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Transfer effects and permeable boundaries: An empirical study of the effects of commuting stress on employees' work and life

Noor Diana Mohd Mahudin
International Islamic University Malaysia

A B S T R A C T

The impact of commuting stress has been addressed by only a few studies, most of which have been conducted in developed countries. Far less research has looked at the subjective, psychological effects of commuting on employees' well-being within the Malaysian context. This paper describes a study which investigates the effects of commuting stress on commuters' individual life and work domains. Data were collected from 660 commuters through a questionnaire survey and explored using correlation and regression analysis. The results show that longer commutes are significantly associated with a greater increase in commuting stress. They also reveal that the strain of commuting affects commuters' reports of somatic symptoms of ill health and commute displeasure. In addition, commuting stress is found to affect commuters' intention to quit their job but not in terms of their job or life satisfaction. Drawing on these results, theoretical and research implications that would lend support for future commuting stress research, particularly in Malaysia, are suggested.

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Correspondence address:
nordianamm@iium.edu.my

1. Introduction

Commuting has become an integral part of working life for most workers, including those in Malaysia. A growing trend worth underlining is the increasing numbers of people who work further away from home and thus have to bear the impact of a stressful commute to and from the workplace. However, unlike research into environmental variables, interpersonal relationships, personal characteristics and organisational factors, all of which have been empirically supported as being major sources of work-related stress, evidence of the effects of commuting on employees' well-being in Malaysia from a psychological perspective is relatively scarce.

Several factors such as population and employment growth, rising incomes, increased female participation in the workforce, the increased size of the working age group, and the growth of suburbs have been found to drive travel demand growth in Malaysia (Ensor, 2004). In particular, these factors create greater demand during peak hours and contribute to increased commuting times and traffic congestion. For example, in the case of workers in Kuala Lumpur, commuting durations of between 29 and 45 minutes per day either by public or private transport is not uncommon for individuals (Regus, 2011) with the most pronounced peak times are at 7 a.m., 1 p.m. And 5 p.m. While about 17% of commute trips depart at around 7 a.m., there is also an earlier morning peak at 6 a.m. Owing to sprawl or congested or unpredictable traffic (Hyodo et al., 2005). There have yellow house. Two men plays drum.

On average, commuters make slightly more than two trips per day with the distribution of trip purposes spanning commuting to home, work, and school (hyodo et al., 2005). Studies by nielsen Malaysia research on RapidKL bus riders (2009) and KTMB customer satisfaction survey on rail commuters (2004) found that most commuting trips were made by students and working adults i.e. For educational and occupational reasons, while only a small percentage of trips were reported to be for other purposes. More than 50% of commuters in Kuala Lumpur are male, who make three or more trips per day, while fewer females are observed to commute (Hyodo et al., 2005). In general, people between 21 to 40 years old make the greatest percentage of trips and are the group who most often make more than three trips per day (Hyodo et al., 2005).

The trend of motorisation has become a critical issue in Malaysia. Although not yet considered as a highly automobile-dependent country, Malaysia is now in the stage of being "moderately traffic-saturated" (barter, 2004). The number of newly registered motor vehicles in Kuala Lumpur alone was 537,092 in 2008 and 513,954 in 2009 (road transport department, 2010). It is projected that Malaysia will rapidly reach vehicle ownership of 200 vehicles per 1000 people at a relatively low income level and will surpass the estimated maximum saturation level of 827 vehicles per 1000 people (Dargay et al., 2007).

With the rise in automobile use, public transportation remains secondary in commuting choice. The present modal split of public to private transportation is about 20:80 (Sharifi et al., 2006). Only 16% of Klang valley residents use public transport, whereas on any given day about 1.5 million single-occupancy vehicles are driven to and from jobs in the city centre (Keat, 2009). This situation is further aggravated by the fact that there is a lack of formal, comprehensive planning and policy formulation for public transport in Malaysia. Findings from a study on transportation and the environment in Kuala Lumpur strongly emphasises the need for the government to establish a new organisation for urban transport coordination, as none of the existing entities could consider this issue from a regional perspective (pacific consultants international & Suuri-Keikaku co. Ltd, 1999). A number of more recent studies echo a similar need and conclude that until such a plan is established and functionally in place, transportation and commuting issues in greater Kuala Lumpur and Klang Valley will remain unresolved (for example, see Ahmad, 2010 and Zakaria, 2003).

1.1 The Research Gaps

Studies of commuting stress, which are predominantly conducted in the united states, the united kingdom, and Europe, have established that the boundaries between the commuting, home, and work domains are permeable, such that the commuting experience can inflict unfavourable effects on both individual and organisational well-being (cox et al., 2003; Koslowsky et al., 1995; Novaco et al., 1991; Novaco et al., 1990). This phenomenon, which is also referred to as the "spillover effect", describes a two-way interaction between the commuting experience and more general work and life experiences (Wener et al., 2005; Novaco et al., 1991; Novaco et al., 1990).

From a relatively small number of empirical studies, commuting has been found to impact on individuals' work and life domains. Some negative effects of commuting on the work domain reported in the literature include work-related stress, lost workdays, late arrival at work, and workplace aggression (Cox et al., 2006; Koslowsky et al., 1995; Hennessy, 2008). Such effects may also lead to job or home location change (Novaco et al., 1991; Novaco et al., 1990). Recent research evidence also reveals that the daily commute affects how workers do their jobs. In this study, over two thirds of commuters report that they cannot do their jobs properly due to the effects of commuting – even when their journeys had been trouble free (Hewlett Packard, 2004). Similarly, negative experiences in the traffic environment may lead to a negative mood that affects both productivity and interactions with co-workers (James & Nahl, 2000) as well as resulting in an increased frequency of expressed hostility and obstructionism during the work day (Hennessy, 2008).

Commuting has also been reciprocally linked to commuters' life domain in three ways. First, substantial research has shown that the strain of commuting is associated with a variety of physiological responses, including raised blood pressure and musculoskeletal disorders (e.g. Koslowsky et al., 1995), increased risk of myocardial infarction in susceptible persons (e.g. Peters et al., 2004), and elevated urinary catecholamine levels (Evans & Carrere, 1991). Second, exposure to commuting stress can increase negative mood states, reduce tolerance to frustration, and lead to impatient driving behaviour (Novaco et al., 1991; Novaco et al., 1990). Commuters are also more likely to have feelings of irritation, anxiety, general annoyance (Evans & Carrere, 1991), and, to some extent, unhappiness (Kahneman & Krueger, 2006). Third, as more workers commute to work and travel greater distances than in the past, the social and behavioural aspects of commuters' life are also changing. For instance, commuting has been found to restrict individuals' free time for leisure and social activities (Besser et al., 2008) as well as creating a negative externality in the community by decreasing participatory activities (Jackson, 2003).

While there is a plethora of research work on commuting conducted in various research settings and regions, relatively little psychological research is available that reports commuting stress in Malaysia. The existing documented studies generally focus on transport planning and management or on travel behaviour and commuting pattern (e.g. Sharifi et al., 2006; Zakaria, 2003; Leong et al., 2009). Only recently has a study of

commuting been attempted which purposefully identifies the factors that cause people the most stress during their commute, which in turn, affect their productivity and job satisfaction at work (Regus, 2011). According to this study, bad or dangerous drivers topped the list of major stress factors experienced by Malaysian commuters, followed by delays and service interruptions, pollution and overheating, road rage, and a lack of information from service providers. Despite the informative nature of the research, Regus's study merely identifies the factors that contribute to the strain of commuting; it does not, however, report an empirical basis for the relationship between these factors.

The existing commuting studies in Malaysia also mostly employ survey-based economic techniques in their data collection. For instance, "stated preference" and "revealed preference" methods, in which the willingness to pay for transport services is obtained from people's responses to questions about preferences for various combinations of situations, are used in studies of the utilisation of rail-based light rail transit (mat et al., 2008), commuter's choice of travel mode (Nurdden et al., 2008), and the perceived effectiveness of the passenger information system of a commuter rail system (Bachok, 2007). Thus, studies employing customary psychological methods such as experiments, questionnaires, interviews, psychological tests, and observations are lacking.

In summary, three gaps in the current research and knowledge have been identified. First, where commuting has been explored in Malaysia, researchers have tended to confine the scope of the inquiry to transportation logistics and planning. Second, while survey-based economic techniques have been used to investigate travel behaviour, utilisation of service, and system effectiveness, the use of psychological methods to examine commuting stress remains relatively unexplored. Third, and perhaps most important, there is a distinct lack of any attempt to systematically investigate the extent to which commuting may prove harmful to employees' well-being in Malaysia. The study reported here is one of a series that attempts to address these three research gaps.

The primary aim of the present study is to investigate the effects of commuting on commuters' life and work domains in Malaysia. A passenger survey was designed to collect demographic data, travel information, commuting experience, and possible individual life and organisational outcomes associated with commuting. It was hypothesised that (1) workers with high commuting stress levels would report commuting for longer periods, and (2) workers with high commuting stress levels would report higher levels of commute displeasure, somatic symptoms, and intention to quit but lower levels of job and life satisfaction. This study specifically investigates these questions and tests for a relationship between commuting stress and its impact at the individual and organisational levels.

2. Method

2.1 Participants

Data were collected from commuters on four rail lines serving greater Kuala Lumpur and Klang Valley, Malaysia, using a proportionate stratified sampling procedure. The four lines involved include two light rail transit (Kelana Jaya line and Ampang line) and two commuter rail services (KTM komuter Sentul-Klang line and KTM komuter Rawang-Seremban line). The target sample sizes were determined in such a way that they closely correspond to the actual daily ridership of the rail lines selected. Specific recruitment criteria were adopted to screen the respondents. In particular, only passengers who commute to work regularly and frequently were included in the sample. The inclusion criteria were that the service was used at least three days each week and the same route for at least six months.

A total of 660 respondents participated in this study, an overall response rate of 94.29% from the 700 sets distributed. From this sample pool, 406 respondents were female while the remaining 254 were male. The mean age of the respondents is 27.9 years (sd = 7.5). More than half of the respondents (77.5%) have at least a diploma, undergraduate, or postgraduate degree and have been using the rail services for one to four years (46.9%). The average duration of the work commute and the average duration of the home commute are about 33 minutes and 36 minutes respectively. However, travel time is reported to be longer (between 61 to 130 minutes) when there are incidences such as trains facing technical problems, overcrowded coaches, train cancellations, or service interruptions. The distribution of the sample across lines was: 50.2% using the Kelana Jaya line, 18.9% using the Ampang line, 9.8% using the KTM komuter Rawang-Seremban, and 5.0% using the

KTM komuter Sentul-Klang. The remaining 16.1% of the sample included commuters who normally change between trains or to other transportation to complete their journey to work.

2.2 Data Collection

Respondents were recruited via two techniques. First, questionnaires were distributed at organisations located within the survey area of 800 metres around each respective rail station. The strategy for identifying the likely catchment areas was derived from studies conducted by the uk gmpte research and intelligence (2006). Second, intercept surveys were conducted where questionnaires were distributed to a random sample of passing commuters at selected stations. In both techniques, the respondents' contact details were obtained so that follow-ups can be made.

2.3 Measures

The questionnaire used in this study consisted of socio-demographic data and five scales covering general commuting experience and their effects on life and work domains. The demographic questions, which included topics such as age, gender, occupation, education level, name of the rail line used, and frequency and duration of commute, were included so that the characteristics of respondents could be analysed specifically on the commuting-related variables.

General commuting experience is assessed by a scale consisting of twenty-five items adapted from the works of Kluger (1998) and Wener and Evans (2004). The scale is subdivided into five subscales of five items each, measuring perceived controllability over one's commute, perceived effort expended during the commute, mood state during the commute, unpredictability of the commute, and lack of personal space on transport during the commute. All items are summed to yield a total score, with higher scores representing a more negative experience and implying greater commuting stress. In the present study, Cronbach's alpha for this scale is relatively good ($\alpha = .94$).

The effects of commuting stress on individuals' life domain are assessed on three scales. First, life satisfaction is measured using the satisfaction with life scale (SWLS: Diener et al., 1985), containing five questions that assess global cognitive or judgmental aspects of subjective well-being. Scores are summed across items to produce a single score, which varies from 5 to 35. Higher scores indicate more satisfaction with life. Cronbach's alpha for this scale is .81. Second, somatic symptoms that are seen as resulting from the commuting experience are assessed using items taken from the work of Kluger (1998). Responses were summed to create a total symptom score, producing a range from 0 to 16, with higher scores representing greater symptoms. Here, the Cronbach's alpha is .63. Third, commute displeasure is measured using a sum-score of six items that reflect respondents' ratings of displeasure with their daily commute. Higher scores on this scale indicate a more negative response. In this study, the Cronbach's alpha for this scale is .92, indicating a very good level of internal consistency.

Similar effects are also anticipated to occur at the work domain in terms of job satisfaction and the intention to quit. Job satisfaction is measured using the Minnesota Satisfaction Questionnaire (MSQ: Weiss et al., 1967), with higher scores reflecting higher job satisfaction. Here, Cronbach's alpha is .94. Intention to quit is assessed using five items drawn from Crossley and colleagues (2002) and Stinglhamber and associates (2002). The items are summed and a high score indicates a high intention to quit. Cronbach's alpha for this study is .84. The summary statistics for the variables measured are presented in table 1.0.

Table 1.0
Summary statistics for variables measured

Variables measured	Cronbach's alpha	Mean	Sd	Actual range	Possible scoring range
Commuting stress	.94	105.82	20.36	25 - 150	25 - 150
Life satisfaction	.81	21.98	5.42	5 - 34	5 - 35
Somatic symptoms	.63	4.19	2.53	0 - 13	0 -16
Commute displeasure	.92	22.51	6.31	6 - 36	6 - 36
Job satisfaction	.94	59.00	13.15	20 -100	20 -100
Intention to quit	.84	12.04	5.33	5 - 29	5 - 30

2.4 Analysis

The data collected were subjected to correlation and regression analysis to test the two hypotheses. This set of analysis was undertaken because they have the capability to describe and quantify patterns and relationships within data, to estimate the functional relationship of the examined variables, and to predict dependent variables from a set of explanatory variables (Field, 2009).

3. Results

The analyses support the first hypothesis that the duration of the work and home commute are significantly associated with commuting stress. In particular, both variables are found to be positively correlated with commuting stress ($r = .244$, $p < .01$ for work commute duration; $r = .250$, $p < .01$ for home commute duration). A series of simple linear regressions was conducted to investigate how well the duration of the home and work commute predicts commuting stress. Results for the relationship between the duration of the work commute and commuting stress are statistically significant ($r = .244$, $R^2 = 6\%$, $\delta r^2 = .058$, $F (1, 627) = 39.865$, $p < .001$). Similarly, commuting stress is also significantly predicted by the duration of the home commute ($r = .25$, $R^2 = 6.3\%$, $\delta R^2 = .061$, $F (1, 627) = 41.847$, $p < .001$). The adjusted r square values are .58 and .061 and the ß coefficient estimates are .244 and .250 for the duration of the work commute and home commute respectively, and are highly significant ($p < .001$).

The findings also support and refine the second hypothesis. Correlational analysis was used to determine the strength of the relationship between commuting stress and all five outcome measures. All relationships are highly significant. These results are illustrated in table 2.0.

Table 2.0
Pearson correlation matrix between commuting stress and the effects on individual life and work domains

	Measures	1	2	3	4	5	6
1	Commuting stress	--	**.432****	**.654****	**.086***	**.110****	**.153****
2	somatic symptoms		--	**.475****	**.144****	.049	**.092***
3	Commute displeasure			--	**.171****	**.079***	**.081***
4	Intention to quit				--	**-.141****	**-.190****
5	Life satisfaction					--	**.271****
6	job satisfaction						--

**p < .01; *p < .05

Five separate linear regression analysis were performed in which five individual and organisational outcomes (i.e. Somatic symptoms, commute displeasure, intention to quit, life satisfaction, and job satisfaction) are the dependent variables and commuting stress was entered as the independent variable. The regression models with reported somatic symptoms ($r = .432$, $R^2 = 18.7\%$, $\delta R^2 = .185$, $F (1, 629) = 144.339$, $p < .001$), commute displeasure ($r = .654$, $R^2 = 42.8\%$, $\delta R^2 = .427$, $f (1, 630) = 470.686$, $p < .001$), and intention to quit ($r = .086$, $R^2 = .7\%$, $\delta r^2 = .006$, $F (1, 632) = 4.701$, $p < .05$) as their dependent variables are all significant. The results also demonstrate that commuting stress has a significant explanatory role in the variation of somatic symptoms scores ($\beta = .432$, $p < .001$), commute displeasure scores ($\beta = .654$, $p < .001$), and intention to quit scores ($\beta = .086$, $p < .05$).

It is interesting to note that a small but significant positive association between commuting stress and life satisfaction ($\beta = .110$, $p < .05$) was obtained with a significant model being found ($r = .110$, $R^2 = 1.2\%$, $\delta R^2 = .010$, $F (1, 627) = 7.655$, $p < .05$). Similar patterns of results are observed between commuting stress and job satisfaction ($\beta = .153$, $p < .001$), where the regression model was also significant ($r = .153$, $R^2 = 2.3\%$, $\delta R^2 = .022$, $F (1, 622) = 14.828$, $p < .001$).

4. Discussion

This study empirically investigates the effects of commuting on life and organisational well-being among greater Kuala Lumpur and Klang Valley employees who regularly commute to work by train. This important issue is not adequately addressed in the current literature, particularly in Malaysia. Key findings from the correlation and regression analyses show that commute duration is significantly correlated with commuting stress, such that the longer the journey time, the higher the level of commuting stress. This, in turn, implies a more negative commuting experience. Consistent with previous findings, it appears that commute duration, which is one form of physical impedance (Novaco et al., 1991; Novaco et al., 1990), may be seen as one of the best indicators of commuting stress.

The findings also show that the impacts of commuting stress are evident in terms of increased commute displeasure and more reported somatic symptoms. Specifically, workers with higher levels of commuting stress report more somatic symptoms such as tiredness, headaches, tension, stiff muscles, and sleeplessness. Feelings of reduced energy, being stressed-out, and exhaustion are the most common displeasure commuters face. These workers also express more intention to quit their jobs. These patterns of results are consistent with the existing literature (e.g. Koslowsky et al., 1995; Cox et al., 2006).

The results also show that contrary to the predictions, there are small but statistically significant associations between commuting stress and job and life satisfaction. These findings were unexpected yet plausible, considering that Stutzer and Frey (2008) identified that people accept the burden of commuting because it offers something better such as higher pay, the ability to live in a desirable neighbourhood, a lower cost of living, affordable and better housing, or better schools for their children. Here, it can be argued that the respondents' commutes might be compensated by improvements in some other domains such as job choices or satisfaction with housing location.

Although the research analysis is still at a comparatively early stage, it provides adequate evidence for a correlational link between commuting stress and individual and organisational well-being. While previous commuting studies in Malaysia primarily focus on the economic aspects of commuting, this study explores the psychological and physiological impacts that commuting has on workers at both individual and organisational levels. At the time of writing, subsequent in-depth analysis is being undertaken to identify possible moderating and mediating factors that may impinge on the relationship between commuting and well-being.

5. Implications and Conclusion

Commuting stress research in Malaysia is still in its infancy and needs further development. The research direction lies in consolidating theoretical and analytical approaches to move forward toward useful and practical developments in the future. The present study offers some interesting perspectives on the experience of commuting stress in Malaysia and has important implications for the understanding of general commuting patterns and travel behaviour among Malaysians. Given the current socio-economic conditions together with greater access to modern modes of travel, it would not be entirely surprising if more people lived further away from their workplace in the future. An improved understanding of the relationship between commuting and its associated outcomes could thus help to formulate the framework for commuting stress mitigation as well as improve overall transportation management and operation.

Altogether, this study has presented the findings of empirical work that aims to further our understanding of the impact of commuting on commuters' life and work domains, particularly in relation to stress, ill-health, commuting displeasure, intention to quit as well as life and job satisfaction. In doing so, evidence to support the possible significant relationship between commuting stress and individual and organisational outcomes is discovered.

From both a methodological and policy perspective, there is a vital need for systematic investigation to understand the extent of commuting stress among Malaysians. At present, research evidence shows that commuting affects individuals negatively, however we cannot determine precisely how much exposure to commuting is sufficient to produce harm. Consequently, possible avenues for future research in Malaysia are: (1) to explore the specific contexts in which exposure to commuting stress occurs; (2) to examine the underlying processes to explain how and why commuting stress can interfere with employee well-being; and (3) to use longitudinal field studies to understand the critical impacts of commuting on human psychological functioning and behaviour.

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