

Causation, Theory, and Policy in the Social Sciences

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Abstract

Despite a penchant for constructing and testing causal theories, social scientists frequently avoid explicit discussion of causal issues. Illustrating with criminological literature, we argue that attention to particular causal issues will improve theory and theory testing and provide a more systematic basis for identifying policy applications. Our argument centers on a discussion of: (i) causal versus spurious effects, (ii) independent versus shared causes, (iii) reversible versus irreversible causes, including symmetric versus asymmetric causes, (iv) basic versus superficial causes, and (v) causal heterogeneity among different populations, units of comparisons, including spatial units, and types of behavior. We further suggest how researchers and policy-makers can benefit from consideration of causal issues.

INTRODUCTION

Explanations in the social sciences almost invariably are causal explanations. While social scientists have debated how to define, model, and demonstrate causation, key issues still have gone unaddressed. This essay addresses some of these key issues through the lens of criminological literature, with an eye to implications for theory and policy in all of the social sciences.

Many criminological theories focus on the causes of crime. Although some crime theorists appear to eschew the term *cause*, they substitute other terms, such as *influences*, *leads to*, *affects*, *determines*, *structures*, *prevents*, *creates*, *depends on*, *brings about*, *increases (or decreases)*, *shapes*, *results in*, *is due to*, *produces*, *generates*, and *forces* (DiCristina, 1995; Glenn, 1989). It is important that criminological theories are causal because noncausal or covariational theories lack policy applications. One of the principal reasons to construct causal theories in the social sciences, whether about crime or another outcome, is to apply them, that is, to use them to identify effective intervention policies for individuals or populations (Freedman, 1997; Hart & Honore, 1985; Marini & Singer, 1988; Sampson, Winship, & Knight, 2013).

In the case of crime, the idea is that if X causes crime, then we may be able to intervene to change X, thereby reducing, if not eliminating, crime.

Criminological theories often involve multiple causes, as do other theories in the social sciences (Cartwright, 2004; Ragin, 2000). There is recognition of multiple causes in theories outside the social sciences as well, including the experimental sciences. However, in theory testing in the experimental sciences, the effects of particular causes can be separated from the effects of other causes through randomization. For example, if W, X, and Y are purported to be causes of Z, the independent causal effects of W can be estimated by randomly assigning cases to values of W, manipulating W, and then observing the values of Z. Randomization will ensure that the effects of X and Y on Z are controlled, leaving only the causal effects of W on Z. Randomization is often impossible in the social sciences, and criminology is no exception. For example, if a theory attributes lawbreaking by juveniles to such causes as child abuse, parents' divorce, and school failure (as does Agnew, 1992), it would be morally unacceptable to randomly assign juveniles to abusive and nonabusive families in order to estimate the independent causal effects of child abuse (Glenn, 1989). Without the possibility of randomization, tests of criminological theories usually rely on statistical controls (or partialing) of variables with multiple regression or similar statistical techniques (also see Farrington & Welsh, 2007). However, applied statisticians have long questioned the use of these techniques for drawing causal inferences because of the need to make strong *a priori* theoretical assumptions that cannot be checked (Clogg & Haritou, 1997; Glenn, 1989; Ragin, 2000; Smith, 1990). Among the more important unchecked assumptions for testing criminological theories, use of these techniques assumes that the causal effects of a set of variables are (i) uncorrelated with the effects of left-out causes (omitted-variable bias) and (ii) the same across all cases (causal homogeneity).

This essay examines these kinds of assumptions and other issues about theories of crime causation. This is done by considering: (i) causal versus spurious effects, (ii) independent versus shared causes, (iii) reversible versus irreversible causes, including symmetric versus asymmetric causes (iv) basic versus superficial causes, and (v) causal heterogeneity among different populations, units of comparisons, including spatial units, and types of crime. While the causal issues considered here lend themselves mainly to quantitative considerations, causal inferences are no less problematic in qualitative research.

FOUNDATIONAL RESEARCH

There is no accepted definition of "cause," and it is widely purported that any attempted definition is destined to fail. We have no desire to join that

definitional debate. For the purposes of this essay, Hart's (Hart & Honore, 1985, p. 29) definition will suffice: "a cause is essentially something which interferes with or intervenes in the course of events which would normally take place" so as to change that course of events (also see Freedman, 1997, p. 116; Stinchcombe, 2005, p. 255). As such, a "cause" is different from both a necessary and sufficient condition. Suppose that a fire results when someone drops a lit cigarette on combustible material. Although oxygen in the air is a necessary condition for a fire, normally we would not think of it as causing the fire; instead, we would think of the lit cigarette as the cause (Hart & Honore, 1985). Now suppose that a man shoots and kills another man. Although deprivation of blood cells of oxygen is a sufficient cause of the man's death, we would not think of it as the cause; instead, we would think of the shooting as causing the death. Although deprivation of blood cells of oxygen is a sufficient condition for death, we are more interested in the "cause of death under circumstances which call for an explanation" (Hart & Honore, 1985, p. 39).

CUTTING-EDGE RESEARCH

CAUSAL VERSUS SPURIOUS EFFECTS

Criminologists have been more likely to consider "causal versus spurious effects" than any other causal issue, the central question being whether an independent variable, X, actually causes crime, net of other independent variables that might cause both X and crime (Hirschi & Selvin, 1966). For the sake of illustration, consider a claim that lack of religion causes delinquency. Johnson, Li, Larson, and McCullough (2000, pp. 37–38) caution that multivariate analyses are necessary to draw "acceptable" causal inferences about the relationship between religion and delinquency. Such cautions reflect a belief that the relationship between any independent variable and crime might be spuriously attributable to other variables. Such a belief is ostensibly why many researchers control for such demographic variables as age, race, gender, and socioeconomic status (SES) in analyzing criminological data (Glenn, 1989, p. 130). Such demographic variables could be causally related to crime and its covariates.

In the case of the religion-delinquency relationship, it is believed that such variables as work and parental and peer influences may be sources of spuriousness (Benda & Corwyn, 1997; Evans, Cullen, Dunaway, & Burton, 1995). For example, religion and delinquency might be related only because both variables are caused by involvement of parents in the lives of their children. If this is the case, religion should not be significantly related to delinquency when parental involvement is included with religion in a multivariate statistical analysis. If religion continues to be significantly related to delinquency

when parental involvement is controlled, it is conventional to conclude that there is a causal relationship between religion and delinquency.

Although conventional, such a conclusion may be wrong because of “omitted-variable bias” (Clogg & Haritou, 1997; Freedman, 2004, 2006; Sobel, 2005). Even if a statistical analysis controls for a wide range of variables to detect spuriousness, it is possible that the *true* source of spuriousness is omitted from the analysis, perhaps because it is unknown. There is no statistical technique, however sophisticated, that can identify an unknown source of spuriousness, since that is a theoretical, not a statistical issue. The more general issue is summarized by Clogg and Haritou (1997, p. 106): If it can be known with certainty that a model about the relationship between X and Y is “causally” right when Z is included and “causally” wrong when Z is omitted, “then of course the casual effect can be identified.” The problem is that this can never be known with reasonable certainty about any purported causal relationship in nonexperimental research. The solution to omitted variable bias is not inclusion of more independent variables in a multivariate analysis. As Clarke (2005, p. 346) has noted:

unless a researcher knows the remaining omitted variable, and furthermore knows the relationship of that variable with the newly included variable, she cannot know the effect that the newly included variable will have on the bias of a coefficient of interest. The newly included variable *may* decrease the bias, but it is just as likely to increase the bias. In short, we cannot know the effect on the bias of including an additional control variable unless we know the complete and true specification.

If there is any bias, it is possible to reach wrong conclusions about the variables that should be targeted to reduce crime.

INDEPENDENT VERSUS SHARED CAUSES

An issue closely related to “causal versus spurious effects” is “independent versus shared causes.” Researchers often attempt to identify variables that are independently causally related to crime, that is, variables that do not share causal effects with other variables (for a general discussion of this issue in the social sciences, see Glenn, 1989, p. 133). To illustrate, consider a simple theory that crime is caused by both race and SES. The theory is “simple” because it does not address *how* race and SES cause crime, and there are many possibilities, such as family socialization practices (Farrington & Welsh, 2007, p. 79). However, because race and SES are likely to be at least moderately associated, a statistical analysis may show that neither is independently related to crime even if both are actually causes of crime. Sekhon (2004, p. 24) gives an example outside of criminology of a regression analysis

of the relationship between race and uncounted election ballots in the 2000 US Presidential election, which shows how shared causes can be *more* rather than less important than independent causes:

If we were able to estimate a regression model . . . , showing that there was no relationship between the race of a voter and his or her probability of casting uncounted ballots when . . . controlling for a long list of covariates, it would be unclear what we had found . . . Before any regression is estimated, we know that if we measure enough variables well, the race variable itself . . . will be insignificant. However, in a world where being black is highly correlated with socioeconomic variables, it is not clear what we learn about the causality of ballot problems from a showing that the race coefficient . . . can be made insignificant.

Similarly, Marini and Singer (1988, pp. 356–357) also illustrate how researchers may be interested only in the:

disjunctive plurality of causes that may produce an effect . . . If an individual is identified as having high susceptibility to several causes of death and dies shortly thereafter, this information offers some explanation of why the individual died but does not single out the actual cause of death. It may be irrelevant to know which of several possible causes produces an effect.

Many criminological theorists ignore the issue of independent and shared causes, choosing instead to let researchers disentangle it, but theories of crime causation would benefit from explicitly recognizing that most causes of crime are probably shared. For example, in his general strain theory, Agnew (1992) argues that delinquency is caused by anger and other negative emotions that are, in turn, caused by negative life experiences, such as child abuse, failure in school, divorce of parents, and loss of a girlfriend/boyfriend. It may be interesting to learn which negative life experiences are most strongly, independently related to delinquency. However, many negative life experiences covary as when abused children also fail in school and experience romantic difficulties, and the covariation renders them no less important causes of delinquency (also see Farrington & Welsh, 2007, p. 22). Moreover, in the case of policy applications, it would be incredulous to address only those negative life experiences that are independently causally related to delinquency and ignore the rest.

There is a tendency among criminologists to assume that all (or virtually all) independent variables in a multivariate analysis are causally related to crime. For example, if W, X, and Y are entered as independent variables in a multivariate analysis with crime as the dependent variable, there is a tendency to assume that all three independent variables are causes of crime.

However, assume that only W and X are causally related to crime and that Y only covaries (is not causally related) with crime. In such a case, it makes little sense to control for Y when estimating the effects of W and X on crime. The problem is worse if Y not only covaries with crime but also with W and X because controlling for Y could lead to underestimation of the causal effects of W and X on crime, which could produce incorrect policy decisions about the variables that need to be manipulated to reduce crime. Farrington and Welsh (2007, p. 96) argue that in the absence of systematic knowledge about which variables cause crime and which variables only covary with it that interventions should involve a “blunderbuss approach” that targets multiple variables.

REVERSIBLE VERSUS IRREVERSIBLE CAUSES

Causes lend themselves to effective intervention policies only if they are reversible, and many causes of crime may be irreversible. According to Gottfredson and Hirschi (1990), crime is caused by low self-control, coupled with criminal opportunity. Their theory is that low self-control forms in early childhood as a function of ineffective parenting and remains stable after that. For people with low self-control, intervention should not decrease their propensity to commit crime. Similarly, Moffitt (1993) argues that permanent neuropsychological impairments, which can be inherited or caused by such factors as maternal alcohol and other drug use, poor prenatal nutrition, and brain injury, cause persistent offending across the life course. These life-course persistent offenders have poor “verbal skills ... and ... [weak] self-control” and cannot be rehabilitated (Moffitt, Lynam, & Silva, 1994, p. 280).

There are different types of irreversible causes (Lieberson, 1985). The Gottfredson–Hirschi and Moffitt theories point to causes of crime that are irreversible because they are unalterable. However, causes of crime may be alterable and still have irreversible effects. According to Lieberson (1985), most researchers assume that if an increase in X causes an increase in Y , then a decrease in X should cause a decrease in Y . However, that is true only of symmetric causes. Asymmetric causes are such that an increase in X causes an increase in Y but a decrease in X *does not* cause a decrease in Y . There are many examples of asymmetric causes outside of criminology. Among populations or for any population over time, the incidence of lung cancer increases when many people smoke, and it decreases when many people stop smoking. Hence, smoking is a symmetric cause of cancer at the population level. However, at the individual level, smoking is an asymmetric cause of lung cancer because smoking cessation will not cure cancer (though it may reduce the likelihood of lung cancer among smokers who have not yet

acquired it). Hence, among individuals, the cause of lung cancer is different from what causes its cure (Hart & Honore, 1985, p. 36). Similarly, Uggen and Piliavin (1998) argue that the reasons why people initiate criminal behavior probably are different from the reasons they may later desist from it (also see Kazemian, 2007; Rosenfeld, 2011). Moreover, they argue that it may be easier to translate causes of desistance into effective intervention policies:

Our ability to isolate the true causal effect of critical etiological factors such as parents, schools, and neighborhoods is constrained by our inability to manipulate the selection mechanisms guiding their allocation. For both social scientific research and for policy purposes, manipulation of these factors is unacceptably invasive in a democratic society. The researcher conducting a desistance study has a more legitimate and expansive *license to intervene* in the lives of participants (Uggen & Piliavin, 1998, pp. 1412–1413).

BASIC VERSUS SUPERFICIAL CAUSES

According to Lieberman (1985), many social scientific theories have focused on superficial rather than basic causes, partly because of a reliance on studying variation. Speaking of the classic image of Sir Isaac Newton sitting under the proverbial apple tree, Lieberman (1985) argues that social scientists probably would identify something other than gravity as the cause of the apple's fall to the ground because gravity is not a variable quantity in earthly situations. Viewed this way, a basic cause is akin to Aristotle's formal cause, which involves the very essence of a thing (Marini & Singer, 1988, p. 363). Theories of crime causation have sometimes posited basic causes. One of the best examples is Merton's (1957) theory of anomie, which states that crime in the United States is caused by a combination of a basic and a superficial cause. The basic cause is adherence to the American Dream, which according to him, is a goal universally shared by people in the United States, and the superficial cause consists of opportunities to achieve the American Dream, which some people have more than others. There is little wonder why researchers have focused on the superficial cause more than the basic cause because, according to Merton (1957), the American Dream is a constant that falls outside the scope of conventional research methodologies.

It may seem from the foregoing example that only superficial causes are variables. However, it is likely that many basic causes of crime are variables and, hence, *do* fall within the scope of conventional research methodologies, *at least in principle*. The qualification is important because there may be serious difficulties with incorporating variable basic causes in testing theories of crime causation, even though it may be possible to do so "in principle." An example comes from Sampson and Laub's (1993) life-course theory in which

they argue that certain life experiences, such as marriage or employment, will cause offenders to desist from crime or at least reduce their offending. However, suppose that both marriage and desistance from crime are causal effects of a “desire to change.” The problem is not that marriage and desistance from crime are spuriously attributable to a “desire to change.” The problem is that a “desire to change” is very difficult to measure and, hence, to incorporate in tests of life-course theory even though it is a basic cause and marriage is only a superficial cause. In such a case, an intervention focusing on marital issues may fail to reduce crime because it ignores a basic cause.

CAUSAL HETEROGENEITY

In an ideal situation, the causes of crime would be the same across all populations. If X causes crime in one population, say among US residents, then X would cause crime in all other populations. However, the situation is far from ideal. The causes of crime may differ among populations because the relationship between any independent variable and crime will be affected by the joint distribution of other variables related to crime, and this joint distribution can vary among populations. If so, a causal relationship between an independent variable and crime likewise will vary among populations (Fagan, 2013, pp. 628–632).

Something similar is true of the causal relationship between an independent variable and crime over time. For example, unemployment rates and crime rates are produced by different stochastic or probabilistic processes, and the result is that the two rates do not “track” well together. The causal relationship, if any, is likely to be complex, “perhaps with changes in unemployment affecting changes in crime in a nonlinear way, or with structural breaks (meaning that the causal relationship changes over time)” (Bushway, 2011, pp. 194–195).

Heterogeneity in the causes of crime also may involve different units of comparison (Bhrolchain & Dyson, 2007). For example, researchers have consistently found either no or a weak negative association *among individuals* between SES and delinquency (Tittle, Villemez, & Smith, 1978). However, there also is considerable evidence of a strong positive relationship *among US territorial units*, such as cities and metropolitan areas, between crime and economic deprivation, reflected in such variables as the percent of families that live below the poverty line and income inequality. Parker’s (1989) research on city-variation in homicide rates is relevant here, as is Blau and Blau’s (1982) research that revealed a strong positive relationship among US metropolitan areas between income inequality and rates of violent crime.

Even for the same population, the causes of crime may differ from one unit of comparison to the next. It may be useful to consider an analogy about

the washing of hands. Even if there is a causal relationship among individuals in a particular country between hand washing and disease, there may be no causal relationship between the two variables among cities in the same country. Variation in disease among individuals might not be affected by factors affecting city-level variation, such as clean water and adequate nutrition. It is not that the one of the causal relationships is right and the other is wrong. They are just different, and that difference should bedevil theorists, researchers, and policymakers.

Little (2011, p. 288) offers a criminological example. If church membership cause a young person to refrain from committing crime, “then we ought to find at the macro-level that a higher index of church membership will be associated with [cause] a lower crime rate.” However, research is likely to produce contrary findings because of the many disparate causes of macro-level variation in crime rates.

Heterogeneity in the causes of crime may be even more complex than this, involving disaggregation by type of crime. To illustrate, Parker (1989) reported in a study of US cities that different types of homicide may have different causes. His multivariate analysis included four independent variables: (i) a poverty index, (ii) income inequality, (iii) a dummy variable for southern region, and (iv) percent black. Neither income inequality nor the southern-region dummy variable was significantly positively related to variation in any of the homicide types. However, the poverty index was significantly positively related to nonrobbery felony homicides, primary nonintimate (friends and acquaintances) homicides, and family-intimate homicides, and percent black was significantly positively related to robbery homicides and primary non-intimate homicides.

Another example comes by Chamlin and Cochran (1998). They found that both increases and decreases in oil prices significantly affected the level of commercial burglaries, but not residential burglaries in Oklahoma City. They also found evidence of asymmetric causation. Specifically, while a decrease in oil prices caused a slight increase in commercial burglaries, there was a substantial decrease in commercial burglaries when oil prices were increasing—the absolute value of percent change in commercial burglaries was 10 times greater during the period of oil-price increases compared to the period of oil-price decreases.

In thinking about causal heterogeneity *among* types of crime, it bears emphasizing that there also may be causal heterogeneity *within* types of crime, arising from at least two sources. First, different researchers may measure a given type of crime (e.g., violence) differently, using, for example, different question wording in surveys. Second, researchers may use different response options. They may, for example, ask respondents whether they

have committed any crime, how much crime they have committed, the timing between crime events, and so on.

Such heterogeneity points to the likelihood that researchers are measuring different concepts, all of which may relate to crime, but nonetheless reflect important differences. By way of analogy, there are many types of depression with the differences depending, among other things, on the frequency, duration, and intensity of the symptoms. In short, not all depression is the same, and the causes of any given type may vary. Put differently, identifying types of depression—or any other behavior—is indicated in no small part because the causes of each may vary, leading to different treatment or policy applications.

Therefore, it is with criminal behavior; it may be that people who commit any crime versus no crime fundamentally differ from each other in important ways. However, those differences are not necessarily the same as those that distinguish repeat versus one-time offenders. In addition, they are not necessarily the same as those that distinguish offenders who follow different trajectories.

KEY ISSUES FOR FUTURE RESEARCH

Theorists, researchers, and policymakers need to be aware of the possibility of drawing unwarranted conclusions about causation. However, there is no need for despair. Even given the limitations of nonexperimental research, evidence for causation can be convincing, if not conclusive, when generated from diverse studies, both quantitative and qualitative. As Glenn (1989, p. 123) states: “certainty may be an illusive goal never to be reached, but the cumulative evidence from studies conducted with different methods may often bring us ... close to certainty.”

There are other equally, if not more, daunting issues that theorists, researchers, and policymakers need to consider about the causes of crime. The complexity of crime (and perhaps all human behavior) requires a complex treatment of causation, including but not limited to the possibility that crime may involve independent and shared causes, reversible and irreversible causes, and basic and superficial causes. The alternative to these more complex views of causation is likely to be ineffective intervention strategies.

Finally, there is considerable evidence that the causes of crime may be heterogeneous rather than homogeneous, with the heterogeneity dependent on type of population, units of comparison, and types of crime. An ideal theory would apply to all populations, units of comparison, and types of crime. However, there is no existing theory that achieves that ideal. At this time, all theories of crime must be considered partial, and researchers should continue to search for ways of integrating and applying them.

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