy of this information was sent to the principal after the meeting. Two classes were picked at random out of five first year classes. These students were aged between 12 and 13 years old. There were approximately 20 to 30 participants in each class. One of the classes was the control group and the other was the intervention group. Random allocation of the classes was performed to determine the intervention and control group. A draw from a hat was used to do this. A passive consent from every student's parent was sought as the participants were less than 18 years of age. This outlined that unless the parents contacted the researcher their daughter did have permission to participate in the study (see appendix A).

3.3 Intervention

The researcher gave the students the intervention once a week for 3 weeks for 30-35 minutes. On week one (week beginning the 20th January), the intervention group gathered in classroom 15. After filling in the pre-questionnaire (see Appendix B), they were given the intervention.

3.3.1 Week one

Week one included a 10 minute presentation on active travel which addressed the study background, what the study is assessing and what is the student role in the study. It reminded the group that they can drop out of the research at any point. After the presentation, the participants were given the intervention. The students were asked to form small groups and come up with 3-5 incentives and barriers of walking and cycling. Time was then spent discussing these answers. A presentation on the pros and cons of active travel followed this discussion. The students were then set a challenge of walking 2-3 days a week for the following 3 weeks with a chance to win a small prize. Also a small prize for the student who walked or cycled the most over the course of the study would be given out at the end of the study. A travel diary was distributed to each participant to record their results (see Appendix C). A short piece of homework outlining ways to decrease the barriers to active travel will be given out at the end of this session. (see Appendix E).

3.3.2 Week two

Week two consisted of classroom based activities. The homework task on how to address the barriers was assessed and discussed in the first 5-7 minutes of the class. A PowerPoint presentation was given, showing a short clip of the DVD, *Beauty and the Bike*. This presentation lasted 10 minutes. Following this the students had to answer questions about the clip and identify ways to increase cycling in their area but also to establish their views on walking and cycling to school.

This lasted 10-15 minutes. The class were then given a homework task where they had to conduct a walkability and bikeability test on the area around the school in groups of 4 to 5. (see Appendix F).

3.3.3 Week three

Week three also comprised of classroom based activities. This class started by discussing their homework task and whether the area around the school is walkable or bikeable and ways in which any problems identified could be addressed. This lasted 20 minutes. The rest of the class was spent going through the travel diaries of the students and handing out prizes

for walking 2-3 days per week and the overall prize for most days walked. This took 8 minutes.

Each session began with counting the number of people in the group who walk or cycle to school and to observe if it increases or decreases. At the end of the three weeks those who cycled or walked 10 days or more received a small incentive to increase their activity in the future. (see Appendix G).

The following week the post questionnaire was handed out and filled in by the students.

Table 3.1: Summary of Intervention layout

<i>Study Section</i>	<i>Week Date</i>	<i>Task</i>	<i>Duration</i>
<i>Introduction</i>	20 th Jan 2014	<ul style="list-style-type: none"> • Questionnaires 	20 mins
<i>Week 1</i>	20 th Jan 2014	<ul style="list-style-type: none"> • Check in with class • PowerPoint presentation • Group task • PowerPoint presentation on pros and cons • Travel diary handed out and explained 	2 mins 10 mins 5 mins 10 mins 5 mins
<i>Week 2</i>	27 th Jan 2014	<ul style="list-style-type: none"> • Check in with class • Correct homework task • PowerPoint presentation • Beauty and the Bike video clip • Class discussion • Homework task 	2 mins 5 mins 5 mins 8 mins 10 mins 5 mins
<i>Week 3</i>	3 rd Feb 2014	<ul style="list-style-type: none"> • Check in with class • Discussion on the walkability and bikeability of the area • Incentive for participation 	2 mins 20 mins 8 mins

<i>Conclusion</i>	10 th Feb 2014	• Questionnaires	20 mins

3.4 Variables/Concepts

Weekly minutes spent walking and cycling for transport (survey)

Number of days that the students walked or cycled to school (travel diaries)

Attitudes to cycling for transport (survey)

Attitudes to walking for transport (survey)

3.5 Data Collection Tools

The questionnaire that was used was adapted from Hagströmer et al. (2008). Hagströmer et al. (2008) looks at active transport and physical activity levels. However, this current study does not look at physical activity so these sections were removed. The sections from Hagströmer et al. (2008) about personal information, modes of travelling to school, attitudes to walking and cycling, active transport as a mode of transport and promoting walking and cycling in the area, all remain and are adapted to the location of the school. A section on the modes travelled to and from school and the workshop encouragement were also added. The questionnaire contains 4 sections. Section 1 has open ended and dichotomous closed questions. Section 2 and 3 uses Likert scale questions. The post intervention questionnaire will resemble the pre-questionnaire. Section 4 includes dichotomous closed questions.

The travel diary includes a table of each day for the 3 weeks of the intervention. All sections will be dichotomous closed questions. A section for morning and evening was included. This allows counting those who walked on 2-3 days and the most often easier.

3.6 Procedures

The intervention duration was for 3 weeks, 30 minutes per week. The 2 classes completed the pre-intervention questionnaire about their travel to and from school and their attitudes to active travel.

All students were handed a copy of the passive consent form to give to their parents prior to the session to obtain consent. This was given out on the 19th December. On day 1 the students in the control group gathered in Room 15 at 11 a.m. on the 16th of January. They were given a copy of the questionnaire and given details of confidentiality and asked to complete it honestly. When they were finished they returned to class and the intervention group arrived. The same procedure was followed. After completion the students remained in the classroom for a short while longer than the control group to view a 15 minute presentation introducing the researcher and their background to the study, explaining the term active transport and what the study aims to assess and what is the student's role in the study. After the presentation the participants were given the intervention.

Following the three weeks, the researcher returned and the students filled in the post survey. This was performed the same way as with the pre questionnaires. The students in the control group gathered in Room 15 at 11 a.m. on the 12th of February. All students were handed a copy of the questionnaire and given details of confidentiality and asked to complete it honestly again. When they were finished they returned to class. After the control group left, the intervention group arrived. The same procedure was repeated. After the 3 weeks, both groups filled in the post intervention questionnaire

3.7 Data Analysis

When the questionnaires were all collected the data was entered into the Statistical Package for the Social Sciences (SPSS version 20). Inferential statistical analysis was used to determine whether active transport levels or attitudes changed post intervention. Specifically a dependant T-Test was used to test for changes in the minutes of walking and cycling for transport. A Wilcoxon Signed Ranks Test was used to examine the changes in student's attitudes to walking and cycling for transport.

3.8 Ethical Considerations

Ethical clearance from the Department of Health, Science and Exercise Science was obtained. All participants were fully informed regarding every aspect of the study. Passive consent was sought from the parents of all students which included the intervention information, researcher's names and contact details. All information regarding the study is 100% confidential and stayed anonymous. Participant's details will not be made public and the research supervisors and researcher will have access to the results. All questionnaires provided information regarding the intervention and the details of the study. All questionnaires also state that all students will have the option not to participate and that participation is on a voluntary basis and they can withdraw at any point of the study.

4.0 RESULTS

4.1 Sample characteristics

The total number of participants in the study was 46 adolescent girls, 21 in the control group and 25 in the intervention group. Nine participants, (3 in the intervention group and 6 in the control group) were boarders who lived on the schools grounds. The total mean age of all the participants was 12.76 years old, (SD=0.431). Passive consent was obtained from all participants. All participants were in 1st year in the Ursuline Secondary School in Thurles Co. Tipperary.

4.2 Characteristics of the journey to school

Table 4.1 shows the mean distance travelled and the mean time taken to travel in the intervention and control group. The mean time to travel to school for the intervention group was 19.96 minutes (SD=11.890) and for the control group was 26.63 minutes (SD= 19.774). The mean distance travelled by the intervention group was 8.11 kilometres (SD= 7.845) and for the control group was 18.63 kilometres (SD=13.556). After an independent t-test was conducted it was found there was no significant difference in mean time travelled but there was a significant difference in mean distance travelled ($p<0.05$).

Table 4.1: Pre and post mean time and distance travelled

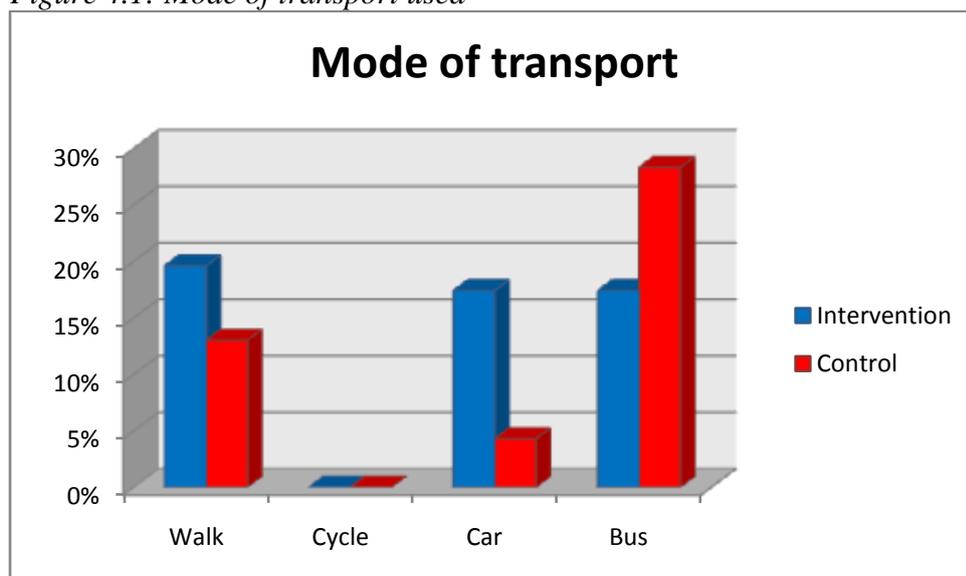
	Mean Time Travelled to School (mins)	Mean Distance Travelled to School (Km)
<i>Intervention</i>	19.96	8.11
<i>Control</i>	26.62	18.63
<i>Sig values</i>	0.151	0.021*

* $p<0.05$

4.3 Mode of transport to school

Figure 4.1 shows the mode of transport that the participants used to travel to school. In the control group, travelling by bus was the most popular mode of transport (n=13). The most popular mode of transport in the intervention group was walking (n=9). However, there is a major difference in car travel. Travel by car is very high in the intervention group (n=8) compared to the control group (n=2). The results show the majority of both groups have access to a bike, 88% of the intervention (n=22) and 95% of the control (n=20) group.

Figure 4.1: Mode of transport used



4.4 Changes in active travel levels and minutes after the intervention

4.4.1 Mode of transport

Table 4.2 shows the change in the mode of transport that the participants used to travel to school. There was a slight but not a statistically significant increase in active travel in the intervention group and no increase in active travel in the control group.

Table 4.2: Mode of transport used after intervention

	Intervention (Pre)	Intervention (Post)	Difference	Control (Pre)	Control (Post)	Difference
<i>Walk</i>	20%	22%	2%↑	13%	13%	0%
<i>Cycle</i>	0%	0%	0%	0%	0%	0%
<i>Car</i>	17%	15%	2%↓	4%	2%	2%↓
<i>Bus</i>	17%	17%	0%	28%	30%	2%↑

↑= Increase

↓= Decrease

4.4.2 Changes in weekly minutes travelled

Table 4.3 shows the change in minutes between the intervention and control group in walking, cycling and active travel. There was a 58% and 10% increase in weekly minutes of walking and active travel respectively in the intervention group, however, these were not statistically significant ($P < 0.05$).

Table 4.3: Changes in active travel minutes

	Intervention Group				Control Group			
	Pre	Post	% change	P value	Pre	Post	% change	P value
<i>Walking Minutes</i>	104.76	165.00	58%↑	0.280	98.71	78.33	21%↓	0.280
<i>Cycling Minutes</i>	41.00	30.40	26%↓	0.230	17.62	18.81	7%↑	0.230
<i>Active Travel Minutes</i>	721.00	796.00	10%↑	0.670	362.67	469.05	29%↑	0.670

*p<0.05 ↑= Increase ↓= Decrease

4.5 Changes in attitudes to cycling

Table 4.4 shows the percentage of participants in both the intervention and the control groups who agreed and disagreed to the statements about cycling below. The intervention group agreed that cycling was not safe, friends think they would look stupid, other students would think they would look stupid if they cycled to school, parents and guardians were happy to drive them to school and that they would worry about their bike being stolen in school. The control group agreed that cycling would take too long, and that they live too far away to cycle to school. The majority of the intervention and control groups agreed that they are confident in their cycling ability, that they hate wearing helmets, don't like to cycle when the weather is bad, they have a lot of stuff to carry to school, that driving to school was the easiest way to school and their clothes make it hard to cycle.

Both groups disagreed that cycling would be too tiring, their friends and others would think they would look stupid cycling to school, that their friends cycled to school, that cycling would ruin their make-up and that there is a safe and direct cycle route from their house to school.

There was a slight change in the attitudes by both the intervention and control groups but only two were significant. "I hate wearing a cycle helmet" and "The clothes I wear make it hard to cycle" show a statically significance, (P<0.05).

Table 4.4 Changes in attitudes to cycling

	<i>Intervention</i>			<i>Control</i>			<i>P Value</i>
	<i>Pre Agree %</i>	<i>Post Agree %</i>	<i>% Change</i>	<i>Pre Agree %</i>	<i>Post Agree %</i>	<i>% Change</i>	
<i>Cycling would be too tiring</i>	44	54	10	38	40	2	0.527
<i>Cycling to school is not safe</i>	52	64	12	43	50	7	0.248
<i>I am confident in my cycling ability</i>	84	76	8	95	86	9	0.157
<i>I hate wearing a cycle helmet</i>	76	64	12	76	43	33	0.004*
<i>I don't like to cycle when the weather is bad</i>	76	76	0	76	90	14	0.405
<i>I have lots of stuff to carry to school</i>	92	88	4	90	90	80	0.564
<i>Cycling to school would take too long</i>	60	60	20	67	57	10	0.317
<i>My friends would think I looked stupid if I cycled to school</i>	40	36	4	19	33	14	0.527
<i>The clothes I wear make it hard to cycle</i>	92	32	60	71	24	47	0.000*
<i>Other students would think I looked stupid if I cycled to school</i>	44	40	4	33	43	10	0.782
<i>My friends cycle to school</i>	0	0	0	5	5	5	1.000
<i>Driving is the easiest way to get to school</i>	64	50	4	75	70	5	0.059
<i>My parents/guardians are happy to drive me to school</i>	60	44	4	48	67	19	1.000
<i>Cycling to school would ruin my make-up</i>	20	20	0	0	0	0	1.000
<i>I worry about my bicycle being stolen in school</i>	52	52	0	40	38	2	0.782
<i>There is a safe cycling route from my house to school</i>	8	4	4	29	38	9	0.480

<i>There is a direct cycling route from my house to school</i>	4	8	4	24	38	14	0.206
<i>I live too far away from school to cycle</i>	40	44	4	57	62	5	0.317

*p<0.05

4.6 Changes in attitudes to walking

Table 4.5 shows the percentage of participants in both the intervention and the control groups who agreed and disagreed to the statements about cycling below. The intervention group agreed that parents and guardians were happy to drive them to school. However, they disagreed with all the other statements. The control group agreed that their friends walk to school and that they live too far away to walk to school. Both the intervention and control groups agreed that they don't like to walk when the weather is bad, they have a lot of stuff to carry to school and that their friends walk to school. They both disagreed that their friends and others would think they would look stupid if they walked to school, that driving to school was the coolest way to get to school, that their parents/guardians encourage them to walk to school, walking would ruin their hair and make-up, that there is a safe and direct walking route from their house to the school and that they live too far away to walk.

There was a slight change in the attitudes by both the intervention and control groups but only one was significant. The statement "Walking to school would ruin my make-up" showed a statistically significant decrease in both the intervention and control groups, (P<0.05).

Table 4.5 Changes in attitudes to walking

	<i>Intervention</i>			<i>Control</i>			<i>P Value</i>
	<i>Pre Agree %</i>	<i>Post Agree %</i>	<i>% Change</i>	<i>Pre Agree %</i>	<i>Post Agree %</i>	<i>% Change</i>	
<i>Walking would be too tiring</i>	40	36	4	45	62	17	0.414
<i>I don't like to walk when the weather is bad</i>	64	56	8	90	67	23	0.071
<i>I have lots of stuff to carry to school</i>	84	88	4	90	85	5	1.000
<i>I couldn't be bothered walking to school</i>	32	20	12	25	48	23	0.739
<i>My friends would think I looked stupid if I walked to school</i>	4	0	4	5	19	14	0.414
<i>Other students would think I looked stupid if I walked to school</i>	4	8	4	5	19	14	0.083
<i>My friends walk to school</i>	68	84	16	55	57	2	0.096
<i>Driving is the coolest way to get to school</i>	16	8	8	10	10	10	0.414
<i>My parents/guardians encourage me to walk to school</i>	12	24	12	35	29	6	0.564
<i>Walking to school would ruin my hair</i>	20	32	12	10	14	4	0.157
<i>My parents/guardians are happy to drive me to school</i>	56	40	4	45	71	26	0.763
<i>Walking to school would ruin my make-up</i>	36	8	28	21	5	16	0.008*
<i>There is a safe walking route from my house to school</i>	36	36	0	35	43	8	0.480
<i>There is a direct walking route from my house to school</i>	28	36	8	35	48	13	0.096
<i>I live too far away from school to walk</i>	48	40	8	50	62	12	1.000

*p<0.05

4.7 Intervention encourage walking and cycling

When the intervention group were asked whether they thought the intervention encouraged them to walk or cycle to school, 79% of the participants agreed, (n=19). When asked whether the intervention encouraged them to walk or cycle other places 92% agreed, (n=23).

5.0 DISCUSSION

5.1 Results overview

The purpose of this research study was to investigate the impact of a school-based active travel intervention on adolescent girls. Firstly, the study observed changes in weekly minutes of active travel to and from school and to other places in the adolescent girls. Secondly, the study explored the attitudes held by the girls towards cycling and walking to and from school and to other places. In order to answer these research questions, girls aged 12 and 13 years old, in an all girl school, were the target population. The presence of active travel levels in adolescent girls was limited to studies in Ireland. Furthermore, there was very little known about the girl's attitudes towards cycling and walking as a travel method to and from school and other places. Nevertheless, this study shows an insight into the active travel trends in this population and their attitudes towards active travel as a whole.

When we look at the mode of transport mostly used by the intervention group and the control group, we see that travelling by bus is the preferred mode of transport by the control group (n=13) and walking by the intervention group (n=9). These numbers relate to the mean distance travelled by each group. The mean distance in the control group is 19km compared to 8km in the intervention group. Therefore the base line of walking is higher in the intervention group. The high bus travel level in the control group means that even if these were the intervention group they were unlikely to be able to change their mode of travel due to their home location. The high distance rate means that these girls may live rurally and may have fewer places to travel to via walking and cycling. This also ties in with the mean time travelled to school. The mean time travelled to school by the control group is 27 minutes. This indicated that the students live rurally and have further to travel and take longer to do so, compared to the intervention group, whose mean travelling time is 20 minutes. Therefore, having the intervention group as the intervention group was beneficial as changes in active travel was evident compared to if the control group were selected as the intervention group, the results wouldn't have been as evident. However, on the other hand there was no change in the mode of transport used in either the intervention or the control group.

When we look at the changes on the weekly minutes travelled we can see that although there was a 58% increase in walking in the intervention group this was not statistically significant ($P > 0.05$). The reason for this may be due to the fact that parents dictate the mode of transport

their children use to travel to and from school from their 1st day of school. However, showing an increase in the weekly minutes indicates the student's knowledge of the need to change modes of transport.

The intervention showed that although not statistically significant there is a trend emerging in this target group of changing attitudes towards active travel levels. Barriers remain towards active travel as a whole but cycling seems to hold more barriers compared to walking. This poses the question, is it easier to encourage walking in adolescent girls compared to cycling. The intervention did however show that 76% and 92% of the intervention group found the intervention encouraged them to walk or cycle to school and other places respectively.

5.2 Changes in active travel levels and minutes after the intervention

Sallis (2000) showed that as children reach their teenage years their level of physical activity drops and once they reach the age of 14 and 15 they are not meeting the health-related guidelines of 60 minutes of activity daily. (ACSM, 2014, Brownson, Eyster, King, Brown, Shyu, and Sallis, 2000). Walking and cycling to and from school may be a way of increasing physical activity levels. Wong, Faulkner, Buliung and Irving (2011) showed that 23% of secondary school and 38% of elementary school children walk to and from school every day. They also state that 32% of secondary and 47% of elementary school children cycle to and from school. These figures were highest in the USA, followed by Australia, while Europe's figures ranked lowest. The research conducted by Wong et al. (2011) highlights that secondary school children's levels of active travel are considerably low. When we compare Wong et al. (2011) results to the results of this study we can see that 33% of the participants walk to and from school and cycling isn't practiced at all. This is similar to Wong, Faulkner, Buliung and Irvin (2011) results but yet is still very low compared to those in other European countries. Giles-Cortie, Cheriachan and Young (2002) found that only 25% of females walk to school. The results above show that walking is higher in this study but yet is still too low. Similarly they found that 54% of students use cars and buses to get to school, 66% of participants in this study use cars or buses as a mode of transport. The main reasoning behind this trend in this study is the problem of location of the school from the home place. In the control group the mean distance is 19km away which is too far away to walk or cycle to and from school. However, in the control group the distance is much shorter at 8km away. Due to the fact that the school is located in a rural town the majority of its students travel from the

surrounding villages and parishes to the school. This is the main reason for the high percentage of students, who travel by bus and car rather than walk or cycle. According to the CSO (2009) 16% of females walk and less than 1% cycle as a mode of transport. This study shows that the figure is slightly higher at 33% and no one cycles. However, these figures are still too low.

This study also showed that the weekly minutes of active travel is increased by 58% but unfortunately was not statistically significant. On the other hand, this shows that even though it's not significant there is a trend appearing towards increasing physical activity levels. The research demonstrates that those who travel to school by foot or cycle are more physically active, (Faulkner, Buliung, Flora and Fusco, 2009, Cooper et al. 2005, Cooper, Page, Foster, Qahwaji, 2003, Duncan, Duncan and Schofield, 2008, Can Sluijs et al. 2009). This research proves that even the simple task of walking and cycling to school can increase physical activity levels. None the less this isn't made known to children and adolescents. Duncan, Duncan and Schofield (2008) study shows that those who walked to school took roughly 1000 extra steps on a daily basis in the 20 minutes it takes them to walk to and from school. These 1000 minutes alone make up 15 to 20 minutes of the ACSM (2014) guidelines of 60 minutes of activity a day. Although not significant, there is an obvious trend towards increasing cycling amongst adolescent girls. The intervention focused on both walking and cycling and ways of increasing the levels of each, however cycling did not increase as much. The main reason for this is that at base line more people walked to and from school than cycling. There seemed to be no interest at baseline in increasing cycling minutes to and from school. This may be due to cycling having more barriers than walking. Bauman et al. (2012) and Garrard (2009) found that traffic speeds and volume and distance from home to school are all barriers to cycling to and from school. Evenson et al. (2004) found that if a participant found that the environment was nice and safe and the facilities were of a high quality, their levels of cycling increases.

5.3 Changes in attitudes to cycling and walking and active travel

Bauman et al. (2012) and Garrard (2009) showed that psychological and social factors are a major reason why adolescent girls don't participate in active travel. Miller, Redmond and Vaux-Bjerke, (2013) and Garrard (2009) found that confidence in their own ability to walk and cycle to school is the main reason for adolescent girls not walking or cycling to and from

school. In contrast, the 84% of the intervention group and 95% of the control group were confident in their walking and cycling ability. Lorenc et al. (2008) conducted a study on attitudes to walking and cycling among adolescent girls and parents. They noticed that the main reason for reduced participation levels in active travel was due to a fear of the environment and safety of themselves and their children. This study found that the participant's parents did not encourage walking and cycling to school. This coincides with Bauman et al. (2012) who found that parents did not have confidence in their children's ability to walk and cycle to school. Unfortunately, a week prior to the intervention starting a female pedestrian in the local town was knocked down and killed, (see Appendix H). This may have had an effect on participant's attitude towards walking. However, the results show that although not statically significant, there is a noticeable trend in changing the walking levels. This study found that 96% of students didn't have a safe cycle route and 92% didn't have a direct cycling route to and from school. It also found 64% didn't have a safe walking route and 72% didn't have a direct route to and from school. After the intervention the figures slightly changed. More participants found that there was a direct route from their home to and from school. Also 88% agreed that they had a lot of stuff to carry to and from school which hindered them from walking and cycling.

When we focus on attitudes towards cycling alone we can see that the intervention had a major change on the attitudes that participants felt towards ruining their makeup. There was a 28% decrease in the amount of girls who agreed that cycling would ruin their makeup. 40% of the intervention group and 57% of the control group agreed that they lived too far from school to cycle. These percentages coincide with Su et al. (2013) study which suggested that the distance between school and home was a major factor in the chances of the child cycling to school. 64% of the participants agreed that cycling to school is not safe. Lorence et al. (2008) found also that adolescents and their parents found that the environment isn't safe for cycling to and from school. The biggest change that was found by the participants was a change of 60% who agreed that their clothes would make it hard to cycle. However, this figure changed dramatically in the control group also. The only reason for this is change in opinion is interaction with the intervention group. As both classes are in the same school and year, participants from both groups interact with each other on a daily basis so this may account in the changes in the opinion of the control group. Surprisingly only 36% agreed that their friends would think they looked stupid if they cycled to school. Bauman et al. (2012), Sallis (2000), Biddle (2005), Van Der Horst (2007) and Garrard (2009) proved that if

adolescent girls had the approval and support from their peers that they were more likely to participate in physical activity. This study shows peer influences and the pressure to look “cool” doesn’t affect this age group when it comes to cycling. 52% of the participants said that they were worried that their bike would be stolen. Bauman et al. (2012) showed that lack of facilities was an issue that effected the decision whether to cycle to school. If students fear that their bike will be stolen then their likelihood of cycling is reduced.

When we look at walking specifically we can see the major change in attitude is walking to school would ruin their makeup. After the intervention only 8% of the intervention group agreed with the statement about makeup. This showed that the intervention changed their attitude towards their makeup being ruined, but however once again the control group changed their attitude on walking would ruin their makeup. Just like cycling 88% of the participants agreed that they had lots of stuff to carry to school. This is the main barrier found in this study towards part taking in active transport. 48% of the participants also stated that they lived too far away to walk. Just like cycling Su et al. (2013) study suggested that the distance between school and home was a major factor in the chances of the child walking to school.

5.4 Study limitations

For the purpose of this intervention, the sample of students was selected using non-probability, convenience sampling. Therefore, one major limitation of the study is that the students were not randomised into either the control or intervention group. The principal of the school selected the two classes that were to be used in the study and which is the intervention and control group. This suggests that these results may not fully reflect all adolescent girls in Ireland and their active travel levels and attitudes.

Also another major limitation to the study is the sample size. For the nature of the study it was not possible to perform the intervention in another school setting due to time restraints. Even though there is no statistical significance there is a trend towards changing habits and attitudes, having a larger population size may show a statistical significance. Therefore, the results cannot be generalised to adolescent girls in Ireland. Also the location of the study is another limitation of this study. The study took part in a rural town school, where many of the students travel from the country; active travel from the home place is difficult. Therefore, this study isn’t generalised to all distances travelled to and from school. Undertaking this study in

a city may show that active travel is actually higher or lower than suggested as more students have the means to actively travel to school.

The duration of the study is another limitation to this study. The intervention lasted 3 weeks with 30 minutes a week. This is a total of 90 minutes. If the length of the study was increased tracking the changes in weekly active travel minutes may have been easier. This short amount of time also means there was not a lot of contact time with the students so the ability to reinforce the message was not feasible.

When we consider the collection of data and its method, using anonymous self-reported questionnaires provide the possibility of not giving the correct information and not providing truthful answers. Anonymous self-reported questionnaires are a convenient way of collecting data but they pose their own limitations. Questionnaires can be bias in the way the questions are asked and its structure. To cater for this a polite study was conducted with 5 adolescent girls and adjustments were made. A fear of answering a question wrong or incorrectly may be present thus answering a question simultaneously with another peer may occur. This reduces the validity of the study.

Another major limitation is the researcher; Ms Sinéad Corcoran also acted as the facilitator of the intervention. As the researcher is an undergraduate student in exercise and health studies and studies the benefits of exercise and physical activity, been the facilitator of an intervention which is promoting increasing physical activity in the form of active travel may be seen as bias. Having the intervention as a teacher led programme may not have increased their active travel levels or changed their attitudes towards active travel. By facilitating the classes over the three weeks a greater insight into active travel may be given compared to the teachers who may have no knowledge in the area.

5.5 Recommendations

As for recommendations for the topic of active travel in Ireland, more research needs to be performed on adolescent girls and trying to increasing their active travel levels and physical activity levels. There is very little research as to whether increasing physical activity levels in adolescent girls can be achieved by active travel. Using interventions from Australia, Canada or the Scandinavian countries and adapting them to an Irish setting may increase levels and reduce diseases such as diabetes.

Targeting parents in these studies should also be considered as the parents make the decisions when it comes to mode of transport to and from school and other places. If parents understand the benefits of active travel and physical activity then they are more likely to encourage their children towards travelling actively and participating in active travel and physical activity themselves.

As the most of Ireland is rural and many adolescents travel via bus or car to school introducing initiatives such as park and ride or park and stride may be a way to introduce physical activity and active travel. Asking parents and buses to stop at a specific location which is for example 1.5 kilometres from the school and the students walk or cycle from here. However, this poses its own problems. Bus insurance states that the bus must drop the children directly outside the school gate. In this situation a change in policy is needed. With permission from parents or guardians and the change in insurance restraints this can be achieved.

As all ready stated above students located in a rural location have a problem using active travel as a means of transport. However, those who live in the town or in close proximity should be also targeted. A specific programme in schools which targets students living 1.5 to 3 kilometres away from the school would be beneficial. Targeting these students is important as these students can participate in active travel and have the means to do so.

Facilities and environment is also another huge area that needs to be targeted. In Ireland the lack of cycling lanes, bike stands, showers, lockers for helmets, smooth surfaces for both walking and cycling is a major issue that needs to be addressed. Environment and facilities were a big reason for adolescents not part-taking in active travel and addressing these factors may make active travel more appealing.

5.6 Conclusion

Although there were numerous limitations to the study, it provides a brief overview of the active travel patterns and attitudes towards active travel in adolescent girls. Despite a lack of Irish research in this field, evidence to a tendency of change in active travel levels and attitudes can be clearly seen from this study. The biggest change was in walking compared to cycling. Furthermore, the study showed a positive change in attitudes towards walking and cycling amongst the adolescent girls. However, these findings are only minor and not

statistically significant. A study of the same nature on a larger scale would determine whether a short-term intervention had any effect on active travel levels in this population. This trend towards change in this population is positive. Change is needed to tackle the issue of childhood obesity and increasing active travel may help increase physical activity levels which in turn decrease diseases such as obesity, diabetes and heart disease. Parents are a major factor in this study and influence the decisions of their child. If parents' attitudes change to become more positive about active travel and physical activity, then there are no reasons why their child cannot do the same.

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7.0 APPENDICES

7.1 Appendix A: Passive Consent Form - The Intervention Group

Dear Sir/Madam,

My name is Sinéad Corcoran and I am currently in my final year studying BA (Hons) in Exercise and Health Studies at Waterford Institute of Technology. For my dissertation I am conducting a study to promote active transport to observe the changes after a three week intervention in secondary school girls. Participation in this study requires the participants to complete an anonymous questionnaire that will take 10 minutes to complete and also to participate in a short three week intervention programme on active transport. These questionnaires will be filled out twice, before and after the intervention to observe changes. The information gathered from the questionnaire and the intervention will be strictly confidential and participation is on a voluntary basis and participants can withdraw at any time. This intervention will take place after the Christmas holidays from January 20th to February 10th. If you have any queries or questions please do not hesitate to contact me on the details outlined below. Thank you for your time.

If you would prefer that your daughter DID NOT participate in this study please contact me by phone or email.

Mobile phone: 0866665803

Email: sinead-corcoran@hotmail.com

7.2 Appendix B: Passive Consent Form - Control Group

Dear Sir/Madam,

My name is Sinéad Corcoran and I am currently in my final year studying BA (Hons) in Exercise and Health Studies at Waterford Institute of Technology. For my dissertation I am conducting a study to promote active transport and observe the changes after a three week intervention in secondary school girls. Participation in this study requires the participants to complete an anonymous questionnaire that will take 10 minutes to fill out. These questionnaires will be filled out twice to observe a change. The information gathered from the questionnaire will be strictly confidential and participation is on a voluntary basis and participants can withdraw at any time. This will take place after the Christmas holidays from January 20th to the 10th of February. If you have any queries or questions please do not hesitate to contact me on the details outlined below. Thank you for your time.

If you would prefer that your daughter DID NOT participate in this study please contact me by phone or email.

Mobile phone: 0866665803

Email: sinead-corcoran@hotmail.com

7.3 Appendix C: Questionnaire



Waterford Institute of Technology



Section 1

1. What age are you? _____ (years)

2. How do you usually travel to school? i.e. the longest part of your journey?

Walk
 Cycle

Car

Bus

3. How long does your journey take from your house to the school gate?

_____ (minutes)

4. How far approximately is your home from the school gate?

_____ (kilometres)

5. Do you own or have access to a bicycle?

Yes
 No

6. During the last 7 days, how many days did you travel for 10 uninterrupted minutes to places that include places like schools shops, the cinema and so on:

1. With a Bicycle?

None

1 day

2 days

3 days

4 days

5 days

6 days

7 days

How much time did you usually spend on one of those days cycling from place to place?

_____ hours _____ minutes per day

2. By foot?

None

1 day

2 days

3 days

4 days

5 days

6 days

7 days

How much time did you usually spend on one of those days walking from place to place?

_____ hours _____ minutes per day

Section 2

7. To what extent do you agree with the following statements about **CYCLING** to school?



	Agree Strongly	Agree	Neither	Disagree	Disagree Strongly
<i>Cycling to school would be too tiring</i>	<input type="radio"/>				
<i>Cycling to school is not safe</i>	<input type="radio"/>				
<i>I am confident in my cycling ability</i>	<input type="radio"/>				
<i>I hate wearing a cycle helmet</i>	<input type="radio"/>				
<i>I don't like to cycle when the weather is bad</i>	<input type="radio"/>				
<i>I have lots of stuff to carry to school</i>	<input type="radio"/>				
<i>Cycling to school would take too long</i>	<input type="radio"/>				
<i>My friends would think I looked stupid if I cycled to school</i>	<input type="radio"/>				
<i>The clothes I wear make it hard to cycle</i>	<input type="radio"/>				
<i>Other students would think I looked stupid if I cycled to school</i>	<input type="radio"/>				
<i>My friends cycle to school</i>	<input type="radio"/>				
<i>Driving is the easiest way to get to school</i>	<input type="radio"/>				
<i>My parents/guardians are happy to drive me to school</i>	<input type="radio"/>				
<i>Cycling to school would ruin my make-up</i>	<input type="radio"/>				
<i>I worry about my bicycle being stolen in school</i>	<input type="radio"/>				
<i>There is a safe cycling route from my house to school</i>	<input type="radio"/>				
<i>There is a direct cycling route from my house to school</i>	<input type="radio"/>				
<i>I live too far away from school to cycle</i>	<input type="radio"/>				

Section 3

8. To what extent do you agree with the following statements about **WALKING** to school?



	Agree Strongly	Agree	Neither	Disagree Strongly	Disagree
<i>Walking to school would be too tiring</i>	<input type="radio"/>				
<i>I don't like to walk when the weather is bad</i>	<input type="radio"/>				
<i>I have lots of stuff to carry to school</i>	<input type="radio"/>				
<i>I couldn't be bothered walking to school</i>	<input type="radio"/>				
<i>My friends would think I looked stupid if I walked to school</i>	<input type="radio"/>				
<i>Other students would think I looked stupid if I walked to school</i>	<input type="radio"/>				
<i>My friends walk to school</i>	<input type="radio"/>				
<i>Driving is the coolest way to get to school</i>	<input type="radio"/>				
<i>My parents/guardians encourage me to walk to school</i>	<input type="radio"/>				
<i>Walking to school would ruin my hair</i>	<input type="radio"/>				
<i>My parents/guardians are happy to drive me to school</i>	<input type="radio"/>				
<i>Walking to school would ruin my make-up</i>	<input type="radio"/>				
<i>There is a safe walking route from my house to school</i>	<input type="radio"/>				
<i>There is a direct walking route from my house to school</i>	<input type="radio"/>				
<i>I live too far away from school to walk</i>	<input type="radio"/>				

Section 4

9. Have these workshops encouraged you to walk or cycle to school more often?

Yes

No

10. Have these workshops encouraged you to walk or cycle more often to other places
(e.g. shop, cinema, meet with friends)?

Yes

No

7.4 Appendix D: Travel Diary

Tick the box yes/no if walked or cycled on that day

Week 1- 20th - 26th January

		<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	<i>Sunday</i>	<i>Total</i>
<i>Morning</i>	<i>YES</i>								
	<i>NO</i>								
<i>Evening</i>	<i>YES</i>								
	<i>NO</i>								

Week 2- 27th January - 2th February

		<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	<i>Sunday</i>	<i>Total</i>
<i>Morning</i>	<i>YES</i>								
	<i>NO</i>								
<i>Evening</i>	<i>YES</i>								
	<i>NO</i>								

Week 3- 3rd - 7th February

		<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Total</i>
<i>Morning</i>	<i>YES</i>						
	<i>NO</i>						
<i>Evening</i>	<i>YES</i>						
	<i>NO</i>						

7.5 Appendix E: Intervention Week 1

Slide 1



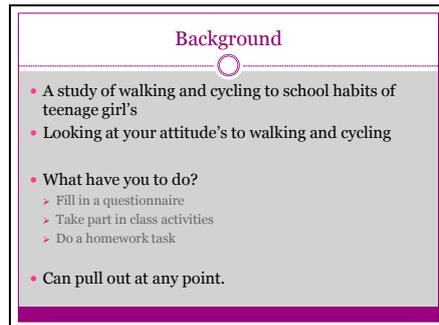
Tell them Who you are, past pupil, in college now doing a study etc....

Explain that it is really important that everyone fills it out honestly

Remind them no one will see it only me and my supervisor.

Hand out the questionnaire, then collect them and continue with the presentation

Slide 2



Slide 3



Slide 4

Barrier's

- What are the Barrier's?
 - Get into group's of 3-5
 - Grab a pen and a paper
 - Come up with 3-4 reasons why we don't cycle
- Benefits of Active Travel



Instruct them to get into groups of 3-5 and come up with barriers to AT
Go through them on the white board
Go through the benefits of AT

Slide 5

Pros 's Vs Con's

Pro's	Con's
<ul style="list-style-type: none"> • Catch up with friend's and have a gossip • Get fresh air • Increase Physical Activity Levels 	<ul style="list-style-type: none"> • Not cool • Weather

Go through them on the white board before you show them on the slide
Physical Activity levels is the most important one

Slide 6

Challenge

- Walk or cycle to school 2 or more day's a week for 3 weeks
- A small prize for the person who walk's the most over the 3 weeks



Slide 7

Homework

- Fill in Travel Diary 
- Ways to decrease the barriers
 - Initiative's
 - Programme's

Handout travel diaries and explain to them what to do.

Explain to them about looking up initiatives and programmes about AT

7.6 Appendix F: Intervention Week 2

Slide 1



Slide 2

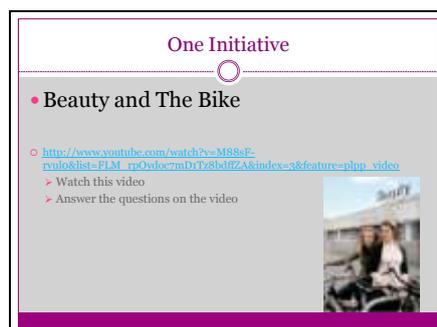


Check in with everyone to see did they do their home work? (1 min)

Go through with programmes they found – (5-7 mins)

Loads- WOW days, Park and Stride, Walking bus etc- Explain these if task hasn't been completed.

Slide 3



Watch the video and Fill in the sheet about the beauty and the bike.

Have a discussion about the video and the students views.

Slide 4

Homework

- ▶ Walkability and Bikeability tests
 - ▶ Use the route to school
 - Use the route you walk to school
 - From where your bus drop you off
 - Around the school (Boarders)
 - Form where your parents drop you off
 - ▶ Do a Walkability or Bikeability test on that route

Do while walking to school or meet after school and do it as a group?

Slide 5

Travel diary

A yellow sticky note is pinned to a grey background with two red pushpins. The note has the text "Don't Forget!" written on it in a black, cursive font. The sticky note is slightly wrinkled and has a white border.

Remind them to keep filling in their travel diary's

Beauty and the Bike

1. Why don't the girls cycle anymore?

2. How many people cycle to school?

3. What would make them cycle to school?

4. Where did the English girls go?

5. What did they do when they arrived?

6. What did they notice when they were cycling around?

7. What were the 3 most important reasons for cycling?

1.

2.

3.

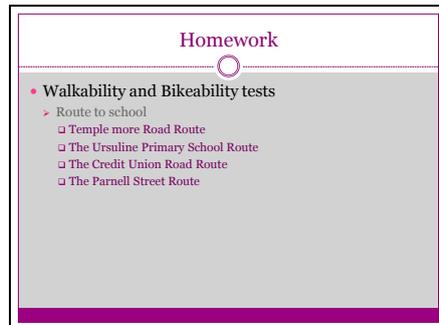
8. What's the difference between Bremen and Darlington?

7.7 Appendix G: Intervention Week 3

Slide 1

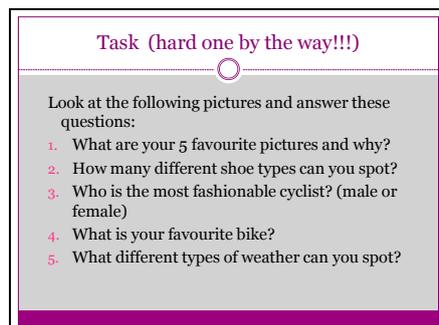


Slide 2



Discuss whether Thurles Town is Walkable or Bikeable? (5 mins)

Slide 3

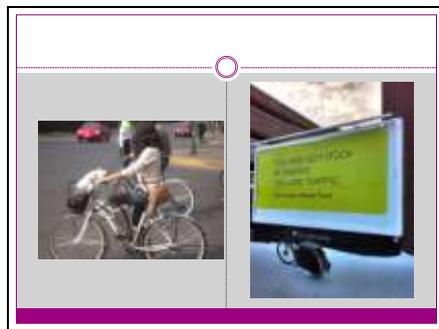


This is the students own opinion
20 different type of shoes...

Slide 4



Slide 5



Slide 6



Slide 7



Slide 8



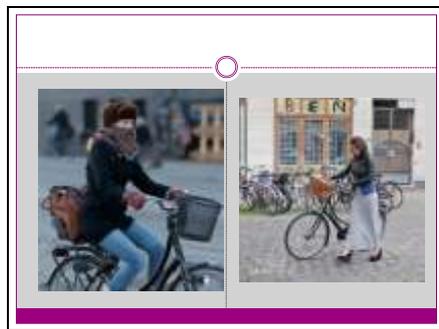
Slide 9



Slide 10



Slide 11



Slide 12



Slide 13



Slide 14



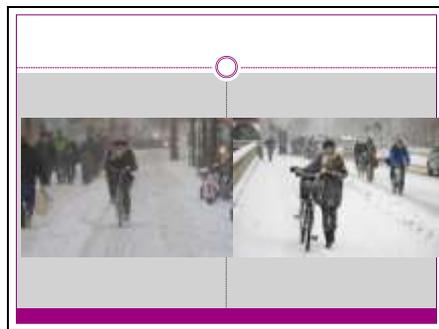
Slide 15



Slide 16



Slide 17



Slide 18



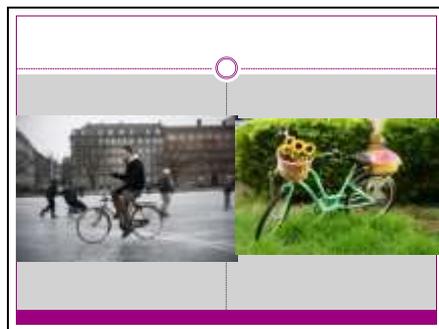
Slide 19



Slide 20



Slide 21



Slide 22



Get them to fill out the post questionnaire

Slide 23



Announce who won and give them the prize...also give every participant a wrist band.

After this class is finished go to the control group and get them to fill out the post questionnaire.

Look at the pictures and answer these questions:

1. What are your 5 favourite pictures and why?

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____

2. How many different shoe types can you spot?

3. Who is the most fashionable cyclist? (male or female)

4. What is your favourite bike?

5. What different types of weather can you spot?

7.9 Appendix H: Newspaper Article

THURSDAY, JANUARY 23, 2014 €2.20 £2.20_{stg} ESTABLISHED 1909

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URSULINES TO BREAK BREAST CHECK RECORD? PAGE 14

QUESTIONS OVER

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RAISED PITCH PAGE 3

Thurles Drama Group Drama has a new home p11

Death is second road fatality in Tipperary this year

Tragedy in Liberty Square

By GUY KELLEHER
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Thurles and Shirrone are coming to terms with the shocking death of a local woman in a traffic accident on Liberty Square.

Thurles Gardaí are appealing for information regarding the death of Maura Murphy on Monday morning.

Ms Murphy, from Quakerstown just outside Shirrone, died at the junction of Liberty Square and the Slievenamon road in Thurles at 11.50am.

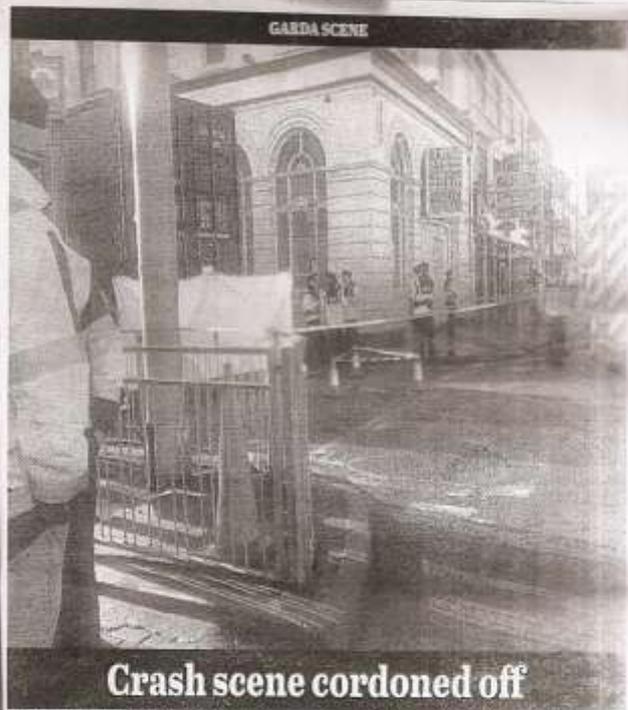
The driver of an articulated lorry, who is from Tipperary town, and two shocked bystanders had to be comforted following the collision. It's

understood Ms Murphy, who worked in the Community Nursing Unit in Birr, was in town shopping, having parked her car nearby before the accident claimed her life. Local reports indicate Ms Murphy was crossing the street from the County Bar direction to the old Permanent TSB bank when the accident occurred. She was pronounced dead at the scene. Her body was removed to the Mid Western Regional Hospital in Limerick, where a post mortem will take place.

An ambulance, fire brigade emergency services, and members of Thurles Gardaí attended the scene, and cordoned off the area for a garda forensic collision investigation. Road traffic diversions were put in place for most of the day. Cllr Jim Casey said

the Murphy family are well known and respected in the area. Ms Murphy is survived by her husband Michael and two adult daughters. "The whole area is in shock. It was an awful accident. A woman in the prime of life. It's a shock to everybody who knew her," said Cllr Casey. Gardaí are appealing for witnesses to the collision to contact Thurles Garda Station on 0504-25100, the Garda Confidential Line on 1800 666 111 or any Garda station.

This is the second road death in Tipperary this year so far, and the second in just a 20-day period. John Gaughan, a father-of-two aged in his 60's died in a crash near Thomastown on January 3rd. There were eight road deaths in Ireland this year prior to the Thurles tragedy on Monday.



Crash scene cordoned off

The accident scene at Liberty Square/Slievenamon Road on Monday. Gardaí are

appealing for witnesses to the tragic accident to contact them at 0504 25100.

Politics

Nenagh's Cllr Morgan quits FF

Nenagh town councillor Tommy Morgan has quit Fianna Fail to throw his weight behind Independent councillor Hughie McGrath in this May's local elections.

Cllr Morgan told the Tipperary Star he handed in

of the local McDonagh Cumann. He said he believed the party should be working more in the community and cited Cllr McGrath's involvement with Nenagh's St Patrick's Day parade and the Bop While you Shop as reasons for his decision.

up a great companionship with Cllr McGrath," he said. "I have felt lost in Fianna Fail."

Meanwhile, former Operation Transformation participant Greg Starr is to run for Labour in the new Nenagh MDC area.