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Does Carpooling To/From Work Reduce Stress?

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Does Carpooling To/From Work Reduce Stress?

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Does Carpooling To/From Work Reduce Stress?

Executive Summary

This purpose of this study is to investigate whether carpooling to/from work reduces stress levels in adults. Many people (including the investigator) have long commutes to/from work everyday. Long commutes are not only costly, but they are also very stressful. The reason for conducting this research study is to make adults aware that there are carpooling options available. Many adults may not realize the many benefits of carpooling to/from work. Decision makers at many organizations may also not encourage employees to carpool because they do not realize the benefits of carpooling. Decision makers may not realize that by having employees arrive at work less anxious and less stressed, the employees will be in a better mood and will be more productive. Also, the employee may be more satisfied with his/her job. Therefore, the research question is: Does carpooling to/from work reduce stress? The investigator had this idea because she also has a long commute to/from work and many of her co-workers do as well. The investigator believes that if more commuters know there are carpooling options available to fit their particular schedule, more of them would be willing to carpool. Carpooling not only saves money, but it also improves the environment by not having as many cars on the road. The investigator compiled the answers from the questionnaires and compared the answers to the current research findings on this subject. This helped the investigator determine if commuters are interested in carpooling and if they know the benefits of carpooling.

In this study, the investigator visited local businesses in the office park where she is employed as well as three small businesses in the Woodstock/Kennesaw area. After explaining the research project and asking the Human Resources Director (hereinafter referred to as the HR Director) if his/her company is interested in participating, the investigator gave the HR Directors

enough cover letters and questionnaires for each employee in the company. The HR Directors at the participant's place of employment distributed the cover letter and questionnaire in all employee mailboxes (those that were over 18 years of age.) The participant was supposed to return the completed questionnaire to the HR Director by the deadline listed on the cover letter (i.e., October 15, 2008). The investigator then collected the completed questionnaires from the HR Directors by a specified date (i.e., October 21, 2008). If a participant did not wish to participate, he/she could simply discard the questionnaire. All responses remained completely anonymous. The investigator promised to distribute the findings of the study to all interested HR Directors by a specified date. The investigator suggested to the HR Director that he/she should share the results with others in the company (regardless of whether they completed the questionnaire).

Of the 350 questionnaires that were distributed to the businesses, 212 were completed and returned, resulting in a response rate of 61 percent. Of the 212 participants, 187 of them use their personal vehicles to get to/from work and 19 of them carpool/vanpool. Most of the participants indicated that their commute from home to work is between 11 to 15 miles. Unfortunately, 78 of the participants indicated that their commuting time takes between 31 to 60 minutes to get from home to work on a typical day. The 212 participants consisted of 122 females and 90 males. Of the 212 participants, 97 were between the ages of 29 to 39 years old. Only four participants were 62 or older. (A statement was included on the questionnaire and cover letter that stated no one under 18 years old was allowed to complete the questionnaire.) When asked about their highest level of education, participants responded as follows: three attended high school, but did not graduate, 66 were high school graduates, 95 had bachelors or

associates degrees, 41 had masters or graduate degrees, three had doctorate degrees and four participants responded “other.”

The questionnaire included a series of questions which asked the participant if he/she had considered carpooling for the following reasons: to save money, to improve the environment, to meet new people, and to reduce stress. The results of these questions are as follows: 109 said they had not considered carpooling to/from work to save money, 106 had not considered carpooling to improve the environment, 169 had not considered carpooling to meet new people, and 131 had not considered carpooling to reduce stress. The next question asked the participant if he/she was more likely to consider carpooling to/from work knowing that research suggests it saves money, improves the environment and reduces stress. Surprisingly, 78 people answered “yes,” 77 answered “no,” and the other 57 participants were not sure.

Results of this study are discussed as well as the strengths/limitations and suggestions for future research. The primary objective of this study is to determine if research findings support the idea that carpooling to/from work reduces stress and to see approximately how many people are actually carpooling. The investigator commutes approximately 22 miles one way to work. On her way to work it takes her approximately 30 minutes, but on the way home the commute time is usually between 45 to 60 minutes. The results of this study were a bit surprising to the investigator. She expected participants to have much higher stress levels due to their commutes since very few of them carpool. At the investigator’s own place of employment she often hears conversations in the break room and hallway regarding how terrible the morning commute was because of an accident or the weather. The investigator hopes the participants, as well as the HR Directors will find the results of this study useful.

Does Carpooling To/From Work Reduce Stress?

TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
INTRODUCTION	6
LITERATURE REVIEW	7
METHODS	18
RESULTS	22
DISCUSSION	27
CONCLUSION.....	29
REFERENCES	32
APPENDIX A: Copy of Instructions Distributed to Human Resources Directors	34
APPENDIX B: “Why Should I Help?” (List of Reasons Human Resources Directors Should Participate in the Study)	36
APPENDIX C: Cover Letter Distributed to Participants	38
APPENDIX D: Questionnaire Distributed to Participants	39
FIGURE 1: Mode of Transportation to Get to/from Work	23
FIGURE 2: How Long Have You Been Employed At Your Current Job?	24
FIGURE 3: Have You Considered Carpooling to/from Work to Save Money?	25
FIGURE 4: Age of Participants	26
FIGURE 5: Sex of Participants.....	26

Does Carpooling To/From Work Reduce Stress?

Introduction

Many people are skeptical when the topic of carpooling is mentioned. One of the first thoughts people have is that giving up their car means giving up their freedom and independence. However, after comparing the amount of money that can be saved and how stress levels can be reduced, many are quick to change their minds. One of the many benefits of carpooling is that anyone can participate. Whether someone is a chief executive officer of a large corporation, an attorney, or a secretary, anyone can benefit from carpooling. “The U.S. Department of Transportation estimates that nearly 120 million Americans commute each day with an average commute time of 26 minutes” (Cohen, 2007, 1). For many people the commute is not only costly and stressful, but it seems to be a waste of time. Time spent sitting in traffic can be spent on more important tasks. For example, if a man spends approximately two hours in traffic in one day, that equals ten hours per work week. In ten hours he could catch up on extra work, learn a new language through books on tapes/CDs, or use the cell phone to catch up with old friends. Many decide to carpool based on the financial benefits, while others enjoy the free time they have after joining the carpool. Some carpoolers even enjoy a nice nap on the way to/from work.

So much time could be saved if more commuters carpoled and there were fewer vehicles on the road. All the articles reviewed in the next section offer good reasons why more people should consider carpooling not only for financial purposes, but also for health reasons. There have been many research studies conducted on carpooling, commuting stress, and the effects commuting stress can have on the body. Commuters may not realize how stressful their commute really is until they begin to see their health declining (i.e., back problems, high blood pressure,

constantly stressed and in a negative mood.) Research indicates that something can be done about long commutes and there are ways commuters can make the most of their time. Not only can commuters reduce stress, save money and time, but they can also meet new friends in their carpool. The primary objective of this study is to determine if research findings support the idea that carpooling to/from work reduces stress and to see approximately how many people are actually carpooling.

Literature Review

The Issue of Stress Levels

Much of the research on carpooling suggests that reducing stress is one of the main reasons people choose to carpool. Many commuters are in stressful traffic situations but they may not realize how detrimental the stress can be to their overall health. A recent study conducted by Psychologist David Lewis found that “commuters can experience greater stress than what fighter pilots going into battle or riot policemen feel” (Frauenhem, 2004, 1). Lewis also states that “commuters’ anxiety is exacerbated by lack of control over their situation” (Frauenhem, 2004, 1). There are numerous articles available that suggest ways to prevent and/or minimize stress. A study conducted at the University of California, Irvine, found that commuting stress can have a significant effect on a person’s health. The study found that stress not only raises blood pressure, but it also releases stress hormones into the body. “Long commutes (more than 18 miles one way) may also increase the likelihood of having a heart attack due to exposure to high levels of air pollutants, which appears to be a risk factor for heart disease” (Credo, 2005,

1). Credo (2005) also lists useful tips for drivers to consider. One suggestion Credo offers that can be used to reduce stress is to prepare for the workday the night before by determining which clothes to wear, getting lunch prepared, and getting briefcases or work related documents ready. This way the morning can be spent on getting ready for work and getting out the door. Also a good night's sleep can provide energy for the next day. Carpooling was also listed as one of the top ten ways to reduce commuting stress. Credo (2005) states that although it will require a little bit of work to coordinate work schedules with one or more people, carpooling is definitely worth the effort. Another idea is to go to the gym after work or have dinner close to work to give traffic time to clear before the ride home. Also, "studies show that ridesharing (i.e., carpooling) lowers commuter stress significantly" (Credo, 2005, 1). By reducing the amount of stress involved with getting to work, commuters can save lots of energy that could potentially be lost due to the stressful commute. This energy can help commuters feel more productive at work, but it can also make the work day much easier and less stressful (Credo, 2005, 2).

A *Reader's Digest* article entitled "De-Stress Your Commute: 21 Tips for a Happier Journey" offers an interesting point regarding carpooling. It states that carpooling is indeed one of the top 21 ways to "de-stress" a commute, but carpooling is not for everyone. For those people that prefer to be alone, are shy, and/or prefer a quiet commute, carpooling may not be the best option. Feeling obligated to talk to strangers can make an introverted person not only feel uncomfortable, but may actually cause stress. However, for those that love to meet new people and are ready to reduce stress, carpooling is definitely the best option (*Reader's Digest*, 2008). Schaeffer and her associates state that although carpooling has many advantages, such as saving money, time, and reducing air pollution, it does have one potential disadvantage. Many drivers may not want to experience "loss of control" (Schaeffer et al., 1988, 945). Drivers may feel that

they need and want to be in charge of all aspects of the commute including the route taken, the radio, and the heater and air conditioner. Having possession of and using a car is “positively related to psychological factors such as mastery and self-esteem. Moreover, the use of a car can enhance feelings of autonomy, protection, and prestige, whereas this is not the case for public transport” (Ellaway et. al., 2003 as cited in Gatersleben and Uzzell, 2007, 417-418).

A September 23, 2008 article in the *Atlanta Journal-Constitution* discussed how the number of commuters driving more than 90 minutes each way increased in 2007. “About 94,592 people now have “extreme commutes,” meaning they travel 90 minutes or more, one way to work. That is an estimated 6,569 people more than in 2006, according to U.S. Census Bureau data” (Pickel, 2008, C1). “The average commute in metro Atlanta is 30.7 minutes, much the same as eight years ago. Statewide, Georgia was eighth in the country in average commute time, with a shorter commute than New York, Washington and California, among others” (Pickel, 2008, C6). Many of us have long commutes that may range between 30 minutes to one hour one way. However there are those that have a much worse commute of 90 minutes or more one way. Commuting is a very time-consuming process that many people must deal with five days a week. “The journey from home to work and back is therefore an important aspect of modern life, affecting people’s well-being and it demands difficult decisions about mobility on the labor and housing market” (Stutzer and Frey, 2004, 21).

A quasi-experimental field study published in the *Journal of Applied Social Psychology* found that commuters that had “high impedance” routes to work had increased systolic and diastolic blood pressure as well as a decrease in “behavioral performance” (Schaeffer et al., 1988, 944). The stress level of commuters in heavily congested areas was lower for those that carpooled. Interestingly enough, the study found that when drivers were given the option of

choosing more than one route to work, they were more stressed than if they only had one route (Schaeffer et. al., 1988, 944). Another study found that among car users, cyclists, walkers, and those that use public transportation, car users reported a higher level of stress with their commute than others (Gatersleben and Uzzell, 2007, 416). There are many physiological stresses commuters must deal with on a daily basis. “Time pressures and aggressive or reckless behavior on the part of other commuters are just a few examples of the psychological stressors that affect commuters” (Koslowsky et. al., 1995, 14).

Hennessy and Wiesenthal (1999) discuss a study regarding driver stress and traffic congestion in which the investigators interviewed the drivers via the cell phone in both high and low congestion areas during one commute. The investigators divided the behavior responses into six categories and analyzed how each person responded to high and low congestion areas. The study found that the stress and aggression levels of drivers were higher in the highly congested areas, rather than the low areas (Hennessy and Wiesenthal, 1999, 409).

Is there a gender gap when it comes to commuting? Does one gender have a longer or more difficult commute than the other? In the *Journal of the American Planning Association*, Crane (2007) found that although there are more and more women participating in the work force in recent decades, the average woman’s commute to work is still significantly different than the average man’s commute (Crane, 2007, 312). The study found that “the distance between work and home for women is increasing faster than their commute durations, compared to men” (Crane, 2007, 313). It also found that the commutes of women with children are “lengthening at three times the rate of their husbands” (Crane, 2007, 313).

Koslowsky (1997) states that the commute to home from work may be more stressful than the commute to work. Usually, one would think the opposite. She believes the commute

home would be more stressful because if the person is caught in traffic he/she views this as a loss of personal time. However, if the person has to sit in traffic on the way to work and ends up being late for work, he/she may consider the time as “company time” (Koslowsky, 1997, 168).

Saving and Spending Money

In a 2005 issue of *Time* magazine, Roosevelt discusses how there are so many people that hate traffic, but only a small number of people are willing to give up their cars to carpool. The magazine also states that if consumers compared the costs associated with driving with the costs associated with carpooling, the savings could be significant enough for a dream vacation. “The American Automobile Association estimates that it costs an average of \$703 a month to own a modest vehicle ...with payments, depreciation, insurance, maintenance and gasoline. Yet government surveys show that most cars are driven only about an hour a day” (Roosevelt, 2005, 3). Roosevelt (2005) also lists interesting statistics which include the following: 83 percent of drivers surveyed do believe that carpooling is one way to lessen traffic congestion; 80 percent stated that they drive alone and are not interested in carpooling. Also, 51 percent of the people who drive alone stated that carpooling would be inconvenient, and they do not wish to participate. However, 18 percent stated that they are interested in carpooling, but they do not know of anyone to carpool with. Another interesting statistic is that 84 percent of commuters stated that they drive to/from work alone (Roosevelt, 2005, 5).

One group of commuters in Boston’s Financial District wanted to do something about their long commutes while also saving money. Many of the carpoolers commute 36 miles or more one way. Between the commute to/from work each day it would cost each carpooler

approximately \$700 per month “in gas and vehicle wear-and-tear and maintenance” (Ailworth, 2008, 1). The \$700 price does not include the cost of parking or toll bridges. Now, the commuters carpool and save \$500 each month. The June 2008 article states that due to the recent surge in gas prices, MASSRIDES, a local carpooling company, has seen a significant increase in the number of carpoolers in recent months. MASSRIDES is contacted by approximately 20 to 50 people per day to sign up for a database that matches potential carpoolers together. The cost of the vanpool in the Boston area is approximately \$200. Carpoolers/vanpoolers can save \$500 per month and relax on the way to/from work. The van pool’s monthly fee ranges from \$200 to \$240 and riders can sit back and use their laptops, read a book, take a nap, or read the newspaper (Ailworth, 2008, 1).

In a recent newsletter, the *Commuter Club*, a local Atlanta organization that focuses on carpooling and vanpooling, estimated how much money its carpoolers and vanpoolers were saving each month. The organization conducted a study of its vanpools in the Paulding County area to see how much money each person saved in gas per month by carpooling or vanpooling. “Each vanpool participant saved an average of \$188 per month. Each vanpool saved an average of \$2,057. All Paulding County vanpools combined saved a total of \$34,972 in just one month” (Commuter Club, 2008, 1). The newsletter included fun facts to help put into perspective how much money is really being saved. It states that \$188 can buy seven adult tickets to the Georgia Aquarium, \$2,057 can buy 12 nights at the Ritz-Carlton, and \$34,972 can buy 27,110 bottles of Coca-Cola (Commuter Club, 2008, 1).

A December 10, 2006 article in the *Atlanta Journal-Constitution* states that Atlanta’s traffic congestion, which was “ranked as the fourth worst in the country, costs us an estimated \$2 billion a year. Between 1993 and 2003, the average time area commuters spent in traffic jumped

from 38 to 67 hours annually – longer than the typical workweek” (Harris, 2006, 1). The article suggests that simply throwing money at the commuting problem is not the solution. As is common in most governments, there is a gap between the amount of money needed and the amount of money available. To complete “long-range transportation improvements” it will cost approximately \$168 billion for the state of Georgia and approximately \$54 billion for metro Atlanta projects (Harris, 2006, 1). The reality is that the number of automobiles on the road is increasing at a steady pace, but the roads and highways cannot keep up with the number of automobiles. “As a result, competition for space; congestion levels; and potential sources of frustration, irritation and stress have escalated” (Taylor, 1997 as cited in Hennessy and Wiesenthal, 1999, 410).

Cities can also help alleviate some of the stress and congestion associated with the commute. The August 2008 issue of *American City & County*, focuses on the city of Sandy Springs and the projects its Public Works Director has been working on to reduce traffic congestion in the area. Having only been the Public Works Director of Sandy Springs for two years, Angelia Parham had a long list of projects that needed to be completed to improve traffic conditions in the area. Her primary goal was to determine how to “ease drivers’ pain” (Isaacs, 2008, 39). Parham states that in her first six months on the job, the city “did 300 work orders just on traffic signals. On one road, a study found that the signal adjustments saved residents more than \$11 million in travel time and fuel costs” (Isaacs, 2008, 39). By retiming its traffic signals and making replacements in the pavement, Sandy Springs “reduced travel times on a major corridor by up to 40 percent in rush hours” (Isaacs, 2008, 39). Also, the Georgia Regional Transportation Authority “was birthed by the state Legislature in 1999 to improve traffic

congestion and air quality in fast-growing areas that were in violation of federal clean air laws” (Harris, 2005, 6B).

Employer Support and Environmental Issues

How do employers feel about their employees carpooling? Does it make a difference to the employer? Many employers are implementing programs to give employees incentives to carpool. Not only can employees save money on gas, but they can also earn free gas cards or cash incentives. In Chicago several corporations have joined together to promote carpooling for employees. These corporations have a unique system in which a kiosk is located in the lobby of the building where employees enter their address and work hours and the computer then provides the employee a list of potential people with whom they can carpool. The kiosk also informs the employee how much money can be saved by carpooling once the employee enters how many miles per gallon his/her car gets. The corporations that participate in this program also provide a “guaranteed ride home” for those carpoolers that may have to work late one day or need to leave early due to an emergency. The “guaranteed ride home” entitles the carpooler to a free taxi ride. One employer stated that in ten months of participating in the program, 170 cars were taken off the road because of his company alone (Fefer, 1994, 2).

Stephanie Armour stated that a 2005 study conducted by the Society for Human Resources Management found that 5 percent of employers offer some type of carpooling subsidy. “The U.S. Census Bureau reports that about 12% of employees carpool to work, and 5% take public transportation. Americans on average spend more than 100 hours commuting to work

each year, according to a March 2005 analysis. That means the average daily commute to work lasted about 24.3 minutes in 2003” (Armour, 2005, 5B).

Other employers, such as American Honda Motor, conducted gas-card raffles and carpooling events during lunch so that employees could meet others that may be interested in carpooling. Honda provides cash incentives for carpooling as well as designated parking areas close to the building that are reserved strictly for carpoolers. The National Aquarium in Baltimore also provides cash incentives for its employees to carpool. Due to the increase in gas prices in recent years, it has seen a significant increase in the number of carpoolers. At the beginning of the year 70 employees of its 300 total employees were carpooling. Now, 90 of the 300 employees are participating in the carpooling program. Children’s Healthcare of Atlanta doubled its monthly subsidy in July 2005 that it offers to employees that participate in vanpools. The amount doubled to \$60 a month instead of \$30. One reason for the increase in the number of carpoolers is a result of high gas prices and long/stressful commutes (Armour, 2005, 2).

A book entitled *Commuting Stress: Causes, Effects and Methods of Coping* contains a vast amount of information on many stressors associated with commuting. According to the book, on an ordinary day in America approximately 2 percent to 4 percent of workers are absent. The approximate cost of these absences (both direct and indirect) cost the United States approximately \$30 billion in 1984 (Rosse, 1991 as cited in Koslowsky et al., 1995, 15). Obviously, if the cost of employee absenteeism were analyzed today it would be much higher than in 1984. Aside from absenteeism the authors also discuss tardiness and how the commute plays a significant role in determining if an employee will arrive at work on time. In extreme situations, tardiness and absenteeism can result in turnover for the corporation. Koslowsky and others (1995) ask the following question, “is commuting one of the variables that have an

influence on whether we show up to work and when we show up at work?” (Koslowsky, 1995, 14). This question is very important because it does make one pause and realize that the commute does have a significant effect on when and if people decide to go to work on a given day. The authors mention a typical situation where it is either raining or snowing outside and people just know that their commute to work is going to be a long, treacherous one. Those commuters are very tempted to stay under the blanket and take the day off. In other cases just knowing there is a long commute ahead will be reason enough for us to stay home.

An analysis of the “State of the Commute Study in Southern California” discusses a study that examined “commuting stress in automobile travel with a large representative sample (2,591) in southern California through a telephone survey” (Novaco and Collier, 1994, 170). This particular study found that commuting stress was associated with the distance of the commute as well as the duration of it. An interesting finding in this study was that gender was also a significant factor. Commutes longer than 20 miles were more stressful for women because in long commutes women “perceive much greater commuting stress spillover to work and home” (Novaco and Collier, 1994, 170).

On the issue of environment, the article entitled “10 Ways to Reduce Commuting Stress” states that when more commuters carpool there is less air pollution and less noise. Also, traffic congestion is reduced and carpoolers can sit back, relax, and enjoy the ride (Credo, 1995, 1). Much of the research thus far suggests that carpooling could significantly reduce the levels of air pollution.

Traffic congestion is not only an issue in the United States, but it is also a problem in Delhi, India. A case study of Delhi stated that the increasing number of cars is causing congested roads, “high levels of energy consumption along with its economic and environmental costs, and

worsening air and noise pollution” (Dewan and Ahmad, 2007, 61). An increased number of vehicles on the road results in lower speed, and increased congestion which leads to higher levels of pollution. A carpooling questionnaire was used in the case study of Delhi in which 500 participants were interviewed. Some of the results of the carpooling questionnaire are as follows: approximately 28.2 percent of people want to carpool with one person, 8.2 percent of people want to carpool with two people, 15.4 percent of people want to carpool with three people, and 48.2 percent of people do not want to carpool at all. Also, 84.8 percent of participants were not carpooling, while 15.2 percent of people were carpooling (Dewan and Ahmad, 2007, 64). Approximately 65 percent of the participants stated that they thought carpooling would save time and 81 percent believed carpooling would reduce pollution (Dewan and Ahmad, 2007, 65).

Since Delhi does not have an “efficient public transportation system” in place, more and more citizens are using their personal vehicles. The use of personal vehicles “is not only more energy intensive and polluting, but also more expensive to the economy” (Dewan and Ahmad, 2007, 61). The increased traffic congestion is not only slowing the commute for many drivers, but it is resulting in “higher oil consumption and emissions that are poisoning the urban areas” (Dewan and Ahmad, 2007, 61). Dewan and Ahmad (2007) state that among other approaches, carpooling and vanpooling are great ways to reduce stressful commutes. They also state that “in order to conserve fuel, decrease traffic congestion during rush hours and enhance the use of existing highways and parking facilities in Delhi, carpooling is required” (Dewan and Ahmad, 2007, 63). This study emphasized the crucial role that employers serve in encouraging employees to carpool, and it suggests that through employer support, the carpooling system can be successful. Dewan and Ahmad (2007) also list benefits for employers that arrange carpooling. These benefits include, “maximizing use of employee parking, encouraging sociability between

employees, reducing stress on driving to work, providing staff with a further benefit, and improving the company image” (Dewan and Ahmad, 2007, 64).

Methods

Participants received a questionnaire with a cover letter distributed in their mailboxes at work. The cover letter explained the following: the purpose of the research, what was expected of the participant, how long the questionnaire would take to complete, how and to whom the questionnaire should be returned to when it is completed, and the two required paragraphs informing participants that participation is entirely voluntary and that the participant may cease participation at any time without penalty. The cover letter also stated that all participants would remain anonymous. A bolded statement was made on the cover letter informing the participant that he or she may remove this page and keep it for reference. It also listed the contact information for the Institutional Review Board at Kennesaw State University and ended by thanking the participant for the time spent completing the questionnaire. A copy of the cover letter is attached on page 37 (see Appendix C).

The investigator created a questionnaire containing 20 questions relevant to the purpose of the research. The first three questions ask the participant the mode of transportation he or she uses to get to and from work, the length (in miles) of the commute from home to work, and the length of time (in minutes) the commute takes. Other questions included in the questionnaire ask the participant how he or she feels after the commute to work and home (i.e., stress levels). Also a question is asked regarding how likely the participant is to change jobs due to the commute. The next four questions are similar in nature, but are intended to gain information on different

reasons one might decide to carpool. These four questions ask the participant if he or she would consider carpooling for the following reasons: to save money, to improve the environment, to meet new people, and to reduce stress. The next question asks if the participant is more likely to carpool knowing some of the potential benefits (i.e., saves money, time, reduces stress, and helps the environment). Other questions ask the participant his/her level of education, gender, and age. The participant is asked to rate his/her overall stress level due to the daily commute to/from work on a scale from 1 to 10 (with 1 being "not stressed at all" and 10 being "extremely stressed"). A copy of the questionnaire is available in Appendix D.

The investigator collected the data by visiting local businesses in the office park where she is currently employed in Atlanta, Georgia beginning Monday, September 8, 2008. She visited the local businesses and asked to speak with the Director of Human Resources (hereinafter referred to as the HR Director). The investigator asked the HR Director how many employees the company had (to ensure there was a minimum of 300 participants and a maximum of 350). The investigator then gave the HR Director a copy of the cover letter and questionnaire and fully explained the purpose of the research. The investigator asked the HR Director to distribute a copy of the cover letter and questionnaire to all employees via the employee mailboxes on site at the company. The investigator explained that the deadline for employees to return the questionnaire to the HR Director was October 15, 2008 and that the investigator would pick up all completed questionnaires on October 21, 2008 (to give employees a few extra days to return the questionnaire in case he/she forgot or was out of the office on October 15th). The investigator made it clear to the HR Director that all questionnaires should be returned via the HR Director's mailbox so that he/she would not be able to link an employee to a particular questionnaire. The HR Director was instructed to check all questionnaires before placing them in

the folder that the investigator provided to ensure that no employee included his/her name on the questionnaire by mistake. If so, the HR Director was supposed to black out the name or tear that portion of the page off so that the investigator could not see the name. The investigator also gave each participating HR Director a quick guide to reference in case of any questions. The sheet served as a quick reference for HR Directors and included information as to how and when to distribute the surveys as well as a few facts as to why the HR Director should participate in the study. (Refer to p.35 Appendix B).The sheet also listed the investigator's name, cell phone number, and e-mail address in case the HR Director had any questions about the questionnaire, the cover letter, or the overall project.

The investigator continued visiting businesses in the area and repeated the same process until she had all 350 questionnaires distributed. The investigator also visited small businesses (approximately 20 employees or less) in Woodstock and Kennesaw to distribute the cover letter and questionnaire. By distributing surveys in Woodstock and Kennesaw, the investigator was able to gain information from commuters in three different cities (Atlanta, Woodstock and Kennesaw) rather than just one. There were a few HR Directors that did not wish to have his or her organization participate, so the investigator thanked him or her for their time and moved on to the next business in the area. Although this was a convenience sample because the investigator only chose businesses near her own place of employment and cities near her home (i.e., Woodstock and Kennesaw), she believes this was a representative sample because there were many different types and sizes of companies in the areas that she targeted.

Participants were selected based on whether he or she worked for a company in the office park near the investigator's own place of employment or at one of the businesses selected in Woodstock or Kennesaw. The HR Director at the participant's place of employment distributed

the cover letter and questionnaire in all employee mailboxes (those that were over 18 years of age). Participants were instructed to return the completed questionnaire to the HR Director. The investigator then collected the completed questionnaires from the HR Director on October 21, 2008. If a participant did not wish to participate, he or she could simply discard the questionnaire. Also, the participants ranged in age from 18 to 62 years old (approximately).

All participants remained anonymous so he or she can be open and honest when completing the questionnaire. No compensation was given to any participants. Those that chose not to complete the questionnaire were not penalized in any way. No minors or other vulnerable participants participated in this research study. There was a statement on both the cover letter and the questionnaire that stated no one under age 18 should complete the questionnaire. Since the HR Director was the person responsible for distributing the surveys in employee mailboxes, he or she should have identified anyone under 18 years of age and ensured that a questionnaire was not placed in that person's mailbox.

To ensure anonymity, the questionnaires were distributed to the employees via their mailboxes at work by the HR Director. The cover letter stated that all participants would remain anonymous. Also, a statement at the end of the questionnaire reminded the participant not to include his/her name since the person's identity was to remain anonymous. The participant was instructed to place the completed questionnaire back in the mailbox of the HR Director (rather than handing it to the HR Director to protect the participant's identity). The HR Director kept all completed questionnaires in a folder (provided by the investigator) in his/her office. Also, the questionnaires should not have any employees' names on them, so even the HR Director would not know how each employee responded to the questionnaire.

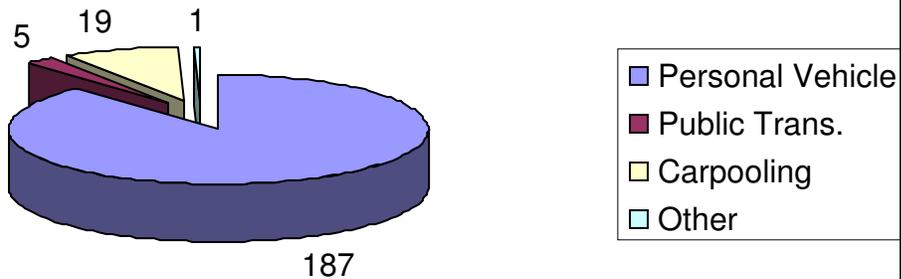
Regarding storage of the data while the study was underway, the investigator provided a folder to the HR Director for all completed questionnaires. The HR Director was required to store the folder in a place (such as a locked file cabinet) so that others could not access these forms. Again, no employee names were on the questionnaires, so it was impossible to link an employee to a specific questionnaire.

The date on the cover letter stated that the questionnaire should be returned to the HR Director by October 15, 2008. The investigator collected the completed questionnaires from all HR Directors on October 21, 2008. (Five extra days were given in case some employees forgot to complete the survey by October 15th or if the employee was out of the office on this day). The investigator will distribute summary data via a written document to all participating HR Directors on January 5, 2009 or sooner. The HR Director can then distribute copies of the findings in all employee mailboxes or post them in a common area (i.e., the break room) so that everyone (even those that chose not to complete the survey) can see the findings of the study. Once the study has been completed, all questionnaires will be shredded via a paper shredder at the investigator's house on January 10, 2009. Again, although no names will be listed, the questionnaires will still be shredded to ensure that no one other than the investigator and the HR Director has access to the questionnaires.

Results

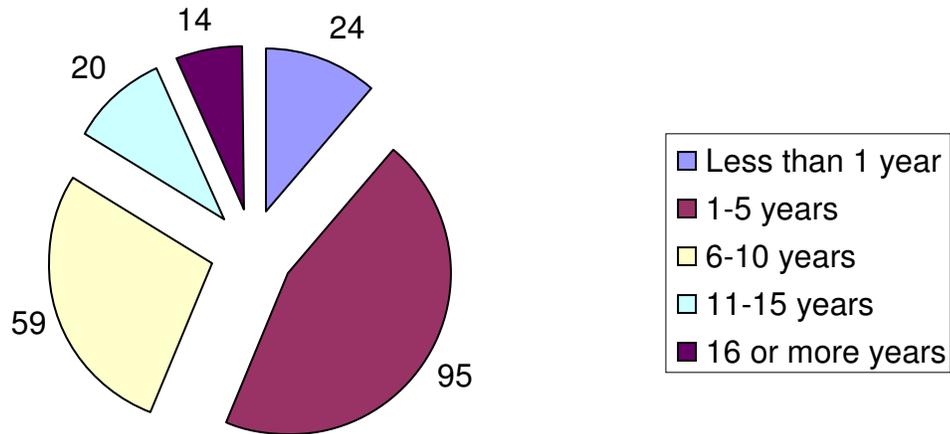
Of the 350 questionnaires that were distributed to the businesses, 212 were completed and returned, resulting in a 60 percent response rate. Of the 212 participants, 187 of them use a personal vehicle to get to and from work and 19 of them carpool/vanpool (see Figure 1).

FIGURE 1: Mode of Transportation to Get to/from Work



Most of the participants indicated that their commute from home to work is between 11 to 15 miles. Further analysis of the data shows that 78 participants indicated that their commute takes between 31 to 60 minutes to get from home to work on a typical day. As for the ride from work to home, 86 participants stated that it takes them between 31 to 60 minutes to get home on a typical day. The questionnaire also asked the participants how long they have been employed at their current job. Most of the participants, 95 of them, have been employed at their job between 1 to 5 years, as reported in Figure 2.

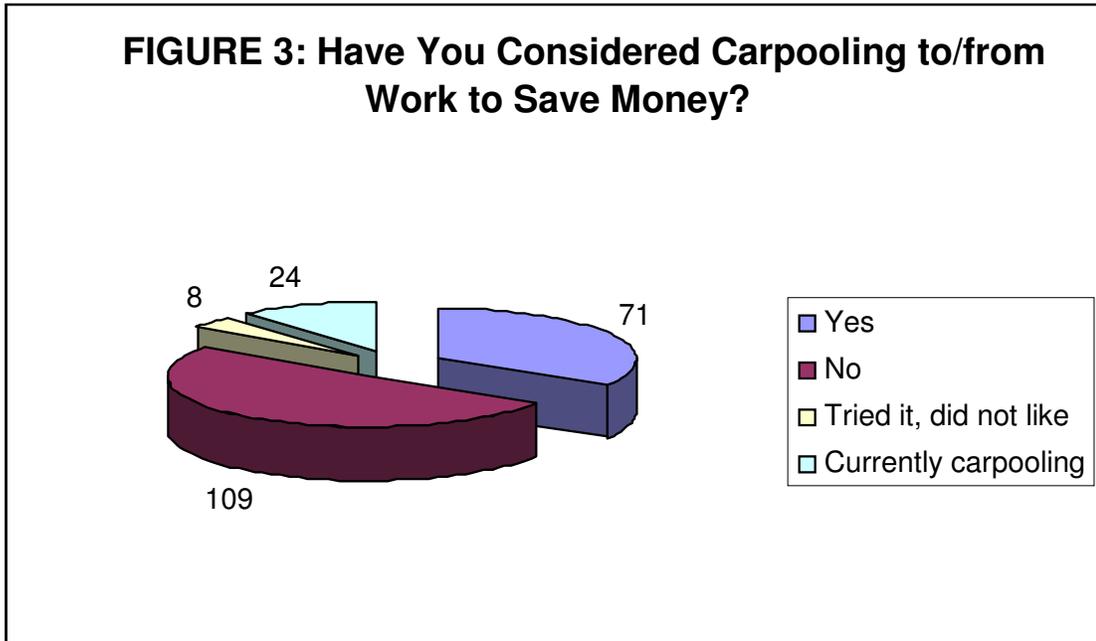
FIGURE 2: How Long Have You Been Employed At Your Current Job?



The questionnaire also asked the participants how they felt after their commute to and from work each day. Surprisingly, 106 participants indicated that they felt calm when they arrived at work after their commute, and 89 participants indicated that they felt calm when they arrived home after their commute. One question on the questionnaire asked, “how likely are you to change jobs to reduce your commute time?” Of the 212 participants, 102 of them stated “not likely at all.”

The questionnaire included a series of questions which asked the participant if he/she had considered carpooling for the following reasons: to save money, to improve the environment, to meet new people, and to reduce stress. The results of these questions are as follows: 106 had not considered carpooling to improve the environment, 169 had not considered carpooling meet new people, and 131 had not considered carpooling to reduce stress. Figure 3 shows that 109

participants said they had not considered carpooling to/from work to save money, 71 had considered it, 8 tried it, but did not like it, and 24 were currently carpooling.



The next question asked the participant if he/she was more likely to consider carpooling to/from work knowing that research suggests it saves money, improves the environment and reduces stress. Further examination of the data revealed that 78 people answered “yes,” 77 answered “no,” and the other 57 participants were not sure. The questionnaire also asked the age, education level, and sex of the participant. Of the 212 participants, 122 were female and 97 of them were between the ages of 29 and 39 years old. Only four participants were 62 or older (see Figures 4 and 5).

FIGURE 4: Age of Participants

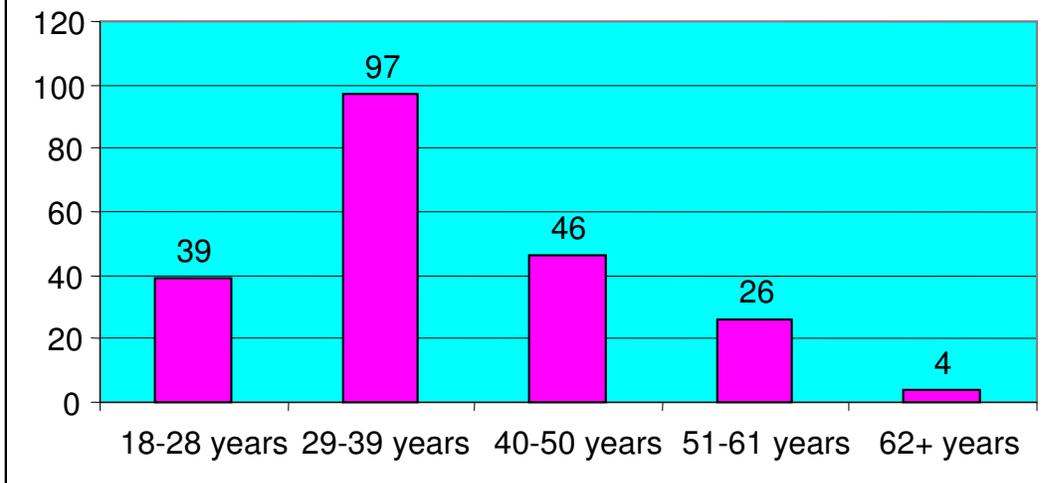
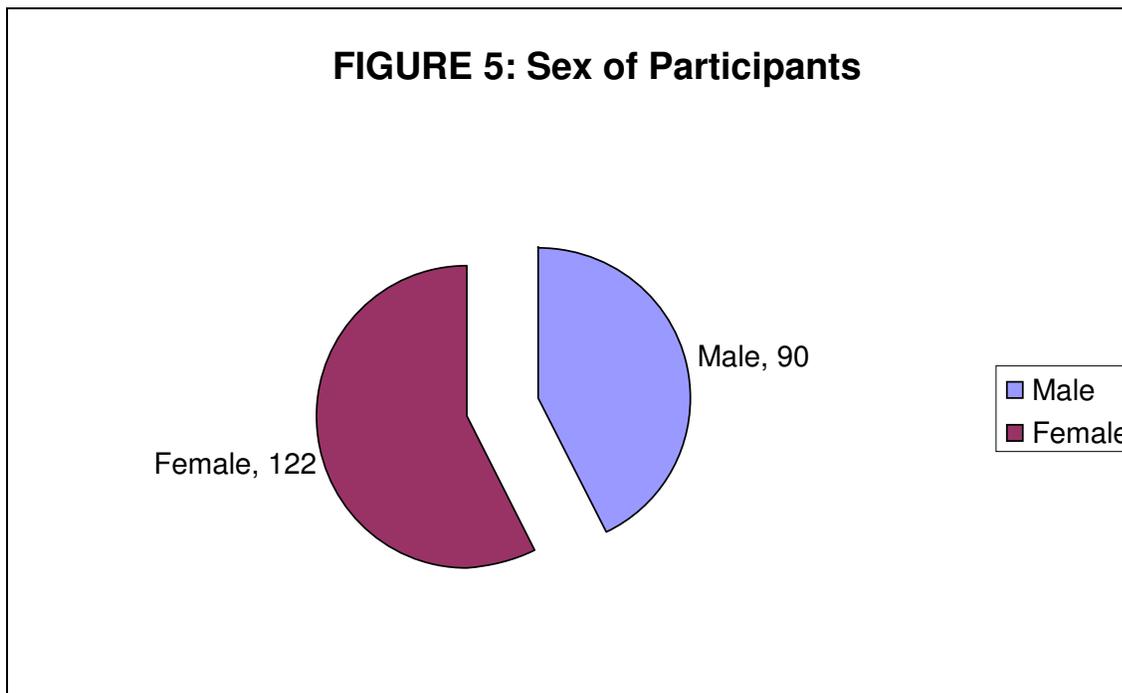


FIGURE 5: Sex of Participants



A statement was included on the questionnaire and cover letter that stated no one under 18 years old was allowed to complete the questionnaire. When asked about their highest level of education, participants responded as follows: three attended high school, but did not graduate, 66 were high school graduates, 95 had bachelors or associates degrees, 41 had masters or graduate degrees, three had doctorate degrees and four participants responded “other.” There were three questions that asked the participants if they had ever experienced headaches, queasy feelings in the stomach, and increased blood pressure levels as a result of their commute. Many of the participants answered “no” to all three of these questions. Of the 212 participants, 126 said they did not arrive at work with a headache due to the commute, 143 did not arrive at work with a queasy feeling in their stomach due to the commute, and 121 did not arrive at work feeling that their blood pressure had increased due to commuting. One of the final questions on the questionnaire asked the participants to rate their overall commute on a scale from 1 to 10 with 1 being “not stressed at all” and 10 being “extremely stressed.” To the investigator’s surprise, 46 of the participants gave a rating of 1 (i.e., not stressed at all) and no participant gave a rating of 10 (i.e., extremely stressed).

Discussion

There were two primary benefits for commuters that participated in the study. The two incentives for completing the questionnaire included the following: The participants were able to voice their concerns and frustrations with the commute to and from work, and can use the results of the study to determine if it would truly be beneficial for them to begin carpooling to reduce stress. There were numerous benefits to humankind regarding this research. As previously

mentioned, carpooling not only reduces time and stress, but it also saves money and protects the environment. After the results from this study are distributed, participants (and others reading the results) will realize the importance of carpooling and all its benefits. Carpooling cannot only help the environment, but it can also save time, money, and reduce stress. Hopefully more adults will begin carpooling and everyone will benefit. Carpooling helps the environment by reducing the number of cars on the road and the constant smog that we are so used to seeing in larger cities.

By carpooling, adults can simply relax on their way to work, read a book, eat breakfast, or even take a quick nap. Others will benefit from carpooling because there will be fewer cars on the road, which will make traffic less congested. Also, the Department of Transportation and other organizations will not have to worry continuously about how and when new roads and freeways will be built to accommodate the growing number of cars. The HR Director can review the results of the research to determine if his or her particular organization should encourage all employees to carpool. For example, the HR Director could contact a local organization that specializes in carpooling and vanpooling and invite a representative from the organization to conduct a seminar on site at the HR Director's company. The HR Director may find that his or her employees are not only saving time and money by carpooling, but they may arrive at work less stressed. Carpooling may also increase the level of job satisfaction since the employee will arrive at either work or home less stressed and will not dread the ride to and from work everyday.

Although it was not intentional, it should be noted that questionnaires were only distributed to private organizations. As previously mentioned, this was a convenience sample because the investigator visited businesses near her own place of employment and near her home. Although the sample came from the private sector, the issues associated with traffic congestion can be applied to the public sector as well. Research suggests that the growing number of cars on

the road harms the environment and can also lead to health problems. Aside from causing health and environmental problems, traffic congestion also takes a toll on bridges, roads, and highways. There is significant policy implication with environmental, health, and road issues because these are issues that affect every citizen, and public officials must determine how to best solve these problems. The growing number of cars on the road increases the wear-and-tear, which will eventually require expensive repairs that citizens must pay for.

Conclusion

The primary objective of this study has been to determine if research findings support the idea that carpooling to and from work reduces stress and to see approximately how many people are actually carpooling. The results of this study are a bit surprising to the investigator. She expected participants to have much higher stress levels due to their commutes since only a few of them carpool. At the investigator's own place of employment, she often hears conversations in the break room and hallway regarding how terrible the morning commute was because of an accident or the weather. The investigator commutes approximately 22 miles one way to work. On her way to work it takes her approximately 30 minutes, but on the way home the commute is usually between 45 to 60 minutes. The morning and afternoon news, as well as radio stations are constantly giving traffic updates. Most of the time it seems there is a car accident or a random object in the roadway that is slowing down traffic.

Although there are many advantages to carpooling, there are also some disadvantages. Some commuters do not want to give up control of their vehicle to carpool. Others (including the investigator) have a difficult time trying to find a carpooling system that works for them due to

work schedules. For example, the investigator's work hours are 7:30 a.m. to 4:30 p.m. However, she likes to arrive at work early (around 6:45 a.m.) to get organized for the day and to take advantage of the quietness of the office. Although her shift ends at 4:30 p.m., some days there are last minute issues that need to be handled and it is not possible to leave at 4:30 p.m. There are some carpoolers at the investigator's place of employment that only carpool a few days a week when they know they are only going to be at work for the specific hours. If employees know they have a late meeting or have to arrive at work early, they will drive their own vehicles on that particular day.

There were both strengths and limitations associated with this study. One of the strengths of this study is that the participants could respond openly and honestly about their commutes and frustrations since all responses remained anonymous. Hopefully after reading the findings of this study and the findings of the research on the subject of carpooling and stress, others will consider carpooling. Many people may believe there is not a carpool or vanpool that will fit their schedule, or pick up at their place of employment. There are numerous carpooling/vanpooling websites available in which commuters can find carpooling/vanpooling pick up/drop off places and the hours of the carpool/vanpool. Some of the vanpooling groups in the Atlanta area usually meet in large parking lots such as Lowe's, Kroger, and Home Depot. Riders simply meet in that parking lot at a specified time, leave their cars in the parking lot, and ride the van to work. The van drops each rider off in front of the door, then the van arrives back at a specified time that evening to take the rider back to the parking lot where his or her car is parked.

There are a few limitations associated with this study. One limitation is that the sample size is fairly small. Although there were 350 questionnaires distributed, only 212 were received. Also, this is a convenience sample because the investigator only distributed questionnaires near

her own place of employment and in cities near her house. Another limitation is that only private organizations participated in this study. Further research should be conducted to include the public sector since health issues, the environment, and road repairs are important issues in the public sector. Carpooling and commuting stress is definitely a subject that requires further research. Many people may never consider carpooling to work. However, the issue of traffic congestion affects everyone whether a person is driving to school, work, a concert, or a baseball game. By increasing the number of carpools and vanpools, commuters can save money, improve the environment, and reduce traffic congestion simultaneously.

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APPENDIX A

Instructions

(THIS PAGE SHOULD BE KEPT BY THE HR DIRECTOR FOR REFERENCE)

1. Distribute questionnaire and cover letter to all employees 18 years old and over.

(NOTE: No one under the age of 18 should complete the questionnaire)

2. Once the questionnaires are returned to the Human Resources Director (hereinafter referred to as the HR Director), they should be placed in the folder provided by Missy Peterson. (The cover letters do not need to be returned as they can be kept by the participant.)
3. The HR Director should store the folder in a place (such as a locked file cabinet) so that others cannot access these forms. Again, no employee names will be on the questionnaires, so an employee cannot be linked to a specific questionnaire.
4. The deadline for employees to return the questionnaire to the HR Director is **October 15, 2008**. Missy Peterson will pick up all completed questionnaires on October 21, 2008 (to give employees a few extra days to return the questionnaire in case he/she forgot or was not at work on October 15th.)
5. All questionnaires should be returned via the HR Director's mailbox so that the HR Director will not be able to link an employee to a particular questionnaire. The HR Director should check all questionnaires before placing them in the folder provided by Missy Peterson to ensure that no employee included his/her name on the questionnaire by mistake. If an employee did include his/her name by mistake, the HR Director should black out the name or tear that portion of the page off so that Missy Peterson cannot see

the name. If a participant does not wish to participate, he/she can simply discard the questionnaire. All responses will remain completely anonymous.

6. The Investigator (Missy Peterson) will distribute summary data via a written document to all participating HR Directors on January 5, 2009. The HR Directors can then distribute copies of the findings to all employee so that everyone (even those that chose not to complete the survey) can see the findings of the study. (All questionnaires will be shredded via a paper shredder at the Investigator's house on January 10, 2009. Again, although no names will be listed, the questionnaires will still be shredded to ensure that no one other than the investigator and the HR Director has access to the forms.)

APPENDIX B

Why should I help?

- Participants will be able to voice his/her concerns/frustrations with the commute to/from work.
- Since all responses will remain anonymous, the participant can respond honestly.
- The participant can use the results of the study to determine if it is truly beneficial for him/her to begin carpooling to reduce stress.
- Participants may also find other benefits to carpooling in addition to reducing stress. All participants will remain anonymous so he/she should feel free to be open and honest when completing the questionnaire. (No compensation will be given to any participants. Those that choose not to complete the questionnaire will not be penalized in any way.)
- The participant may realize the importance of carpooling and how carpooling cannot only help the environment, but it can also save time, money, and reduce stress.
- Other advantages to carpooling include the following: Riders can read a book, sleep, catch up on some work, talk on the cell phone, or get to know the people they are riding with.
- The HR Director can review the results of the research to determine if his/her particular organization should encourage all employees to carpool. (For example, the HR Director could contact a local organization that specializes in carpooling and vanpooling and have a representative from the organization conduct a seminar on site at the HR Director's company.)

- The HR Director may find that his/her employees are not only saving time and money by carpooling, but the employees may arrive at work less stressed.
- Carpooling may also increase the level of job satisfaction since the employee will arrive at work/home less stressed and will not dread the ride to/from work everyday.

My hope is that once the results from this study are distributed, participants (and others reading the results) will realize the importance of carpooling and all of its benefits. Hopefully more adults will begin carpooling and everyone will benefit. Carpooling helps the environment by reducing the number of cars on the road and the constant smog that we are so used to seeing in larger cities. By carpooling, adults can simply relax on the way to work, read a book, eat breakfast, or even take a quick nap. Others will benefit from carpooling because there will fewer cars on the road, which will make traffic less congested.

Please contact me if you have questions:

Missy Peterson (The Investigator)

mpeter10@students.kennesaw.edu

678-749-3594 (cell)

APPENDIX C

September 8, 2008

To: Research Participants

From: Missy Peterson (The Investigator)
Kennesaw State University
1000 Chastain Road
Kennesaw, GA 30114 (770-423-6000)

Re: Research study on reducing stress by carpooling to/from work

The attached questionnaire is designed to provide information to conduct a study to determine the effectiveness of carpooling to/from work and its ability to reduce stress. Your responses on the attached questionnaire will be extremely helpful in determining if in fact carpooling to/from work reduces stress. Please note that no one under 18 years old is allowed to complete the questionnaire.

Participants are simply being asked to complete the attached questionnaire. The questionnaire will take approximately ten (10) minutes or less to complete. Once the responses have been received, the investigator will compile all results. Please note that your identity and your responses will remain anonymous. The expected benefit for the participants is to discover the advantages and the effectiveness of carpooling to/from work and its ability to reduce stress. Please return the completed questionnaire to your Human Resources Director's mailbox no later than **October 15, 2008** (remember that you should **not** include your name on the questionnaire.)

The purpose of this research has been explained and my participation is entirely voluntary. I have the right to stop participating at any time without penalty. I understand that the research entails no known risks and that my responses are not being recorded in any individually identifiable form. By anonymously completing this survey, I am agreeing to participate in this research project.

THIS PAGE MAY BE REMOVED AND KEPT BY EACH PARTICIPANT

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to Dr. Ginny Q. Zhan, Chairperson of the Institutional Review Board, Kennesaw State University, 1000 Chastain Road, #2202, Kennesaw, GA 30144-5591, (770) 423-6679.

I know that your time is valuable and I greatly appreciate your participation.

APPENDIX D

Questionnaire

The attached questionnaire is designed to provide information to conduct a study to determine if carpooling to/from work reduces stress. Your responses on the attached questionnaire will be extremely helpful in determining if in fact more commuters should carpool to reduce stress, improve the environment, and save money.

Please note that no one under 18 years old is allowed to complete the questionnaire.

Directions: Please complete the questionnaire by circling your answer for each question. Please only circle **one** answer per question.

1. Which mode of transportation do you use to get to work?

(a) personal vehicle (b) public transportation (c) carpooling/vanpooling (d) other (please specify)_____

2. How far is your commute from home to work? (Assuming no stops are made along the way.)

(a) 0-5 miles (b) 6-10 miles (c) 11-15 miles (d) 16-20 miles (e) 21 miles or more

3. How long (in minutes) is your commute to work on a typical day?

(a) 0-15 minutes (b) 16-30 minutes (c) 31-60 minutes (d) 61-90 minutes
(e) 91 minutes or more

4. How long (in minutes) is your commute home on a typical day?

(a) 0-15 minutes (b) 16-30 minutes (c) 31-60 minutes (d) 61-90 minutes
(e) 91 minutes or more

5. How long have you been employed at your current job?

(a) less than 1 year (b) 1-5 years (c) 6-10 years (d) 11-15 years (e) 16 or more years

6. When you arrive at work how do you feel after your commute?

(a) very stressed (b) anxious (c) calm (d) a little stressed (e) other (please specify)_____

7. When you arrive home how do you feel after your commute?

(a) very stressed (b) anxious (c) calm (d) a little stressed (e) other (please specify)_____

8. How likely are you to change jobs to reduce your commute time?

(a) very likely (b) somewhat likely (c) not likely at all (d) not sure (e) I have never considered this

9. Have you considered carpooling to and/or from work to save money?

(a) yes (b) no (c) tried it, but did not like it (d) currently carpooling

10. Have you considered carpooling to and/or from work to improve the environment?

(a) yes (b) no (c) tried it, but did not like it (d) currently carpooling

11. Have you considered carpooling to and/or from work to meet new people?

(a) yes (b) no (c) tried it, but did not like it (d) currently carpooling

12. Have you considered carpooling to and/or from work to reduce stress?

(a) yes (b) no (c) tried it, but did not like it (d) currently carpooling

13. Research suggests that carpooling to/from work not only costs less and improves the environment, but also reduces stress. Knowing this, are you more likely to consider carpooling to/from work?

(a) yes (b) no (c) not sure

14. What is your highest level of education?

(a) some high school, did not graduate (b) high school graduate (c) Bachelor's or Associate's degree (d) Master's or Graduate degree (e) Doctorate degree (f) Other (please specify)_____

15. What is your gender?

(a) male (b) female

16. Do you ever arrive at work with a headache due to your commute?

(a) yes (b) no (c) sometimes (d) have not thought about this

17. Do you ever arrive at work with a queasy feeling in your stomach due to your commute?

(a) yes (b) no (c) sometimes (d) have not thought about this

18. Do you ever arrive at work feeling that your blood pressure has increased due to your commute?

(a) yes (b) no (c) sometimes (d) have not thought about this

19. How would you rate your overall stress level due to your daily commute to/from work on a scale from 1-10? (With 1 being “not stressed at all” and 10 being “extremely stressed.”)

(a) 1 (b) 2 (c) 3 (d) 4 (e) 5 (f) 6 (g) 7 (h) 8 (i) 9 (j) 10

20. What is your age?

(a) 18*-28 years (b) 29-39 years (c) 40-50 years (d) 51-61 (e) 62 or older

* No one under 18 years of age is allowed to complete this questionnaire.

When you have completed this questionnaire please place it in your Human Resources Director’s mailbox. Please remember you should not include your name or any identifying information on this questionnaire as all responses will remain anonymous. Thank you for participating.