

# Chapter 4.

## The Effect of Economic Contraction on the Prevalence of Psychiatric Disorder

Ralph Catalano  
School of Public Health, University of California, Berkeley

*There has been much speculation about the effects of bad economic times on the prevalence of psychiatric disorder. The most common speculation, referred to as the provocation hypothesis, is that bad times add to prevalence by increasing incidence. The assumption is that economic contraction forces formal and informal organizations to adapt to fewer resources. Individuals presumably experience these adaptations as undesirable life events. Much of the research in the field, therefore, tests the hypotheses that the incidence of undesirable life events increases with economic contraction, and that these events are risk factors for disorder.*

*While there is much support for the provocation hypothesis in that the incidence of disorder appears elevated among job losers, the effect on prevalence is less clear. Recent findings suggest that two other mechanisms may compensate for increased incidence due to job loss. The first mechanism, which I call the inhibition hypothesis, is the possibility that a contracting economy reduces the incidence of alcohol abuse and violent behavior among persons who remain employed. This hypothesis assumes that workers prone to alcohol use and violence fear that exhibiting such behavior in a contracting economy would cause them to lose jobs. This fear may reduce the incidence of clinically significant disorders by increasing individual efforts to control behavior. A related mechanism is that a contracting economy may increase the fraction of the chronically ill population that is in treatment. This mechanism, referred to as the uncovering hypothesis, assumes that community tolerance for deviance decreases when the economy contracts. Lowered tolerance causes more ill persons to seek treatment than would do so in a stable or growing economy. The effect, therefore, may be to reduce prevalence.*

*These three hypotheses are not mutually exclusive. As described below, there is empirical evidence that all are at work. This possibility implies that any estimate of the net effect of economic contraction on the prevalence of disorder must reconcile provoking, inhibiting, and uncovering mechanisms. A model for reconciling these effects is suggested. The possibility that all three of these effects are at work inevitably complicates the debate over interventions. The potential implications for intervention are summarized in the last section of this chapter.*

## **Tests of the Provocation Hypothesis**

A comprehensive review of the literature concerned with the mental health effects of economic life events is beyond the scope of this paper. There are, moreover, several such reviews in the literature (e.g., Catalano, 1991; Dooley & Catalano, 1986). I will attempt, rather, to selectively review recent work that is representative of the field.

### **Relationships Between The Economy And Stressors**

The provocation hypothesis has two central tenets. The first is that a contracting economy should increase the incidence of undesirable life events. The second is that these events should be risk factors for disorder. The provocation hypothesis assumes that the chain from macroeconomic phenomena to individual experiences has at least two links. The first is that labor market dynamics (e.g., changes in total employment or the unemployment rate) should be associated with the incidence of job and financial events such as job loss, change in work hours, loss of income, difficulty paying bills, repossessions, and foreclosures. The second link is that non-job, non-financial stressors (e.g., changes in leisure activities, problems with spouse and family) should increase after increases in job and financial events have occurred.

The literature supports both links. Studies based on epidemiological surveys of at least three communities support the suspected association between labor market dynamics and the incidence of undesirable job and financial events. Data collected in Kansas City suggested that the incidence of such events increase when the labor market contracts (Catalano & Dooley, 1977; 1979a). Similar data collected in Washington County, Maryland, supported the same relationship in a non-metropolitan community (Dooley, Catalano, Jackson, & Brownell, 1981). A 3-year study of 8,000 Los Angeles County households reported that several measures of the local economy were related to the reported incidence of undesirable job and financial events (Catalano & Dooley, 1983; Dooley & Catalano, 1984).

The second, and less intuitive, link between job and financial and other stressful events has also been supported. The Los Angeles data showed that persons experiencing undesirable job and financial events were more likely to have subsequent undesirable non-job, non-financial events than similar persons who did not have adverse job and financial experiences (Catalano, Dooley, & Rook, 1987). The analyses controlled for earlier non-job, non-financial events.

A politically important but rarely discussed finding in the literature concerns the distribution of job and financial stressors across socioeconomic groups. The Los Angeles data showed that, while households in the lowest socioeconomic group consistently reported the most job and financial stressors, the risk of these households having such a stressor did not vary over time with fluctuations in economic indicators (Catalano & Dooley, 1983; Dooley & Catalano, 1984). Only the middle of the socioeconomic strata reported more such events when total employment contracted or was less than expected. The authors attributed this phenomenon to the fact that the jobs typically held by the lowest income households are not the jobs that are eliminated when firms attempt to cut costs. The jobs that are eliminated are usually those that confer benefits (e.g., health insurance, unemployment insurance, and pensions) that reduce employer control over costs. Poorer households often hold jobs that are temporary and confer no benefits. These jobs are less likely to disappear in recessions and may even increase.

The literature testing associations between economic indicators and the incidence of stressful life events has given way to work concerned with the effect of the macro-economy on the stress process. Fenwick and Tausig (1994), for example, conclude that economic contraction is stressful not only because it affects the incidence of discrete events, but also because it changes the nature of work. They report that economic contraction leads to increased demands on workers and to a reduction in the resources available to meet those demands. This circumstance is, of course, the defining component of stress.

The literature concerned with the second tenet of the provocation hypothesis, that there is a relationship between undesirable job and financial events and illness, is extensive and, for the most part, supports the provocation hypothesis. The literature concerned with depression, alcohol abuse, and violence is selectively reviewed below.

## **Provocation Of Depression**

Outcome measures in the literature typically include scores on epidemiological scales but not clinical diagnoses. Dooley and Catalano (1984), for example, used the Psychiatric Epidemiology Research Interview scales (Dohrenwend, Shrout, Egri, & Mendelsohn, 1980) to measure nonspecific psychological distress and found it to be more common among persons who had experienced undesirable job and financial events than among those who had not. More specific outcomes, however, have been of greater interest and will be focused on below. The first is depression. The literature connecting job loss to symptoms of depression has been extensive. It includes cross-sectional studies that uniformly report higher levels of depression among those who want to work but are not working. This literature includes case-control designs (Hall & Johnson, 1988; Melville, Hope, Bennison, & Barclough, 1985; Roy, 1987) as well as those based on community samples and statistical control (Dressler, 1986; Weisman, Bruce, Leaf, Florio, & Holzer, 1991). The weakness in this work is reverse causation or the possibility that depression and co-morbid conditions cause unemployment. Indeed, there are many reports of depressed mood being a risk factor for unemployment and at least one of these is based on a rigorous prospective panel study (Hamilton, Hoffman, Broman, & Rauma, 1993).

Attempts to control reverse causation through retrospective designs in which the timing of job loss and the onset of symptoms are recalled support the findings of the cross-sectional designs. Kessler, Turner, and House (1988), for example, used this design and reported higher levels of depressed mood among persons who lost jobs. Eales (1988) also used recall among surveyed persons and found that symptoms of depression were more common among those who had lost jobs than those who had not.

Another type of study concerning depressed mood follows depressed persons who have lost jobs to determine whether labor market experiences affect the course of the illness (e.g., Bolton & Oatley, 1987). These studies have reported that reemployment is associated with reduced depression and at least one (Kessler, Turner, & House, 1989) provides empirical evidence that the effect is not due to reduced depression leading to reemployment.

Data from a prospective panel study, originally intended to assess the effects of workplace exposures to toxins on women, were used to assess the effect of layoffs and length of unemployment on symptoms of depression among a small group of women (Dew, Bromet, & Penkower, 1992). Findings were that job loss was associated with elevated symptoms and that symptoms increased with length of unemployment.

A recent prospective study (Viinamaki, Koskela, & Niskanen, 1993) with controls reports that job losers are at elevated risk of depression as measured on the Beck Symptom Inventory (Beck, Ward, Medelson, Mock, & Erbaugh, 1961). As with many of the best studies in the field, the work was done in Europe (i.e., Finland). Its applicability to the United States is unknown. The study, moreover, involved a plant closing, implying that the independent variable is not only losing a job but also being embedded in a community coping with the closure.

The typical finding of increased depression among job losers was reinforced by a recent study based on data from the Epidemiologic Catchment Area (ECA) project. The ECA project, conducted in the mid 1980s, was the most ambitious panel study of the prevalence of psychological disorder in the United States. Survey data were collected in Baltimore, Los Angeles, New Haven, Raleigh-Durham, and St. Louis. Researchers at each site used similar survey designs and identical "core" questions to assess the prevalence and incidence of specific mental disorders, use of health services, and socioeconomic and demographic factors. At each site, a minimum of 3,000 adult community residents received two face-to-face interviews at a 1-year interval (Eaton & Kessler, 1985; Robins & Regier, 1991).

The principal instrument of the ECA project was the Diagnostic Interview Schedule (DIS), which yields diagnoses for a large range of major mental disorders defined by the clinical community (Robins & Regier, 1991). The DIS is a highly structured interview, administered by laypersons, covering past and current symptoms. The instrument identifies lifetime (i.e., ever met the criteria for a diagnosis) as well as recent diagnoses (from current to within past year).

Dooley, Catalano, and Wilson (1994) used data from the ECA study to model relationships among job loss, symptoms of depression, and diagnosable major depression. The difference between depressed mood and major depression is that the latter requires an episode of dysphoria that disrupts functioning for at least two weeks (American Psychiatric Association, 1987). The episode cannot occur with other syndromes (e.g., alcohol abuse) that could induce depression. Dooley et al. found that, consistent with earlier work, losing a job significantly increased the odds of exhibiting symptoms of depression. The odds ratio was 2.08. The odds ratio for clinical depression was of similar size (i.e., 2.28) but did not reach significance. The authors attributed this to the low power of the test. The failure to reach significance could also, however, be due to the possibility that while job loss induces depressed mood and possible comorbidity, it does not significantly increase the likelihood of extended functional impairment.

The ECA data also allowed the authors to test the possibility that a contracting labor market interacts with job loss to affect depression. No interaction effect was found.

In sum, the empirical research in the field supports the inference that job loss is a significant risk factor for depressed mood. The effect on clinically significant major depression is not established but seems likely.

## **Provocation Of Alcohol Abuse**

A disproportionate fraction of persons in treatment for alcohol disorder are unemployed (NIAAA, 1982). Many cross-sectional studies also report that alcohol consumption among job losers is greater than among other persons (Armor, Polich, & Stambul, 1978; Brown, 1983; Crawford, Plant, Kreitman, & Latchman, 1987; Hyman, Helrich, & Besson, 1972; Kessler, House, & Turner, 1988; Pearlin & Radabaugh, 1976; Rayman & Bluestone, 1982; Seeman, Seeman, & Budros, 1988; Smart, 1979; Wilson, 1980). The principal weakness of these studies is reverse causation - the possibility that problem drinking caused the job loss rather than vice versa.

There are several reports of time-series associations between macroeconomic indicators and variables related to alcohol consumption (Brenner, 1975; 1977; Catalano, Dooley, & Jackson, 1983; Thomas & Kramer, 1978). The best known of these studies is probably Brenner's (1975) report that increases in the national unemployment rate are associated with subsequent increases in sales of alcohol, admissions to mental health facilities for alcohol-related disorder, arrests for alcohol-related offenses, and death by cirrhosis of the liver. The principal strength of this research is that the threat of reverse causation is reduced; increases in the consumption of alcohol are unlikely to cause earlier contraction of the macro-economy. The weakness of the work is the "ecological fallacy" or the logical error of assuming that the association between two characteristics of a community will generalize to the same characteristics measured at the individual level.

The most rigorous research in the field is based on longitudinal panel studies. These studies compare alcohol consumption over time among job losers to that of a comparison group that remains employed. Monitoring of consumption typically begins with notice that a factory or firm is about to close. Reverse causation can be discredited in such work because the timing of job loss and of changes in consumption can be established. The ecological fallacy does not apply because the unit of analysis is the individual.

There are at least seven well-designed panel studies in the literature (Buss & Redburn, 1983; Catalano, Dooley, Wilson, & Hough, 1993; Giesbrecht, Markele, & MacDonald, 1982; Iversen & Klausen, 1986; Kasl & Cobb, 1982; Leventman, 1981; Plant, 1979). Of these, one (Giesbrecht, et al., 1982) reported that miners who had been laid off did not increase their use of alcohol. The workers, however, received considerable financial and social support from their union. The results, therefore, may not generalize to the large populations that do not enjoy such support. Iversen & Klausen (1986) studied ship workers in Denmark whose use of alcohol was measured by survey before and at seven months and one year after the shipyard had closed. The results suggest that the amount of alcohol consumption did not change after unemployment. The social welfare system of Denmark, however, provided the unemployed workers with considerable financial (e.g., 70% of original income) and other resources (e.g., counseling) that raise questions of external validity.

The remaining five studies all support the provocation hypothesis. The most recent of these is based on the ECA data (Catalano, Dooley, Novaco, Wilson, & Hough, 1993). The dependent variable in the ECA alcohol analyses was whether a respondent met clinical criteria for alcohol abuse or dependence, which requires the presence of specific behaviors that indicate excessive alcohol use as well as impairment of functioning. The DIS has been shown to identify the presence of both sets of criteria (Helzer, Burnam, & McEvoy, 1991). Statistical estimates of the agreement between DIS and psychiatric assessments have varied from study to study, but the unanimous conclusion has been that the DIS can identify clinically significant alcohol disorder (Goethe & Ahmadi, 1991; Helzer, et al., 1985; Robins, Helzer, Ratcliff, & Seyfried, 1982; Spitznagel & Helzer, 1985;).

The ECA data allowed more rigorous tests of the provocation hypothesis than had previously been possible. The outcome variable, for example, was diagnosable disorder rather than a surrogate such as alcohol consumption. The longitudinal nature of the data enabled researchers to determine the timing of layoffs and the onset of alcohol abuse. The size and structure of the sample allowed results to describe either the communities in which the data were collected or the nation.

The data supported the provocation hypothesis because the risk of alcohol-related disorder at second interview was six times greater among workers who were laid off between interviews than among those who remained employed (Dooley, Catalano, & Hough, 1992). The test controlled for age, gender, socioeconomic status, ethnicity, other diagnosable disorder, alcohol disorder earlier in life, and marital status. In summary, there is good evidence supporting the hypothesis that job loss provokes alcohol abuse, at least in the United States. The effect appears robust across methods and includes increases in clinically significant alcohol abuse.

## **Provocation Of Violence**

The suspicion that job loss provokes violence is as old, and perhaps older, than the theory of Dollard and his colleagues that frustration leads to aggression (Dollard, Doob, & Miller, 1939). At the core of these theories is the Freudian notion that aggression is a primordial reaction to the blocking of pleasure. There have been many tests of this family of theories over the years, and contemporary assessments of the literature agree that the central tenets have been supported (Berkowitz, 1993). There is further consensus that frustration is most likely to lead to aggression when the thwarting event is unexpected and perceived as arbitrarily inflicted. People who are laid off encounter aversive events that produce negative affect. I.e., the otherwise expected attainment of well being is being blocked, and they are losing their job through no fault of their own.

Evidence for an effect of job loss on violent behavior includes that from aggregate time-series as well as individual-level studies. The former include reports that child abuse (Steinberg, Catalano, & Dooley, 1981) and other forms of mayhem (Brenner, 1976; Hepworth & West, 1988) are more common during periods of economic contraction. The controversy surrounding aggregate data analysis has, however, led to considerable skepticism toward this literature (Catalano & Serxner, 1987). Individual-level studies also report that violent behavior is more common among persons who have been laid off than among others (e.g., Gil, 1971). This work, however, has been cross sectional and does not address the possibility that violent behavior led to job loss.

The most compelling individual-level evidence for the provocation hypothesis comes from the ECA study. Several items concerning violence were included to gauge antisocial behavior. Researchers have used these items to estimate the prevalence of violence in the ECA sample (Swanson, Holzer, Ganju, & Jono, 1990). Catalano and colleagues (Catalano, Dooley, Novaco, et al., 1993) used this definition of violence to test the provocation hypotheses. The hypothesis was that workers who did not report violence at first interview and who were laid off between interviews would be more likely to report violence at second interview than similar persons who remained employed.

The data supported the provocation hypothesis. The odds of violence at second interview were six times greater among workers who were laid off between interviews than among those who remained employed. The test controlled for age, gender, socioeconomic status, ethnicity, other diagnosable disorder, violence earlier in life, and marital status. Among the control variables, only being young and previously violent were significantly related to the odds of reporting violence at the second interview.

The results were essentially the same when the analyses were restricted to workers who had reported no lifetime violence at first interview. The analyses were also repeated among persons with no lifetime diagnosis of behavioral disorders (other than

The literature, in short, supports the hypothesis that job loss provokes violent behavior. The evidence is not as copious as that for the provocation of depressed mood or alcohol use, but it is consistent with the large body of empirical research on the frustration-aggression theory.

The adverse effects of undesirable job events also spread from the person experiencing the events to his or her social network. Wives of workers with undesirable job experiences have, for example, been reported to be at elevated risk of nonspecific psychiatric disorder (Rook, Dooley, & Catalano, 1991). These findings are consistent with other reports of the contagion of demoralization and symptoms of depression in families in which jobs have been lost (Dew, Penkower, & Bromet, 1991; Liem & Liem, 1988).

# The Inhibition and Uncovering Hypothesis

## Inhibition

The inhibition hypothesis is that the incidence of disorder should decrease with a contracting economy. The hypothesis arises from three widely accepted propositions: (a) individuals will change their behavior to avoid adversity; (b) job loss is an aversive event; and (c) that persons with behavioral problems are the first to be laid off in times of contraction and the last to be hired in times of expansion. The last proposition may seem overstated, but the utilitarian model of choice is widely honored in personnel practices. That model implies that a firm should strive to employ persons with the greatest ratio of production to cost. Production is lost by absenteeism, and costs include trouble with supervisors and workmates as well as resistance to change. As the stigma literature demonstrates, many Americans believe, fairly or otherwise, that these problems are characteristic of persons with histories of alcohol abuse and antisocial behavior (Link, Cullen, Frank, & Wozniak, 1987). Persons with such histories are aware of their stigma and, according to the inhibition hypothesis, attempt to lower their chances of layoff when the demand for labor slackens. Drinkers drink less and violent persons work harder to contain their behavior. In short, at least one punishment for deviance - unemployment - is more certain when the economy contracts (Whiteside, 1988). Persons with modifiable behavior attempt to avoid the punishment by being less deviant, implying that the incidence of clinically significant disorder among those with a history of such disorder may be reduced during times of economic contraction.

The provocation and inhibition hypotheses both apply to persons who do not have a clinically significant disorder before the economy contracts. The former, however, applies to persons who have lost jobs while the latter applies to persons who remain employed.

Support for the inhibition of alcohol abuse and violent behavior comes from the ECA-based analyses. Catalano and his colleagues (Catalano, Dooley, Wilson, & Hough, 1993) report that respondents who were employed at both interviews and had no disorder at the first interview were at lower risk of clinically significant alcohol abuse during periods of unexpectedly low employment. Among the control variables, being male, being married, and having had an earlier episode of alcohol disorder significantly increased the likelihood of alcohol disorder at second interview.

Evidence for the inhibition of violence has also been reported (Catalano, Dooley, Novaco, et al., 1993). The authors tested the hypothesis that, among persons employed at both interviews and reporting no violent behavior at first interview, those in contracting industries would be less likely to report violence at second interview. The data supported the hypothesis. While being in a contracting industry was a significant predictor, socioeconomic status, ethnicity, gender, history of violence, and history of diagnosable disorder were not. Among the controls, only being young significantly predicted the likelihood of violence.

## **Uncovering**

The uncovering hypothesis is, essentially, that persons with behavioral disorder are more likely to seek help for that disorder when the economy contracts than when it is stable or growing (Catalano & Dooley, 1979b). The mechanism assumed by the uncovering hypothesis is closely related to the inhibition mechanism. The most important differences are that the former applies primarily to persons with clinical or sub-clinical disorder and concerns seeking help for that disorder. The argument is essentially that persons with chronic mental illness who function well enough to work will, for reasons described under the inhibition hypothesis, fear layoff when the economy contracts. This fear is well founded. Data from the ECA study indicated that having diagnosable illness at first interview was a strong predictor of being laid off at second interview. Violent behavior at first interview, for example, multiplied the odds of being laid off at the second interview by 15 (Catalano, Dooley, Novaco, et al., 1993). Intuitively aware of such odds, persons with illness presumably seek help to control their illness.

The uncovering hypothesis has been supported by case reports (Ricklefs & Bennett, 1988) as well as by more rigorous analyses, including both aggregate time-series analyses (Catalano & Dooley, 1979b; Catalano, Dooley, & Jackson, 1985) and studies based on individuals (Catalano, Rook, & Dooley, 1986). Among the time-series analyses are reports that the association between economic indicators and use of mental health services is not reduced to insignificance when survey measures of symptom levels in the population are controlled (Catalano & Dooley, 1979b). The provocation of newly symptomatic persons by economic contraction could not, in other words, fully explain the widely reported association between economic contraction and use of services. The authors inferred that the association must be due, at least in part, to persons with existing disorders seeking help.

Other time-series support for uncovering comes from revisiting Brenner's seminal analyses of admissions to New York State mental hospitals (Catalano, Dooley, & Jackson, 1985). Brenner assumed that his data measured first admissions. He, therefore, attributed the inverse association he found between admissions and economic indicators to provocation. Closer scrutiny of the data, however, led to the discovery that they were first admissions only to the reporting facility. When true first admissions were separated from readmissions, it was discovered that only subsequent admissions of persons with chronic disorder were related to the economy.

Individual-level analyses also support the uncovering hypothesis. Data from the Los Angeles study showed that persons in contracting economies were, controlling for symptoms, more likely to use mental health services than similar persons in stable and growing economies (Catalano, Rook, & Dooley, 1986). Economic contraction also appeared to induce prophylactic help seeking; people with low levels of symptoms were more likely to seek help when the economy contracted than at other times.

## Reconciling Provocation, Inhibition, and Uncovering

The three mechanisms outlined above have countervailing effects on the prevalence of disorder. Provocation has the intuitive effect of increasing prevalence because it increases incidence among those losing jobs and possibly among those in households in which jobs have been lost. Inhibition, however, may compensate for provocation by suppressing incidence among those who are prone to disorder and fear job loss. Uncovering may further dissipate the effect of provocation on prevalence by leading persons with illness into treatment.

Assuming the above inferences from the existing research are correct, the net effect of economic contraction on the incidence of clinically significant disorder in a community may be described by the following model:

$$Y_t/P - Y_t = c - \hat{\alpha}_1 X_{1t} - \hat{\alpha}_2 X_{2t} + \hat{\alpha}_3 X_{3t} + e_t \quad (1)$$

Where:

$Y_t$  is the prevalence of clinically significant disorder in the community during time period  $t$ .

$P$  is the population at time  $t$ . Dividing prevalence by the population less prevalence yields the odds that an individual in the population will be disordered at time  $t$ .

$c$  is the  $Y$  intercept.

$X_{1t}$  is the population with a history of disorder that is working at time  $t$  and fears job loss.

$\hat{\alpha}_1$  is the effect coefficient for  $X_{1t}$  and as such is the estimate of the inhibition effect.

$X_{2t}$  is the disordered population that is working at time  $t$  and fears job loss.

$\hat{\alpha}_2$  is the effect coefficient for  $X_{2t}$  and as such is the estimate of the uncovering effect

$X_{3t}$  the number of persons laid off in time period  $t$ .

$\hat{\alpha}_3$  is the effect coefficient for  $X_{3t}$  and as such is an estimate of the provocation effect

$e_t$  is the error term at time  $t$  (i.e., exhibits no trends, cycles, or tendencies to remain high or low after large or small values).

The three X series are assumed to be stationary in their mean (i.e., exhibit no secular trend). If these assumptions could not be made, one of the several commonly used approaches to specifying autocorrelation in time series could be added. If, for example, the widely used Box-Jenkins (1976) approach were used, the general equation would be as follows.

$$\ddot{A}_n(Y_t/P - Y_t) = c - \dot{u}_1 \ddot{A}_n X_{1t} - \dot{u}_2 \ddot{A}_n X_{2t} + \dot{u}_3 \ddot{A}_n X_{3t} + (1 - \dot{e}B^n)/(1 - \dot{o}B^n)e_t \quad (2)$$

Where:

$\ddot{A}_n$  is the difference operator that indicates a series was differenced at lag n to remove secular trends or cycles (i.e., render the series stationary in its mean).

$B^n$  is the backshift operator or value of the series to which it applies at time t-n.

$\dot{o}$  is an autoregressive parameter used in the Box-Jenkins approach. Autoregressive parameters measure a series' tendency to remain above or below its expected value after a perturbation or shock.

$\dot{e}$  is the "moving average" parameter. Moving average parameters measure the tendency of perturbations or shocks to be present for more than one time period.

Equation 2 cannot be estimated in practice because we never know the values of  $X_1$  or  $X_2$ . These, however, are functions of the degree to which the number of layoffs (i.e.,  $X_3$ ) exceeds those that are expected in time t. If layoffs are greater than the community expects, the fear of job loss spreads through the labor force and induces inhibition and uncovering. The effect is probably not linear in that fear becomes increasingly pervasive as layoffs exceed expectations (Karr, 1992). The effect should, however, tail off at some level because the number of persons exposed to layoff is limited. The inhibition and uncovering effects could, therefore, be expressed as logistic (i.e., dose) responses to the degree that layoffs exceed expected values. For the present purpose, the degree to which lay offs exceed expected values could be specified as the de-seasonalized incidence of layoffs in time t.

Under these assumptions, Equation 2 could be estimated in the following form to yield the net effect of economic contraction on the prevalence of disorder at time t:

$$\ddot{A}_n \text{LN}(Y_t/P - Y_t) = c + \dot{\alpha}_3 \ddot{A}_n \text{LN} X_{3t} - \dot{\alpha}_4 [(1 - \ddot{\alpha}_1 B^n) / (1 - \ddot{\alpha}_1 B^n) \ddot{A}_n X_{3t}] + (1 - \ddot{\alpha}_2 B^n) / (1 - \ddot{\alpha}_2 B^n) e_t \quad (3)$$

Where  $\ddot{A}_n \text{LN}(y_t/P - Y_t)$ :

- is the Logit of the prevalence of disorder in time period t.
- prevalence is transformed to its Logit (i.e., the natural logarithm of its odds) to capture the likely logistic shape of the effect of unexpectedly high layoffs on fear
- is the natural logarithm of the number of lay offs in time period t
- layoffs are transformed to natural logarithms to preserve the linear relationship implied by provocation.
- is the combined effect of inhibition and uncovering at time t.

And where  $[(1 - \ddot{\alpha}_1 B^n) / (1 - \ddot{\alpha}_1 B^n) \ddot{A}_n X_{3t}]$  is the deseasonalized number of lay offs in time period t.

The meaning of Equation 3 is that prevalence will increase linearly with the number of layoffs but decrease logistically to the degree that layoffs exceed the level expected from history. The combined inhibition and uncovering effect ( $\dot{\alpha}_4$ ) in Equation 3 is derived from the separate effects of fear of layoff on the population that remains working and has either current or past disorder or is prone to disorder. While the number of persons laid off may often seem alarmingly high compared to its own history, the number of persons who fear layoff is usually much greater. Indeed, over a third of the labor force reported fear of imminent layoff during the economic restructuring of the early 1990s (Karr, 1992). The research question is whether the net effect of economic contraction, at least on alcohol abuse and violence, could therefore be to reduce the prevalence of both .

## **Implications for Intervention**

Another important question concerning the model offered above is whether it has any value for the prevention and treatment of illness. Strategies designed to prevent the mental health adversity of economic contraction fall into two groups. The first includes policy interventions to reduce the incidence of economic stressors. This approach is analogous to classic public health interventions such as water quality assurance; it attempts to keep the pathogen away from the population. Policy interventions in unemployment require that profit-making by firms or individuals be restrained, directly or indirectly, through private or public policy. A direct approach would be to reduce the freedom of firms to jettison labor as a cost-cutting strategy. Contracts between unions and management can include any and all arrangements that restrain layoffs. Government's options, while more constrained than those negotiated between labor and management, are considerable. They range from temporary injunctions to prohibit layoffs without public review to raising the employer contribution to unemployment compensation taxes for firms that account for a disproportionate share of layoffs.

Any private or public scheme to directly constrain the freedom of firms to reduce labor in this society must recognize a fundamental commitment to private property. Private parties are not forced to make their assets available for production. Therefore, no scheme can be implemented beyond short periods without the agreement of those who own capital. This means there are few direct constraints on the freedom of firms to reduce labor. This general bias is reinforced by a belief that direct constraints are ultimately counterproductive, encouraging capital-intensive rather than labor-intensive production. Indeed many European nations have recently reduced their direct constraint of employment practices in the hope of reducing their relatively high levels of unemployment. The research described above may, therefore, affect the arguments made in private negotiations and public debates about the freedom of firms to reduce labor, but I would hypothesize that the outcome is more likely to be affected by social attitudes toward direct restraints on the use of private property.

The indirect approach to controlling undesirable job and financial events is to use public policy to encourage economic growth and stability. It has been argued, for example, that the most appropriate way to prevent the adverse psychological effects of job loss is to use public policy to bolster employment (Catalano & Dooley, 1980; Keiselbach & Svensson, 1988). The argument assumes that policies favoring employment would be chosen under utilitarian criteria if the costs of psychiatric disorder and its sequelae were properly attributed to policies that tolerate disemployment as a means to productivity. The research described above does not necessarily support this assumption. As already noted, workers who abuse alcohol or are prone to violence may curtail their problem behaviors when they fear for their jobs. The research question, therefore, is whether the net effect of layoffs is a reduction in alcohol abuse and violence because many more people fear losing their jobs during hard economic times than actually lose them (Karr, 1992).

The second type of prevention averts illness by improving the ability of individuals to cope asymptotically with pathogens that cannot be avoided. This "inoculation" model differs from the classic public health approach in several important ways. The most obvious is that it intervenes with the individual rather than the environment. This difference makes the inoculation model intuitively appealing to psychologists and social workers trained in the clinical tradition. The research described above, moreover, supports this intuition. Economic contraction may significantly reduce the prevalence of alcohol abuse and violence if the inhibition and uncovering effects are real and if job losers could be inoculated to avert such problematic behavior. Programs to help job losers cope asymptotically with their adversity have been developed. Those based on practical training and stress inoculation have been reported to be successful, particularly with the most disadvantaged of the unemployed. (Price, Ryn, & Vinokur, 1992). The research questions now involve the reality and size of the inhibition and uncovering effects, the extent to which promising intervention models can be effectively utilized in wide-scale program efforts, and what organizational and professional infrastructures are required to sustain such an effort.

However, another view of the inoculation model suggests that its logical extension is to create workers who accept the injustices of economic policy making. As Dubos (1965) noted years ago, people may be able to adapt to extreme distortions of the physical and social environment, but will they still be human or humane after these adaptations? The literature concerned with the moral and ethical issues raised by this conundrum is small but growing (e.g., Keiselbach, 1995)

On a more practical level, the research described above may offer useful information for the planning and allocation of treatment services for persons whose illness cannot be prevented. Knowing when and where to deliver services can improve their cost-effectiveness because fewer services would be deployed when and where they are not needed. The inhibition mechanism suggests that need among people who are without illness and remain employed may not be as great as intuition may suggest when the economy contracts. More capacity should, however, be allocated for those who remain employed but who have chronic illness, because the uncovering hypothesis suggests that a growing fraction of this population will seek services when the economy contracts. The provocation hypothesis, of course, suggests that services and outreach should be allocated for people who lose jobs due to redundancy. This is the population at greatest risk of onset of new illness as the economy contracts. Again realistic planning efforts depend on the availability of research data-- on the numbers expected to generate each of these forms of service demand, the types and costs of services required, and service delivery system- and client- characteristics that affect successful outcomes of service.

From a financing perspective, the volume of services available should reflect the prevalence of illness. As the model offered above suggests, economic contraction may affect prevalence and therefore the total cost of services. The effect, however, will be a function of the net result of provocation, inhibition, and uncovering. There is a possibility that the cost of services may not be greatly increased by contraction, especially if prevention among job losers is aggressively pursued. It is a possibility that deserves empirical examination.

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