Driving in force: The influence of workplace peers on commuting decisions on U.S. military bases[☆]

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ABSTRACT

We investigate the role of social influence in the commute to work. Using instruments to address the endogeneity of commute decisions and a dataset of U.S. military commuters on 100 military bases over the period 2006–2013, we show that workplace peers positively influence one another's decisions to drive alone to work and carpool to work. All else equal, an increase in the fraction of peers who drive alone of 10 percentage points increases the probability of driving alone by 6.05 percentage points. An increase in the fraction of peers who carpool of 10 percentage points increases the probability of carpooling by 5.14 percentage points. To examine whether conventional measures of social status and seniority predict who exerts the strongest influence on others, we disaggregate the dataset into subgroups and identify which subgroups have the greatest influence and which are most susceptible to influence. Results show that in commute decisions, intra-group influence can be more important than inter-group influence. This suggests that workplace travel interventions that seek to shift employees away from driving alone or toward carpooling may be most effective if communicated by one's own peer group.

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1. Introduction

Social influence has been shown to play an important role in behavior at the individual-level, including behavior related to consumption (e.g., Goolsbee and Klenow, 2002), income and labor (e.g., Topa, 2001), education (e.g., Angrist and Lang, 2004), health (e.g., Trogdon et al., 2008; Ma et al., 2015), and crime (e.g., Glaeser et al., 1996). Recently, economists have become interested in the role of social influence in decisions with environmental ramifications such as vehicle purchases (Grinblatt et al., 2008), the adoption of solar panels (Bollinger and Gillingham, 2012; Graziano and Gillingham, 2015), energy conservation (Allcott, 2011; Delmas and Lessem, 2014), and the adoption of green products (Kahn and Vaughn, 2009).

Research in social psychology suggests that an individual's motivation to conform to a majority behavior (e.g., driving alone to work) is governed by informational (Mackie, 1987) or normative (Moscovici, 1980) forces. For example, according to Mackie's (1987) objective consensus approach, an employee may choose to drive alone to work because driving alone is viewed as the "correct" behavior (i.e. the objective consensus) in a given workplace. On the other hand, Moscovi's (1980)

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conversion theory suggests that an employee may decide to drive alone after realizing this will help him or her be more liked by workplace peers. Even if a worker does not agree internally with a given majority behavior, he or she may conform to that behavior to avoid rejection or punishment from the group (Cialdini and Trost, 1998).

Norm transmission intensifies when the norms are communicated by individuals of authority or higher social status who may have who have superior information and power through "knowledge, talent, or fortune" (Cialdini and Trost, 1998, p. 170). Norm transmission also intensifies when the norms are communicated by members of one's own social group through social validation, which arises when one looks to other individuals – often those similar to oneself – for confirmation that a given action is acceptable (Cialdini and Trost, 1998).

This paper examines how workplace peers influence one another's mode of travel to work. Specifically, we study how the normative commuting behavior at a given work site affects whether an individual drives alone to work and whether an individual carpools to work. One unique feature of our research is that we disaggregate observations into sub-groups to determine which subgroups have the greatest influence and which groups are most susceptible to influence. The ability of a workplace or jurisdiction to reduce the environmental, economic, or societal burden of commuting begins with understanding the forces behind commuting decisions and how those decisions can be shifted.

We focus in particular on peer effects between military personnel who work on the same military base, for several reasons. First, unlike many workplaces, military bases are limited to a known geographic area and set of workplace peers: that within the base perimeter. Thus, the physical movements of military personnel and the people with whom they interact are arguably better controlled than other workplaces identifiable in U.S. Census data. Second, to examine workplace peer influence requires a sizeable sample from a given workplace. We are not aware of other surveys with commute to work variables in which such a large number of individuals (10,000s in our dataset) can be identified and located at a specific worksite. Third, unlike many workplaces, a military base is a self-contained community. Most bases have an area of dense employment with administrative buildings and operations offices; training grounds for physical fitness or combat exercises; a commercial area with retail shops and restaurants; a warehouse section for the storage of machinery, tools, and vehicles; and residential communities in the form of barracks, ships' berthings, and base housing (U.S. DoD, 2015). Thus, as the military operates as a community, peer effects may be important.

We build on previous studies of peer effects between U.S. military members in other contexts. Carrell et al. (2009) exploit random assignment of individuals to roommates and squadrons at the U.S. Air Force Academy to estimate how one's cohort influences academic achievement. Lyle and Smith (2014) examine the influence of high-performing senior officers on junior officers in the U.S. Army.

This paper also draws on the extensive literature on transportation mode choice (e.g., McFadden, 1974; Chatman, 2003; Bento et al., 2005; Belz and Lee, 2012). Most research in this field uses the characteristics of the individual and the physical environment (or "built environment") as key explanatory variables, often in a discrete choice framework. In this paper we also use a discrete choice model and control for individual built environment variables. To estimate the influence of "peers," we use the average rates of driving alone (versus other modes) and carpooling[2] (versus other modes) at the same workplace as additional (endogenous) explanatory variables.

A weakness of econometric analyses of travel decisions is that they often rely on cross-sectional datasets – like the National Household Travel Survey (U.S. DOT, 2009.) or local travel surveys – and thus fail to exploit variation in behavior over time. Similarly, travel datasets that include a time dimension are typically aggregated to the county-, city-, state-, or nation-level and thus neglect important variation between individuals. The dataset used here – the American Community Survey (ACS) from the Integrated Public Use Microdata Series (IPUMS) – is a repeated cross-section dataset that includes variation across both individuals[3] and time, and is suitable to our needs because it includes several variables on the commute to work.

There are three sources of endogeneity that must be overcome when estimating peer effects. The first is the simultaneity problem of reflection: an individual exerts influence on the group just as the group influences the individual (Manski, 1993). The second is an omitted variables problem which exists because of the impossibility of controlling for all travel-related variables that affect both an individual and his/her workplace colleagues, some of which may be correlated with the commute decisions of peers.[4] Lastly, there is a group self-selection problem because individuals may choose careers, workplace locations, and housing locations based on similar attitudes which may carry over to commuting preferences.

This paper addresses these endogeneity problems using instrumental variables. In particular, we instrument for the fraction of base workers who drive alone with the fraction of base workers who are born in Latin America, and we instrument for the fraction of base workers who carpool with the fraction of base workers who immigrated to the United States 5–10 years ago. Latin American-born individuals drive alone at lower rates than the general population in the U.S. (e.g., McKenzie, 2015) and immigrants carpool at higher rates than the general population (e.g., Myers, 1997; Blumenberg and Smart, 2014; McKenzie, 2015). Average group demographic variables have been used in past literature as instrumental variables for peer

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[2] "Carpooling" is often referred to as "ridesharing" in the transportation literature.

[3] As discussed below, important socio-economic and demographic variables are at the individual-level. However, the built environment, transit, and group demographic instrumental variables are aggregated to the PUMA-level. PUMAs are the smallest identifiable geographic region in census data at the person-level and typically have ~100,000 people.

[4] Examples of unobservables that are difficult to quantify but could affect the commute decisions of both an individual and his/her workplace peers include the availability of pedestrian walkways at the workplace or distance from parking to office buildings.