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Methodological difficulties of modeling peer influence

Bob Edward Vásquez *

Department of Criminal Justice, Texas State University-San Marcos, 601 University Drive, San Marcos, TX 78666, United States

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ABSTRACT

Using data from wave IV of the National Youth Survey, the effect of drug-related peer delinquency on delinquency is modeled as a function of the bond to peers. Due to the complexities of such a test, this article discusses limitations of both the standard linear model and Tobit regression when applied to delinquency data coupled with statistical interactions. Results from a censored least absolute deviations (CLAD) model and why this is a useful alternative to OLS and Tobit are discussed. The results suggest the effect of peers increases with the intensity of bonds to peers. However, encouragement is provided for further investigating peer influence, a process, as opposed to an additive peer effect.

1. Introduction

The notion that delinquents associate with delinquent peers is a bivariate observation that approaches a law in the social sciences. Hundreds of scientific investigations spanning nearly a century and differing on a variety of methodological and theoretical fronts have demonstrated the association between peer delinquency and delinquency (Elliott et al., 1985, p. 71; Reiss, 1986; Thornberry and Krohn, 1997, p. 218; Battin-Pearson et al., 1998, p. 1; see also Warr, 2002; Giordano, 2003). While no study has failed to demonstrate the correlation (Warr, 2002, p. 42), the explanation for the correlation was a point of contention for criminologists.

Some theories view behavior as a socialization process, and therefore argue delinquent behavior is learned within the intimate and reinforcing setting provided by delinquent peer groups (Sutherland, 1947; Akers, 1997, p. 60). Others contend the association is explained entirely by homophily,[1] or the "birds of a feather flock together" hypothesis (Glueck and Glueck, 1950, p. 164; Hirschi, 1969; Gottfredson and Hirschi, 1990). This selection perspective also includes the hypothesis that adolescents associate with delinquents *and* engage in delinquency as a result of low control; thereby viewing the association as spurious (Hirschi, 1969, p. 138). The interactional (Thornberry, 1987), a third perspective, argues both selection and socialization effects provide the explanation via bidirectional causal relationships over time.

While this three perspective debate occupied criminologists, evidence for the correlation accumulated. In contemporary research, the correlation is not a discovery but expected and assumed. The work of Warr (2002, pp. 42–43) presented this turning point and urged criminologists to abandon the debate; a debate that painted an overly simplistic black or white picture of the direction of causation where either peer delinquency caused delinquency or vice versa. Contemporary researchers, while able to move beyond the debate, have now inherited a more complex task where one assumes the existence of socialization and selection effects, but knows relatively little concerning the ways in which these theoretical processes operate empirically.

* Fax: +1 512 245 8063.
E-mail address: Bob.Vasquez@txstate.edu

[1] A word invented by Lazarsfeld and Merton (1978, p. 23).

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This area will be consequently occupied with statistical complexities, especially interactions, in order to estimate more detailed empirical models. This article focuses only on peer influence in order to devote considerable attention to the pitfalls of usual methods (such as, least squares and Tobit regression) when one involves statistical interactions to explain delinquency; a variable that is typically left censored and right skewed. The hypothesis being tested states the effect of peers increases with the intensity of the bond to peers.

2. Review of literature

Differential association (Sutherland, 1947) and social learning (Burgess and Akers, 1966; Akers, 1973, 1977) are the two prominent and compatible criminological theories stressing the importance of peers. Due to their lasting impact on the field, both theories are widely known, and several detailed discussions are available (e.g., Kornhauser, 1978; Matsueda, 1988; Akers, 1997; Agnew, 1999; Sampson, 1999; Morash, 1999; Krohn, 1999; Warr, 2001). Only relevant aspects are discussed here.

For example, the effect of peers manifests from a process of learning, and the major part of learning occurs through interactions within "*intimate* personal groups" (Sutherland, 1947, p. 6). Sutherland (1947, p. 6) states, a "...person who is not already trained in crime does not invent criminal behavior," and subjects do not have some naturally inherited trait for behaving in conventional or unconventional fashions. While differential association is criticized for stopping short of specifying a learning process (Akers, 1973, p. 45), social learning theory (Burgess and Akers, 1966), a more detailed restatement of differential association theory (Akers, 1973, p. 45, 1997, p. 62; Thornberry and Krohn, 1997, p. 219), incorporates general behavioral reinforcement principles, and can be understood as differential association theory nested in cognitive learning (Bandura, 1977) and operant conditioning.

The development of social learning theory, "has relied principally on four major concepts: *differential association*, *definitions*, *differential reinforcement*, and *imitation*" (Akers, 2000, p. 76); with differential association being most relevant here. As opposed to specifying a fixed-sized socialization effect, differential associations and their effects vary across frequency, duration, priority, and intensity (Sutherland, 1947, p. 7; Akers, 2000, p. 76). The associations that: (1) occur earlier in the individual's life (*priority*); (2) last longer and occupy more of the individual's time (*duration*); (3) occur most often (*frequency*); and (4) involve others who are more important or have closer relationships with the individual (*intensity*), have greater effects on behavior (Akers, 2000, p. 76).

And although the theoretical detail involved in social learning theory can become fairly elaborate, the basic hypothesis that links theories viewing the correlation from a socialization perspective posits delinquent peers socialize individuals into delinquency. Since the ways in which socialization in general is thought to operate varies by theory, the actual process of socialization remains paradigmatic and largely untested. The empirical predictions and tests of the theories are also basically identical. The effect of peer delinquency on delinquency being positive and statistically significant is the centerpiece of evidence in support of socialization, and evidence supporting differential association theory supports social learning theory (Akers, 2000, p. 74).

With regard to evidence for a peer effect, most studies rely on self-report data. The self-report technique is indeed the usual method in contemporary work in general. This method, which can be studied in its own right (see Thornberry and Krohn, 2000), has improved greatly since the work of Short and Nye (1957, 1958), and produces reasonably valid measurement for most research purposes (Elliott et al., 1989, p. 7; Thornberry and Krohn, 2000, p. 33). The method of using self-report data from *only* focal respondents to measure delinquency *and* peer delinquency, however, has been greatly criticized. This criticism is spearheaded by the works of Gottfredson and Hirschi (1987, p. 598, 1990, p. 157); which also provide a propensity theorist's perspective denying the existence of peer influence. While Gottfredson and Hirschi (1990, p. 157) discuss several ways in which such a peer delinquency measure is contaminated, their basic claim is the respondent reports personal delinquency twice; once for personal delinquency, and once for peer delinquency. If this claim is true, one would expect a strong but artifactual correlation between the two measures, and call into question all evidence from such measures.

Especially since the National Youth Survey (NYS) and the Rochester Youth Development Study (RYDS), two major and widely known data collection efforts, fit squarely within this criticism, the measurement-contamination claim received attention in the area (e.g., Warr, 1993, 2002; Thornberry et al., 1994; Elliot and Menard, 1996; Thornberry and Krohn, 1997, pp. 222–223; Matsueda and Anderson, 1998; Haynie and Osgood, 2005). Warr (2002, p. 44) draws attention to early studies demonstrating the correlation while being exempt from this limitation (e.g., Reiss and Rhodes, 1964, p. 8; Erickson and Empey, 1965, p. 273; Hepburn, 1977, p. 454). With factor analysis, Agnew (1991b) analyzes NYS data, and Thornberry et al. (1994, p. 62) analyze RYDS data. Both studies show peer delinquency and delinquency measures load on separate factors. Matsueda and Anderson (1998, p. 299) use multiple waves of NYS data and allow correlations between errors from peer delinquency and delinquency measures. The size of the peer effect is smaller but remains positive and significant. Matsueda and Anderson's results (1998, p. 275) also reject the hypothesis that control causes *both* delinquency and peer delinquency. Peers have an effect beyond prior delinquency, the best measure for low self-control. Such evidence, to the extent that peers affect behavior, suggests the theory of low self-control is at least incomplete.

In short, researchers' confidence in a peer effect rests on a variety of evidence. Studies demonstrate the correlation with observation (e.g., Thrasher, 1927), official data (e.g., Thrasher, 1936; Shaw and Myers, 1929), self-report data directly from the subject and associates (e.g., Reiss and Rhodes, 1964; Erickson and Empey, 1965; Hepburn, 1977; Aseltine, 1995; Haynie