Perceived Commute Strain, Negative Physical Symptoms, and Exhaustion in Employees Who Commute

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According to the U.S. Department of Transportation (1994), the number of automobile commuters increased from 43 million to 101 million between 1960 and 1990. This 135.5% increase was partly due to the increased numbers of women who entered the workforce. With such a large number of Americans commuting to and from work by automobile, the impact of commuting and its effects need to be understood. To date, however, little research has investigated the effects of commuting (Hennessy & Wiesenthal, 1997). Past research suggested that commuting is a source of stress and that it can interfere with family, leisure, and work activities.

Gulian, Matthews, Glendon, Davies, and Debney (1990) noted studies of commute stress and strain are important because these factors consistently correlate with problems of sleep quality, work, and health. Novaco, Stokols, and Milanesi (1990) used 99 commuters from two industrial firms to investigate commute physical and subjective impedances. Physical impedance refers to the concrete experience of the commute environment (e.g., miles commuted, minutes commuted, or number of traffic lights). Subjective impedance addresses the commuter's perception of the constraints of the commute (e.g., reduction of travel speed due to stop signs). The physical variables Novaco et al. (1990) included in their study were chest pain, colds/flu, and headaches. They found that self-reported occasional chest pain was significantly correlated with subjective impedance and that physical impedance was related to work absences due to illness and the reported number of colds/flu. The number of freeways and road exchanges traveled by a commuter each day was also significantly correlated with the reported number of colds/flu.

Evans and CARRERRE (1991) used male bus drivers to study the effect of traffic congestion on psychophysiological stress. They found that among these bus drivers, increased exposure to peak traffic was associated with elevated levels of urinary catecholamines. Previous studies found urinary catecholamines to be a reliable and valid indicator of occupational stress during a workday (Frankenhaeuser & Johansson, 1979).

More than 100 million Americans commute between destinations in their automobiles (U.S. Department of Transportation, 1994). We examined perceived strain, number of negative physical symptoms, and exhaustion of employees who commute to and from work using automobiles. We gathered data through an Internet survey completed by 323 employees from across the United States who commuted to and from work daily in their automobiles. As predicted, commuters with high commute strain reported more negative physical symptoms and exhaustion than commuters with average or low levels of commute strain. Sex differences were found: women reported significantly higher levels of commute strain than did men. This study has important implications for commuters who may already be aware of their commute strain but are not aware of the negative health consequences related to elevated levels of strain.
Traffic congestion reduced a bus driver’s ability to adjust speed, change lanes, and maneuver into curbside areas to pick up and discharge passengers.

Schaeffer, Street, Singer, and Baum (1988) used commuters from a governmental research agency to study traffic congestion and physical symptoms. They found that greater traffic congestion during the morning rush hour was related to increased blood pressure and deficits in commuters’ physical task performance on proofreading tasks and color discrimination tasks.

Exhaustion is another debilitating condition that can impact work and home activities. Koslowsky, Kluger, and Reich (1995) noted that commuters are logical candidates for exhaustion; commuters often report being tired or exhausted when they arrive at work or home. Wright and Cropanzano (1998) argued that managing emotional exhaustion is important for improving quality of life and functioning at work. They noted associations found between emotional exhaustion and poor work attitudes, decreased job performance, turnover intentions, and somatic difficulties such as colds, gastrointestinal problems, headaches, and sleep disturbances.

Koslowsky, Aizer, and Krausz (1996) used commuters to study commute impedance and strain. Strain was measured by using subjective stress, perceived control, and exhaustion scales. Commute impedance predicted the commuters’ subjective stress and perceived control, but did not predict exhaustion. The authors did not look at the relation between commuters’ strain and exhaustion.

Sex is a variable that has often been hypothesized to influence commuting behavior, but recent research has not found sex effects. For example, Aronsson and Rissler (1998) studied the psychophysiological stress reactions of male and female bus drivers. Both the male and female bus drivers had significantly higher levels of adrenaline, noradrenaline, and cortisol levels during work than during the control sessions. The men and women also did not differ in their self-reported stress, irritation, tenseness, strain, satisfaction, alertness, confidence, good mood, powerlessness, uneasiness, and dissatisfaction while driving.

Similarly, Hennessy and Wiesenthal (1997) investigated sex effects with their examination of state driver stress in commuters who drive in highly congested traffic conditions. They conducted interviews using cellular headset telephones while the participants were driving under low or highly congested conditions and found the level of state driver stress was dependent on the trait susceptibility to commute stress. Hennessy and Wiesenthal did not find sex to be a significant predictor of state driver stress or trait driver stress.

On the basis of the research presented above, we devised the following hypotheses:

1. Higher perceived commute strain will be related to reporting more negative physical symptoms.
2. Greater levels of commute strain will be related to greater levels of exhaustion.
3. Male and female commuters will report similar levels of commute strain.

Method

Participants

Three hundred twenty-three participants from 30 states in the United States responded to the Internet questionnaire. Sixty-five percent of the participants were from Georgia, Alabama, Kansas, Florida, Louisiana, and California.

Of the 323 surveys received, 9 surveys were not used in the analyses because the respondents did not commute by automobile, an additional 16 surveys lacked significant amounts of data, and another 14 respondents reported working less than 30 hours per week. Part-time employees are not included in this study because they commute less frequently than full-time workers. The resulting number of surveys used in the statistical analyses was 284.

The sample used in the analyses included 100 male participants and 184 female, ranging in age from 21 to 62 years, with an average age of 37 years. Eighty-seven percent reported their ethnicity as White, 7% African American, 2% Asian, 2% Hispanic, and 1% other. The majority of the sample had a bachelor’s degree or higher (71%). The average number of hours worked per week was 45, and the respondents had been working at their current job for an average of 6 years. The average commute time was 30 minutes each way, with an average number of daily total miles commuted being 39.4. The respondents had driven their present commute for an average of 4.5 years.

Measures

Commute strain. We used the 17 items of Kluger’s (1998) Cognitive and Affective Commute Strain Scale to assess commute strain. The scale has three factors including resentment, fears, and worries. Items include “I resent the length of my commute,” “I often feel fear for my personal safety during my commute because of seeing accidents,” and “My commute causes me to worry about constantly being under time pressure,” respectively. A 7-point Likert scale is used for responses (1 = strongly disagree, 7 = strongly agree); thus higher scores indicate higher commute strain. The Cronbach alpha reliability coefficient was .91 for this scale, and for our sample it was .93.
Negative physical symptoms. The Somatic and Affective Complaints Scale (Kluger, 1998) consists of a checklist of 15 physical symptoms including a stiff neck, tiredness, back pain, difficulty in focusing attention, tension, anger, and “flying off the handle.” Kluger suggested the number of symptoms checked should be summed to obtain an overall measure of somatic and affective complaints. Kluger reported a Cronbach alpha reliability coefficient of .84 for the 15 items, and for our sample it was .77.

Exhaustion. Fifteen items from the Burnout Scale developed by Pines, Aronson, and Kafry (1981) were included in this study. An example item from their scale includes “being unhappy.” A 7-point Likert scale is used for responding (1 = never, 7 = always), and higher scores indicate greater exhaustion. Pines et al. assessed the internal consistency of their 12-item scale with 80 samples of participants and reported that the coefficient alpha values ranged from .91 to .93, and for our sample it was .94.

Procedure

The questionnaire used to collect data for this study was posted on an Internet Web site controlled by Websampling. A copy of the html file containing the questionnaire is available from the second author. The questionnaire remained available on the Internet for 10 weeks during the spring of 1999. Participants were recruited by the researchers, by the researchers’ peers and colleagues, and by participants who had previously filled out the survey. This project was part of a larger project completed by a college research class investigating commuting.

Results

Intercorrelations were calculated for the variables in this study. The correlation between commute strain and negative physical symptoms was .73, between commute strain and exhaustion was .47, and between negative physical symptoms and exhaustion was .53. These correlations were significant at the .01 level.

For this study, the participants were put into one of three groups (high, average, or low) on the basis of their commute strain total score. Percentiles placed the participants into one of these groups. The commuters between the 25th and 75th percentile (total score of 29 to 60) are considered to have average strain. The commuters above the 75th percentile (total score of 61 to 104) are considered to have high commute strain, and the commuters lower than the 25th percentile (total score of 17 to 28) are considered to have low commute strain.

Hypothesis 1, higher perceived commute strain will be related to reporting more negative physical symptoms, was supported. Using a one-way analysis of variance, we found that the commuters with high, average, and low commute strain reported significantly different levels of negative physical symptoms, $F(2, 291) = 101.64, p < .0001$. We used Scheffe comparisons to examine the differences between the three groups. The commuters with high commute strain reported significantly more negative physical symptoms ($M = 5.08, SD = 2.40$) than the commuters with average commute strain ($M = 2.45, SD = 2.03$) and the commuters with low commute strain ($M = .64, SD = .99$).

Hypothesis 2, greater levels of commute strain will be related to greater levels of exhaustion, was also supported. The commuters with high, average, and low commute strain reported significantly different amounts of exhaustion, $F(2, 291) = 32.56, p < .0001$. We used Scheffe comparisons to examine the differences between the groups. The commuters with high commute strain reported significantly more exhaustion ($M = 55.94, SD = 19.28$) than the commuters with average strain ($M = 44.99, SD = 16.51$) and the commuters with low strain ($M = 34.10, SD = 13.66$).

Hypothesis 3, male and female commuters will report similar levels of commute strain, was not supported. The men ($M = 42.00, SD = 19.62$) and women ($M = 47.36, SD = 21.86$) differed significantly on their reported levels of commute strain, $F(1, 290) = 4.27, p < .05$. Female commuters reported significantly greater levels of commute strain than did male commuters.

Discussion

Commuters with high strain reported more negative physical symptoms and greater exhaustion, supporting Hypotheses 1 and 2. Hypothesis 3 was not supported as women reported higher levels of commute strain than did men. The reason for this difference between men and women needs to be investigated further. However, popular press articles have asserted that women bear additional stress in their commutes if they are the individuals responsible for children in the family. It is often necessary that children be picked up at day-care facilities or after-school activities at specific times, and getting stuck in traffic may increase stress levels in individuals who are aware of those deadlines and have no control in changing their present traffic situations.

Important implications can be drawn from the findings of this research. Commuters often admit that they have commute strain, but they may not be aware that negative physical symptoms and exhaustion could be related to having high commute strain. Commuters experiencing high commute strain, negative physical symptoms, or exhaustion from their commute should look into the possibility of changing their work hours.
to avoid the rush hour, carpooling so they do not have to drive every day of the week, moving closer to their workplaces, or finding new jobs closer to where they live.

Hennessy and Wiesenthal (1997) noted that long-term commute stress effects that cause commute strain can accumulate and carry over into other life situations. Negative physical symptoms and exhaustion from commuting could affect the commuter’s work by contributing to absences and lower productivity (Kluger, 1998). Companies and workers should recognize that there are potential negative side effects of commuting. Companies could help by providing changes such as flexible work hours, compressed work weeks, telecommuting, or company transportation to help their workers who are experiencing commuting strain, negative physical symptoms, or exhaustion. City officials also have a responsibility to help commuters by constantly working on improving road conditions and developing mass transit options.

This study has several strengths. First, it expands the limited literature available concerning commuting, and second, it examines the relationships among commute strain, negative physical symptoms, and exhaustion. Another strength is the large sample size: much of the commuting research in the past suffered from small sample sizes. Finally, the Internet questionnaire was based on previously used commuting scales with established reliability.

Several limitations of the present research can be noted. This study was available only on the Internet, which allowed only persons with access to a computer to participate. However, using an Internet questionnaire allowed the researchers to easily obtain participants from across the United States. Another limitation of the current study involves the notion of perceived commute strain; because data were collected through self-report surveys, the actual strain of the commuters was not measured. Some individuals may be more willing to acknowledge and report greater levels of commute strain than other individuals. Future research may want to compare actual and perceived commute strain levels. Also, there is a possibility that the negative physical symptoms and commute strain reported by participants could have been the result of other factors, such as illness.

Future research should assess commute strain, negative physical symptoms, and exhaustion over a period of time to determine whether specific days and times for commuting are worse than others. Varying traffic conditions can be monitored to determine how they affect commute strain. Investigations might also examine commute strain and its relation to specific medical problems, such as gastric disorders, cardiovascular problems, or high blood pressure. This type of research could help the medical community to better assess and treat the long-term physical effects of strain from commuting.

References


