



## Peer effects on risky behaviors: New evidence from college roommate assignments



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### ABSTRACT

Social scientists continue to devote considerable attention to spillover effects for risky behaviors because of the important policy implications and the persistent challenges in identifying unbiased causal effects. We use the natural experiment of assigned college roommates to estimate peer effects for several measures of health risks: binge drinking, smoking, illicit drug use, gambling, having multiple sex partners, suicidal ideation, and non-suicidal self-injury. We find significant peer effects for binge drinking but little evidence of effects for other outcomes, although there is tentative evidence that peer effects for smoking may be positive among men and negative among women. In contrast to prior research, the peer effects for binge drinking are significant for all subgroups defined by sex and prior drinking status. We also find that pre-existing risky behaviors predict the closeness of friendships, which underscores the significance of addressing selection biases in studies of peer effects.

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### 1. Introduction

The spread of substance use and other risky behaviors in social networks is important to understand in order to inform health and social policy. Information about spillover effects can improve predictions about the dynamics of behaviors in populations and assist the design of interventions that mitigate harmful spillovers or leverage beneficial spillovers. Behaviors such as heavy alcohol consumption and other substance use have substantial impacts on health, functioning, and educational outcomes (Rice, 1999; Carpenter and Dobkin, 2011; Carrell et al., 2011).

Economists and other social scientists continue to devote considerable attention to measuring spillover effects for risky

behaviors not only because of the important policy implications but also because of the challenges in identifying unbiased causal effects. As Manski (1993) and others have described, there are three main factors that may bias estimates of social interaction effects: (1) the reflection problem, in which the effect of others on the self cannot be disentangled from the reverse; (2) selection into social networks, which may lead to correlations in unmeasured individual characteristics and generate spurious correlations in outcomes; and, (3) unmeasured contextual factors, or “common shocks,” which may also generate spurious correlations in outcomes. In addition, from a policy perspective it is useful to distinguish between “endogenous” peer effects that imply multiplier effects (behavior A by one person is directly influenced by behavior A by another person), versus “contextual” peer effects that imply causal but not necessarily multiplier effects (behavior A by one person is influenced by being around another person engaging in behavior A, but the causal mechanism is through other peer characteristics correlated with behavior A).

In this study we use the natural experiment of assigned college roommates to estimate peer effects for substance use and

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other risky behaviors. This empirical approach addresses the identification issues noted above and thus yields unbiased estimates. The approach has been used in previous studies mainly to look at academic outcomes, particularly grade point average (GPA), using administrative data from colleges and universities. For this study we collected new survey data to examine a range of behaviors with important implications for health and wellbeing: binge drinking, cigarette smoking, illicit drug use, gambling, sexual activity, suicidal ideation, and non-suicidal self-injury.

We find significant peer effects for binge drinking but little evidence of effects for the other outcomes. The effects for binge drinking are robust to controlling for a range of additional peer characteristics, suggesting that these are true spillover effects (“endogenous” rather than “exogenous” effects, in Manski’s terminology), although we cannot rule out the possibility that the effects are driven at least in part by unmeasured roommate characteristics. The magnitude of the effects—a 8.6 percentage point increase in the probability of binge drinking, as a result of having a binge-drinking roommate—is somewhat smaller than in most previous studies of peer effects. As compared to a previous study based on college roommate assignments, which finds significant peer effects on binge drinking only for men with prior binge drinking (Duncan et al., 2005), we find more widespread effects: for both women and men, and for both prior binge drinkers and prior non-binge drinkers. We also examine the closeness of roommates’ relationships, as reported in the follow-up survey. This analysis indicates that similarity in pre-existing behaviors predicts closeness of relationships, for the most part. Also, roommates who end up being close friends exhibit stronger apparent peer effects on binge drinking; this differential is less robust, however, when we look at predicted friendship levels based on baseline measures, rather than the endogenous actual friendship levels.

## 2. Background and prior research

### 2.1. Conceptual discussion

The discussion of social interaction effects by Glaeser and Scheinkman (2001) offers a useful starting point for considering how peers might influence each other’s behaviors. They describe various mechanisms that could produce such effects, including what they term learning, stigma, and taste-related interactions. Learning about risky behaviors from peers may take place through direct communication as well as observation. The new information may in turn cause changes in the net price of the behavior (e.g., by lowering the search costs) and in the perceived benefits and costs (e.g., by demonstrating positive and negative consequences of the behavior). Whereas learning refers to effects on information, stigma and taste-related interactions refer to effects on preferences. Stigma-related interactions include situations in which one’s opinion about the desirability of a behavior is influenced by observing other people doing that behavior and one’s opinions or feelings toward those people. For example, if a student observes that her roommate uses marijuana and the student likes or respects the roommate, this may lower the student’s stigmatizing attitudes about drug use. Taste-related interactions refer to a more direct influence on preferences: one may simply have a desire for conformity or imitation, such that observing someone else’s behavior raises the desirability of doing the same (Cutler and Glaeser, 2007).

These mechanisms suggest that peer effects on risky behaviors may go in either direction. For example, peers’ behaviors may reduce one’s behavior if the learning from peers highlights adverse consequences, whereas peers’ behaviors may increase the behavior if the learning highlights positive consequences. Also, the possible mechanisms imply that, other things equal, peer effects should be

larger (in either direction) for behaviors that are more likely to be observed or discussed among peers, as awareness of peer behaviors is a necessary precursor to learning or preference effects. This suggests that, among the behaviors we examine, binge drinking is more likely to exhibit large peer effects, because in college settings drinking frequently takes place in social contexts with many peers (Beck et al., 2008). Also, heavy drinking has relatively low stigma in college-age populations (and on the contrary, is often considered a positive marker of social status), suggesting that it is likely to be openly discussed among students (Neighbors et al., 2007). Another reason peer effects might be especially strong for alcohol, as well as drug use, is that peers may have more influence on search costs for goods that cannot be legally purchased.

Young people may also experience peer effects differently depending on their gender and their previous risky behaviors. For instance, males and females differ somewhat in their exposures and responses to social pressures during adolescence and young adulthood, and they also differ more generally in their developmental processes with respect to risky behaviors (Byrnes et al., 1999). Young people with previous risky behaviors may be more influenced by peer effects, if they are more likely to be near the margin in their propensity to engage in a behavior or not. On the other hand, people with previous risky behaviors may be less influenced by peer effects, if they have more solidly formed preferences and information about the behaviors.

### 2.2. Prior empirical evidence

A number of studies in the recent economics literature estimate peer effects on substance use among adolescents in secondary schools, using various combinations of instrumental variables and fixed effects (Gaviria and Raphael, 2001; Powell et al., 2005; Lundborg, 2006; Clark and Loheac, 2007; Fletcher, 2010, 2012). All of these studies find significant peer effects for the behaviors under examination, and in most cases the estimates imply fairly large effects.<sup>3</sup> These approaches improve upon prior studies in terms of addressing the key identification issues noted earlier, but their validity still depends on some untestable assumptions about the lack of correlations in unobserved variables among peers.<sup>4</sup> A recent study by Card and Giuliano (2013) addresses this issue by specifying structural assumptions about selection into friendships and carefully examining the robustness of these assumptions, finding significant peer effects for sexual behavior, marijuana use, cigarette smoking, and truancy.

The most similar study to ours is that by Duncan et al. (2005), the only published study using college roommate assignments to estimate peer effects on risky behaviors. Their sample includes

<sup>3</sup> For example, these studies find that for each percentage point increase in peers engaging in a behavior, individuals have the following percentage point increases in the likelihood of the behavior: (1) Gaviria and Raphael (2001): 0.35 (SE = 0.13) for drinking, 0.32 (0.08) for drug use, 0.16 (0.12) for smoking. (2) Powell et al. (2005): 0.58 (0.10) for smoking. (3) Lundborg (2006): 0.23 (0.08) for binge drinking, 0.17 (0.05) for smoking, 0.07 (0.02) for drug use. (4) Clark and Loheac (2007): mostly significant effects for smoking, drinking, marijuana, in the range of 0.10–0.20. (5) Fletcher (2010): 0.35 (0.17) for smoking. (6) Fletcher (2012): 0.57 (0.24) for binge drinking.

<sup>4</sup> Another noteworthy contribution to this literature has been the evidence from a community-level adult sample in the Framingham Heart Study on social interaction effects for cigarette smoking (Christakis and Fowler, 2008) and alcohol use (Rosenquist et al., 2010). Although economists have questioned whether these studies sufficiently address the key identification issues (Cohen-Cole and Fletcher, 2008), the studies have garnered significant media attention (Kolata, 2008) and have enlivened interest in spillover effects in the fields of medicine, public health, and beyond. Also, an important strength of these studies is the rich information on social networks, including neighbors, family members, and friends.

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