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Emergence of depression following job loss prospectively predicts lower rates of reemployment

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ABSTRACT

Job loss has been associated with the emergence of depression and subsequent long-term diminished labor market participation. In a sample of 500 adults who lost their jobs, trajectories of depression severity from four years before to four years after job loss were identified using Latent Growth Mixture Modeling. Rates of unemployment by trajectory were compared at two and four years following job loss. Four trajectories demonstrated optimal model fit including resilience (72%), chronic pre-to-post job loss depression (9%), emergent depression (10%), and remitting depression (9%). Logistic regression comparing reemployment status by class while controlling for age, gender, and education at two-years post job loss revealed no significant differences by class. An identical logistic regression on four-year reemployment revealed significant differences by class with post-hoc analyses revealing emergent depression resulting in a 33.3% reemployment rate compared to resilient individuals (60.4%) together indicating that depression affects reemployment rather than lack of reemployment causing the emergence of depression. The emergence of depression following job loss significantly increases the risk of continued unemployment. However, observed high rates of resilience with resulting downstream benefits in reemployment mitigates significant concern about the effects of wide spread unemployment on ongoing global economic recovery following the Great Recession.

1. Introduction

The Great Recession that began in 2007 was the largest global economic downturn of the post-World War II era, and it resulted in a record rise in unemployment and a persistent increase in long-term unemployment that continues to threaten overall economic recovery (Elsby et al., 2010). While the United States is no longer in a recession, the labor market remains historically weak, threatening the long-term vitality of the current post-recession economic recovery (Rothstein, 2011).

While many factors influence long-term unemployment, a key factor of concern to some economists is the "psychological harm" caused by unemployment, which can impact motivation, sense of control, confidence, and self-respect (Sen, 1997; Winkelmann and Winkelmann, 1998). Rates of depression among the unemployed are nearly double that of employed individuals causing a significant economic burden to society (Greenberg et al., 2003). Previous research has demonstrated that unemployment is associated with increases in unhealthy behaviors such as alcohol and tobacco consumption, as well as weight gain and incidence of myocardial infarction and stroke (Deb et al., 2011; Falba et al., 2005; Gallo et al., 2006). There are a number of reasons why unemployment may result in distress. Psychological disorders are prevalent among socially disadvantaged individuals, and employment status is a particularly relevant component of social privilege (Fryers et al., 2003). Research has also demonstrated that social causation, through such factors as ongoing stress and adversity, may be especially key to the onset of depression in some individuals (Dohrenwend et al., 1992). In addition, health selection plays a role in both job loss and ongoing unemployment, as individuals with physical or psychological ailments are more likely to lose their jobs and are less likely to be rehired (Mastekaasa, 1996; Thomas et al., 2005). Furthermore, the stigma of joblessness may make employers view applicants as less desirable the longer unemployment persists (Obetholzer-Gee, 2008). In turn, self-perception of low social status may result in psychological distress and physical ailments (Singh-Manoux et al., 2003), thereby increasing the likelihood of poor health selection in the job market. Unemployment may impact perception of personal efficacy and locus of control, and can also cause a sense of subjective helplessness (Goldsmith et al., 1996). Indeed, unemployment has been shown to have a "scarring effect" on individuals' sense of

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wellbeing, which continues even after the financial harm of job loss has dissipated (Clark et al., 2001; Lucas et al., 2004). For this reason, the psychological toll of unemployment is a relevant issue deserving of further study.

These observations have caused concern that psychological factors, particularly the emergence of depression which has been shown to be common following unemployment and to increase with the duration of unemployment (Mossakowski, 2009), can cause a continued drag on the economy due to the impact of job loss on motivation, productivity, and particularly reemployment (Ginexi et al., 1999; Lerner et al., 2004; Vinokur and Schul, 2002; Whooley et al., 2002).

The negative psychological effects of unemployment, coupled with high rates of job loss in the past decade, provide a sobering prognosis for labor productivity as the economy expands and new jobs become available. Recent research however, has demonstrated that major life stressors, including unemployment, do not have uniform effects across the population on depression and related constructs such as wellbeing and distress (Bonanno et al., 2012; Galatzer-Levy et al., 2010, 2011; Galatzer-Levy and Bonanno, 2012, 2014). By utilizing prospective population based samples, these studies have demonstrated that the majority of individuals, typically upwards of 70% of the population, are resilient as characterized by sustained high functioning or low symptoms in response to an incident stressor. Further, prospective studies of depression have demonstrated that rates of depression following an incident stressor are frequently inflated due to the conflation of those who were already depressed with those who develop depression in response to the incident event (Burton et al., 2014; Galatzer-Levy and Bonanno, 2012, 2014; Zhu et al., 2014). Previous studies leave open key questions including the rates of emergent depression following job loss and the effects on subsequent labor market participation. Further, it remains unclear whether depression following job loss is a determinant of continued unemployment, or whether an inability to find a job results in the emergence of depression (See Fig. 1).

The current study utilizes a large, longitudinal, population based panel dataset to identify prospective trajectories of depression severity in response to job loss. Further, rates of reemployment at two and four years post-loss are examined in relation to the identified trajectories to determine whether variability in unemployment rates by trajectory occur prior to or subsequent to the emergence of depression.

2. Methods

Data were drawn from the Health and Retirement Study (HRS), a 24-year longitudinal study of more than 20,000 American adults. Data on financial assets, employment and mental and physical health were collected via biennial interviews and self-report measures beginning in 1992 and continuing through the present day.

2.1. Participants and procedure

A sample of *N*=500 individuals who lost their jobs between the years 1996 and 2006 were selected into the current study. The mean age was 59.77 (*SD*=7.85), and the range was from age 32 to 94. The mean number of years of education was 12.32 years (*SD*=3.15), 82.0% was Caucasian, and 54.4% was female. Mean annual income prior to job loss was $28,559.70 (*SD*=28,121.12) and mean debt amount was $3108.23 (*SD*=8206.15). The majority (64.0%) reported job loss due to termination while the remaining 36% reported job loss due to business closure, and 64.8% lost a blue-collar job while 35.2% lost a white-collar job (See Table 1).

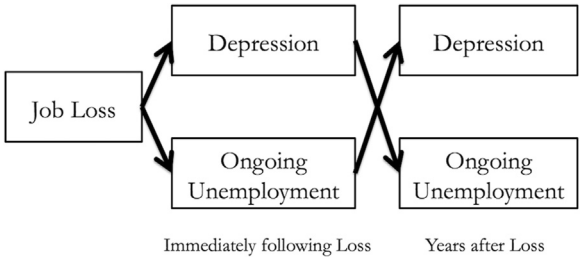

Fig. 1. Schematic representation of research question pertaining to temporal relationship between depression and ongoing unemployment.

Table 1
Sample demographics (N=500).

	Percentage	Mean	SD
Age	–	57.77	7.85
Years of education	–	12.32	3.15
Income prior to job loss	–	$28,559.70	$28,121.12
Sex			
Male	45.6%	–	–
Female	54.4%	–	–
Occupation type			
Blue-Collar	64.8%	–	–
White-Collar	35.2%	–	–
Reason for job loss			
Termination	64.0%	–	–
Business closure	36.0%	–	–

2.2. Measures

2.2.1. Depression symptomatology

Depression was assessed using an abbreviated version of the Center for Epidemiological Studies- Depression (CES-D) scale (Radloff, 1977). This 8-item abbreviation asks participants whether they experienced a number of depressive symptoms in the past week using a binary rating system (0= did not experience, 1= did experience). The CES-D short form has demonstrated high internal consistency (Kohout et al., 1993).

2.2.2. Health

During each wave of data collection participants were asked to rate their self-perceived health status using a five-point Likert-type scale in which 1 indicates “excellent” and 5 indicates “poor.”

2.2.3. Reemployment

was defined in the current study as employment status four years following job loss.

2.2.4. Occupation type

Consistent with previous research that utilized the HRS dataset to examine the effects of job loss (Gallo et al., 2006), occupation type was defined as either blue-collar or white-collar. Blue-collar occupations included forestry, military, fishing, farming, production and operations. White-collar occupations included those in administrative, managerial, professional, clerical, sales and service fields.

2.2.5. Reason for job loss

Sample selection was based on the criterion of job loss due to either termination or business closure. In the analyses, this classification was represented by a binary variable. Retirement was not included as a reason for job loss; thus, all participants lost their jobs involuntarily rather than voluntarily.

2.3. Data analytic strategy

A “floating baseline” design was utilized where observations across multiple panels are centered around the year of job loss to facilitate the identification of depression response from before to after job loss (Galatzer-Levy et al., 2010). In the current study, two time points before and two time points after self-reported job loss were utilized. Time 1 measurements occurred 2 years prior to job loss, Time 2

measurements in the year of job loss, Time 3 was 2 years following job loss, and Time 4 was 4 years following job loss.

Trajectories of depression severity from four years pre- to four years post-loss were identified using Latent Growth Mixture Modeling (LGMM) using Mplus 7.1 (Muthen and Muthen, 2006). Intercept variance was freely estimated while the slope parameter was fixed to 0 to aid in model convergence. Model fit was adjudicated by comparing progressive nested models seeking a model with reductions in the Information Criteria (AIC, BIC, SSBIC), tests of model fit based on changes in log-likelihood (LRT, BLRT) along with parsimony, interpretability, and consistency with theory (Jung and Wickrama, 2008). The identification of trajectories without the influence of covariates is referred to as the *unconditional model*.

Models including covariates are referred to as the *conditional model*. Age, gender, number of years of education, previous income, amount of debt, reason for loss (termination versus lay-off), optimism, occupation type and health status were examined as covariates in the conditional model. Finally, probable class assignments were saved to SPSS version 20 (Statistics, 2011). Class assignment was examined as a predictor of reemployment at 2 and 4 years following job loss while controlling for age, gender, and education in two separate logistic regressions. In addition, in the case of significant results, a χ^2 test of independence and compared relative cell frequency and Haberman's standardized, adjusted residuals statistic (HAR) was utilized to compare the frequency distribution of each cell relative to chance (Haberman, 1978).

3. Results

3.1. Unconditional LGMM

We used LGMM to identify the number of trajectories in the best fitting model. This analysis examined depressive symptoms at each time point. Unconditional models with two, three, four and five classes were compared, and the information criteria and fit statistics favored four classes overall. The information criteria slightly favored 5 classes. However, the LRT indicated adequate model fit only through four classes. The 4-class model was also the most parsimonious and theoretically relevant and therefore we chose the 4-class model as the optimal solution (See Table 2).

The four identified classes included *resilient* (72%) followed a trajectory of low, stable depressive symptomology across the four time points; pre-to-post-job loss *chronic depression* (9%); *emergent depression* following job loss (10%); and *remitting depression* following a pattern of decrease in depression following job loss (9%; See Fig. 2). The *resilient* trajectory was characterized by a low intercept (b=0.74, SE =0.06, $p < 0.001$) and flat slope across time points (b=−0.03, SE =0.03, p=0.32), while the *remitting depression* trajectory was characterized by a relatively high intercept (b=4.11, SE =0.57, $p < 0.001$) and significant negative slope (b=−0.64, SE =0.26, p=0.01). The *emergent depression* trajectory was characterized by a low intercept (b=1.29, SE =0.53, p=0.02) and a significant, positive slope (b=1.13, SE =0.23, $p < 0.001$) and the *chronic depression* trajectory was characterized by a high intercept (b=5.27, SE =0.49, $p < 0.001$) and flat slope (b=0.19, SE =0.23, p=0.40).

Table 2
Fit indices for 1–5 class models of depression symptom severity (unconditional).

Growth Mixture Model				
Fit Index	2 classes	3 classes	4 classes	5 classes
AIC	6780.241	6718.175	6662.064	6642.803
BIC	6809.743	6760.321	6716.854	6710.236
SSABIC	6787.525	6728.580	6675.591	6659.451
Entropy	0.892	0.885	0.874	0.865
LRT p-value	< 0.001	0.03	0.05	0.09
BLRT p-value	< 0.001	< 0.001	< 0.001	< 0.001

Note: AIC= Aikake information criterion; BIC= Bayesian information criterion; SSABIC= Sample-size adjusted Bayesian information criterion; LRT= Lo-Mendell-Rubin test; BLRT= Bootstrap likelihood ratio test

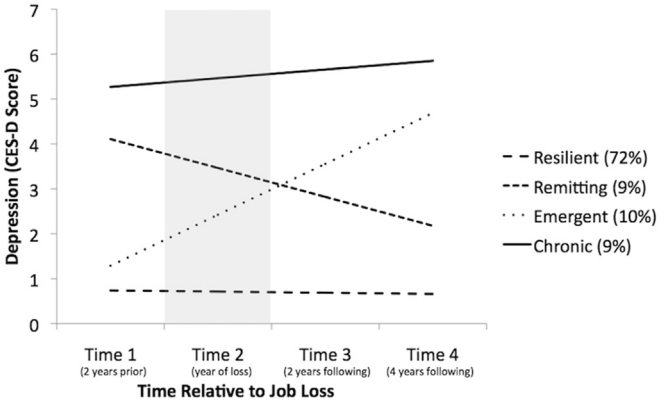

Fig. 2. Estimated mean level of depression by class from two years prior to four years following job loss for the unconditional model (without covariates).

3.2. Conditional LGMM

A multinomial logistic regression nested in the LGMM demonstrated that at age, gender, income, debt, job status, occupation type and reason for job loss were not significant predictors of class membership. Individuals in the *resilient* class were likely to have more years of education and better baseline self-reported health than those in the *emergent depression* class (See Table 3).

3.3. Reemployment

The first logistic regression, predicting reemployment two years following job loss demonstrated a non-significant overall model fit and non-significant results for each covariate. Further, the χ^2 revealed no differences above chance by class for reemployment status.

The second logistic regression, predicting reemployment four years following job loss demonstrated a significant omnibus model $\chi^2(3) = 14.23$, $p < 0.005$. Results indicate that membership in the *resilient* class was associated with increased probability of reemployment four years following job loss as compared to the *emergent depression* class (Wald chi-square of 9.64, OR=0.33, $p < 0.005$) and the *chronic* class (Wald chi-square of 5.16, OR=0.44, $p < 0.05$) (See Table 4).

Analyses of individual cells compared the frequency distribution using the HAR, and revealed that within the *resilient* class more than half of the sample (60.4%) was reemployed at Time 4, HAR=3.0, $p < 0.005$. Within the *chronic* trajectory, less than half the sample (40.0%) was reemployed, which occurred in excess of chance, HAR=2.0, $p < 0.005$% and 33.3% of the *emergent depression* class was reemployed, HAR=3.0, $p < 0.005$. Within the *remitting* trajectory, 58.3% of the sample reemployed (See Table 5).

4. Discussion

The current study identifies prospective trajectories of depression severity in response to job loss in a large, prospectively studied population-based cohort to determine whether responses to unemployment are heterogeneous, and whether that heterogeneity has downstream consequences for reemployment. Consistent with previous studies that have examined individual differences in depression in response to major life stressors, the current work identified four trajectories of response to job loss with *resilience* being the modal trajectory of response (72% of the overall sample) along with *chronic depression* (9%), *remitting depression* (9%), and *emergent depression*

Table 3
Multinomial logistic regression of predictors on depression symptom trajectories.

Reference Class	Emergent Depression			Resilient		Remitting Depression
Compared Classes	Resilient Coeff. *(SE)*	Remitting Coefficient *(SE)*	Chronic Coeff. *(SE)*	Remitting Coefficient *(SE)*	Chronic Coefficient *(SE)*	Chronic Coefficient *(SE)*
Years of Education	0.18 (0.08)*	0.06 (0.14)	0.07 (0.08)	−0.12 (0.11)	−0.11 (0.07)	0.02 (0.12)
Health Status	−0.85(0.27)***	−0.16 (0.33)	−0.06 (0.28)	0.69 (0.26)**	0.79 (0.23))***	0.10 (0.30)

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

(10%) (Bonanno, 2004; Galatzer-Levy and Bonanno, 2012, 2014; Zhu et al., 2014). In particular, these data are consistent with the findings of Galatzer-Levy et al. (2010) in the German Socioeconomic Panel Data that resilience was the most common response to job loss. While mean participant age was somewhat younger in the earlier study, the results of the current study demonstrate that heterogeneous response to job loss pertains equally to an older mean population that may be closer to retirement age. The different classes in the present study did not differ in age, gender, income, debt, occupation type, or reason for job loss. However, resilient individuals were more likely to be better educated and were generally healthier.

Notably, depression response to unemployment was an important determinant of reemployment status four years after job loss. Both individuals who were resilient and those whose depression remitted following job loss demonstrated significantly greater chance of reemployment within four years of job loss (60.4% of resilience individuals and 58.3% of remitting individuals) compared to those with chronic pre-to-post job loss depression (40.0% reemployed) and those demonstrating a pattern of emergent depression who fared the worst (33.3% re-employed). It is noteworthy that a remitting depression trajectory exists, and that these individuals demonstrated equivalent rates of reemployment as resilient individuals. Prior literature has indicated that individuals who follow this pattern are more likely to utilize social support following the incident stressor which has been shown to be a factor contributing to sustained depression following job loss (Mancini et al., 2015; Vinokur and Schul, 2002).

While the relationship between depression and reemployment is obscure in the case of those with chronic depression, there appears to be a clear relationship among those with emergent depression such that the emergence of depression affects reemployment rather than continued unemployment affecting depression. Two years following job loss, rates of reemployment did not significantly differ among the classes, while at four years following job loss individuals on the *emergent* trajectory were less likely to be reemployed than those on the *resilient* trajectory. If continued unemployment were driving depression, then one would expect to see a significant difference between rates of reemployment two-years following job loss, as individuals in the *emergent* trajectory were already endorsing symptoms of depression. The lack of a significant difference suggests that emergent depression negatively affected rates of reemployment rather than the converse. Further, evidence that age, gender, income, debt, or reason for job loss are not predictors of trajectory membership indicate that these effects are not unique to a particular socioeconomic class or due to the nature of unemployment.

The current findings provide evidence that unemployment may be causally related to the emergence of depression and that the emergence of depression may be causal to a reduced probability of reemployment. The potential psychological impact of unemployment may undoubtedly be grave. However, by identifying heterogeneous patterns of response rather than assuming population homogeneity, the current work suggests that the emergence of depression following job loss is a relatively rare phenomenon, and is potentially less likely to have a profound impact on economic recovery than once thought. Further, it is evident through the use of prospective data that roughly half of those individuals depressed following job loss were chronically depressed and were not affected by unemployment, thereby further reducing the broad economic impact of depression following job loss. Nonetheless, despite the fact that impact of job loss on mental health may not be as severe as once thought, the remediation of newly emergent depression among unemployed individuals is a pressing issue that deserves attention.

There were limitations to the current study. Depression was measured at two-year intervals, which precluded a fine-grained examination of changes in symptom levels between the points of measurement. As a result, it is possible that certain individuals experienced more fluctuation in depression than is characterized by their class trajectory. In addition, participants lost their jobs between the years of 1996 and 2006; since job loss did not occur in the same year for all participants, there may be some heterogeneity in the impact of the loss. Furthermore, previous work suggests that shifts in depressive symptomology following job loss are not likely linear (Galatzer-Levy et al., 2010). Observation of such patterns requires that the data fit non-

Table 4
Logistic regression of depression symptom trajectories on reemployment status two years and four years following job loss.

	Predictor	*b*	*SE b*	Wald	*p*	*df*	Exp *(B)*	95% confidence interval	odds ratio
2 years post-loss									
	Class[a]								
	Emergent	0.28	0.33	0.70	0.40	1	1.32	[0.69, 2.54]	0.76
	Chronic	0.60	0.36	2.79	0.10	1	1.82	[0.90, 3.67]	0.56
	Remitting	−0.08	0.35	0.06	0.81	1	0.92	[0.47, 1.81]	1.08
4 years post-loss									
	Class[a]								
	Emergent	1.12	0.36	9.64	0.002	1	3.05	[1.51, 6.16]	0.33
	Chronic	0.83	0.36	5.16	0.02	1	2.29	[1.12, 4.67]	0.44
	Remitting	0.09	0.36	0.06	0.81	1	1.09	[0.54, 2.20]	0.92

Note: The overall model for the analyses at 2 years post-loss was not significant, Wald=3.48 (p=0.32, df=3). The overall model for the analyses at 4 years post-loss was significant, Wald=14.23 (p=0.003, df=3).
[a] The resilient class was used as the reference class.

Table 5
Chi square analysis of employment status by class two years and four years following loss.

Class		Resilient	Remitting Dep.	Emergent Dep.	Chronic Dep.
Two years post-loss	% employed	60.5%	62.5%	53.7%	45.7%
	Adjusted residual	−1.2	−0.5	0.7	1.6
Four years post-loss	% employed	60.4%**	58.3%**	33.3%**	40.0%**
	Adjusted residual	−3.0**	−0.3**	3.0**	2.0**

** $p < 0.01$.

linear parameters, which was not the case in the current study. The fact that the data did not fit these parameters may be due to limitations in the dataset, which include relatively lengthy spacing between assessment points.

Despite these limitations, our results replicated and expanded upon previous findings that there are distinct, heterogeneous patterns of adjustment following job loss. The current work provides important evidence that prior estimates of the impact of unemployment on depression and subsequent large market effects may have been overestimated as resilience to job loss was the modal response pattern. Similarly, emergent depression and ongoing unemployment were observed in a small minority of the overall sample. Results do indicate, however, that remediating depression among the unemployed may indeed have broad economic consequences.

Declaration of interests

No conflicts of interest exist.

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