

On the Biopsychosocial Costs of Alienated Labor

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Abstract

Data from the national, longitudinal Mid-Life in the US (MIDUS) study were used to examine work alienation and its relationship to biological health as well as psychological and social functioning. The alienation measure focuses on the autonomy and creativity the work provides.

*This article is being published posthumously. Dr Melvin Seeman passed away at the age of 101 in January 2020, just before the publication of this article. His first published work – in the *American Sociological Review* – was in 1946, more than 70 years ago. This final publication bookends a long and distinguished career that, over many decades, and hundreds of articles, chapters, and lectures, played a key role in defining the empirical study of alienation.

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We hypothesized that alienated work would have negative associations with each of the three domains: in biology, higher ‘allostatic load’ (biological dysregulation); in psychology, poorer cognitive performance; and socially, negative impacts on family life. The outcomes are generally as predicted, though there are notable differences for men and women.

Keywords

alienation, allostatic load, biopsychosocial health, self-estrangement, work

Introduction

Work and Its Discontents was the title of a commentary by the respected sociologist and public intellectual Daniel Bell (1956), who examined the alienation and estrangement that characterized, he contended, the gulf between labor and personally meaningful activity. Work and its discontents has also been an enduring topic for analysts of varied persuasions and styles going back to early industrialization and Marx’s depiction of the worker’s powerlessness and disengagement in the workplace. The styles of address on this topic range from Studs Terkel’s (1974) in-depth interviews with working men and women, to programmatic summaries sponsored by governmental agencies (e.g. O’Toole, *Work in America*, 1973) to systematic multi-year and cross-national research focusing on the nature and consequences of work experience (e.g. the European Working Conditions Survey (EWCS), a quinquennial survey (starting in 1995) of representative samples of employees in 15 countries from within the European Union; Eurofound, 2007).

Among the finest examples of this programmatic work are the studies of the British civil service by Marmot’s group (as described in *The Status Syndrome* (2004)) emphasizing the significance of the lack of control at work, and the series of studies led by Kohn and Schooler (1983) (see also Kohn, 1990 and Schooler et al., 1999) on the ‘substantive complexity’ of work – meaning, essentially, the intellectual challenge and personal control experienced in the work process. This line of research has been followed up recently in other cross-national research (e.g. by Gow and colleagues (2014) and by Andel et al. (2019)), who found, in keeping with the Kohn studies, that workers involved in intellectually challenging occupations (as assessed by the workers themselves) scored higher in cognitive ability. Cross-national data from the EWCS have also documented a range of negative psychological and physical health outcomes that are associated with employment in jobs perceived to afford lower control or discretion in job performance and/or high job demands (Hakanen et al., 2019; Lorente et al., 2018; Nappo, 2019; Toch et al., 2014). Longitudinal EWCS data also point to trends in some occupations toward decreased job discretion and control (Green et al., 2013; Holman and Rafferty, 2018), as do similar data from the Skills and Employment Survey in Britain (Felstead et al., 2015: 16–21), suggesting potentially increased health risks for occupants of those jobs.

Two related bodies of research have focused on hypothesized health consequences of the ‘demand-vs-control’ job characteristics and their association with job strain (Karasek, 1979; Karasek and Theorell, 1990) and, more recently, effort–reward imbalance in work conditions – the latter an expansion of the demand/control model that incorporates consideration of job security, career development and salary issues along with consideration of extrinsic/situational stressors and intrinsic/persona coping aspects of the work

environment (Peter and Siegrist, 2000; Siegrist, 1996). Jobs characterized by greater job strain and/or effort/reward imbalance have been associated with increased health risks, including risks for major morbidity, such as diabetes and cardiovascular disease (Dragano et al., 2017; Kivimäki et al., 2018; Magnusson et al., 2019; Nordentoft et al., 2020; Peter and Siegrist, 2000). But job satisfaction and stressful working conditions are not necessarily the defining parameters of alienated work, though the lack of control, which has been tied to poor health and cognition (Lachman et al., 2011), certainly plays its part in the alienation scenario. One way to get at an alternative view of the matter is to see work alienation (as Marx did in his early manuscripts) as a form of depersonalized labor ‘with no personally self-expressive and self-developmental significance in the life of the worker who performs it’ (Schacht, 1994: 50) – in brief, engagement in activity that is not intrinsically rewarding and hence a form of self-estrangement (Seeman, 2001). As Jaeggi (2014: 12) remarks in a recent extended analysis of the concept of alienation: ‘we can identify two dimensions of the deficit in relation to self and world that Marx theorizes as alienation; first, the inability meaningfully to identify with what one does with those with whom one does it; second, the inability to exert control over what one does’.

Her view in this regard is entirely consistent with a social learning theory framework – a version of which, along with the evidence on its research utility, can be found in Reich and Infurna (2016); and likewise is consistent with the conceptual analysis of alienation (presentation by Seeman (1959) and in an up-dated version (2001)) on which the present work is based. See also Rotter et al. (1962) as an early statement of an interdisciplinary (psychology and sociology) research program on alienation-related studies. The current study sought to leverage a unique combination of data reflecting independent assessments of job alienation based on national experts other than the study participants along with objective health assessments that contrast with the vast majority of prior work based largely on self-reports. The current study also incorporates consideration of cognitive function along with work–family balance in relation to work alienation. We hypothesized, as modern reinforcement and socialization theories would suggest, that the alienation ‘deficit’ in self-fulfillment would have repercussions in each of our three domains of measurement (as described in detail below); thus:

1. With regard to the respondent’s health, we propose that the deficit of self-fulfillment in an arena as central as work will be associated with poorer (higher) scores on overall ‘allostatic load’ – a comprehensive clinically based measure of physiological status reflecting the wear and tear of daily activities. The ‘wear and tear’ could well be a function of stress-induced circumstances (as is proposed in the demand/control model, and by McEwen and Seeman, 1999), but it may also be a dynamic that is keenly attuned to issues of self-image and intrinsically rewarding work.
2. As suggested by Kohn and his colleagues, and by the recent evidence in Fisher et al. (2014), challenging and intrinsically rewarding work experience (i.e. unalienated labor) should be associated with superior cognitive ability. We predict a similar association, both for men and women, based on what is a straightforward reinforcement principle (workers learn the rewarding feature of maintaining and improving cognitive skills), and a more complicated ‘use it or lost it’ principle.

The latter argues that continued successful use of one's intellectual capacity serves to bolster the individual's reserves against cognitive decline (for competing evidence on the 'use it or lose it' phenomenon, see Rohwedder and Willis, 2010 and Salthouse, 2006).

3. In the social relations sphere, we predict that greater opportunity for self-fulfillment in work will carry over into more favorable relations in family life as revealed in indices of positive and/or negative 'spillover' from work experience to the family situation.

Two caveats are in order before turning to the measurement details. First, the systematic positives hypothesized here for unalienated labor should not be taken for granted since earlier work suggests that the evidence in that regard is both limited and not very persuasive (see, for example, Mirowsky and Ross, 2007 and Schnorpfel et al., 2003). Second, in addition to controlling for the usual background variables – for example, socioeconomic status, age, race – we need to pay special attention to (1) male–female differences (given the different work circumstances of women, both historically and contemporarily) and (2) the role of education in the analysis (given the inherent connection between education and the skills that make unalienated labor on the whole a more feasible alternative for workers).

Data and methods

We use data from an ongoing study of health and aging in mid-life in the United States (MIDUS), in conjunction with a newly developed occupational rating system provided by a revision of the US Department of Labor (see below for details). The MIDUS study was initiated in 1994–95, when a national sample of 7108 individuals was surveyed via telephone using random digit dialing (with additional provision for a mail survey and oversampling in five metropolitan areas). All participants were non-institutionalized English-speaking adults between the ages of 25 and 74 living in the US. The original cohort was resurveyed roughly nine years later; the longitudinal response rate at MIDUS 2, adjusted for mortality, was 75% (for additional details, see Radler and Ryff, 2010).

The present analysis focuses initially on a subset of individuals for whom O*NET data were available (i.e. those reporting being employed or having been employed and who provided job information) and who participated in a biomarker study at MIDUS 2 (N = 688). The latter were individuals who agreed to a 24-hour stay at one of three General Clinical Research Centers (Washington, DC; Los Angeles, CA; Madison, WI) between July 2004 and May 2009. The protocol for these visits included a physical exam, a 12-hour overnight urine sample and fasting morning blood draw (for further details, see Dienberg-Love et al., 2010). Those included in the current analyses were comparable to the larger MIDUS 2 sample on demographic and health characteristics, with the exception that they were somewhat younger and, not surprisingly given the requirement that O*NET data be available, were more likely to be currently employed and had slightly higher household income-to-poverty ratios (Table 1). Like the biological data, all interview data come from the MIDUS 2 data collection in 2004–2009.

Table 1. Descriptive statistics comparing the analysis sample with the main MIDUS sample and O*NET subset.

	MIDUS 2 sample		O*NET subsample		Biomarker (allostatic load) subsample	
	N = 4963		N = 3127		N = 688	
	% or mean (median; std)	N	% or mean (median; std)	N	% or mean (median; std)	N
Primary predictor						
Alienation	–	–	–0.014 (–1.2; 6.2)	2762	–0.64 (–2.2; 6.0)	611
Alienation items						
Independence	–	–	–0.0001 (0.2; 1.0)	2762	0.10 (0.4; 1.0)	611
Creativity	–	–	0.0001 (0.1; 1.0)	2762	0.12 (0.2; 1.0)	611
Autonomy	–	–	–0.0001 (0.2; 1.0)	2762	0.08 (0.5; 1.0)	611
Complex problem-solving	–	–	–0.0001 (0.1; 1.0)	3127	0.06 (0.11; 1.0)	688
Freedom to make decisions	–	–	–0.0003 (0.3; 1.0)	3008	0.06 (0.27; 0.95)	663
Thinking creatively	–	–	0.0001 (–0.1; 1.0)	3127	0.09 (0.13; 1.02)	688
Reasoning & decision-making	–	–	–0.0002 (0.1; 1.0)	3127	0.08 (0.18; 0.99)	688
Covariates						
Age	55.4 (55.0; 12.5)	4963	51.3 (50.0; 10.1)	3127***	52.1 (52.0; 10.0)	688***
Male	46.7%	4963	52.2%***	3127	49.8%	688
Race		4961		3125		687
White	89.8%		89.7%		91.6%	
Non-white	10.2%		10.3%		8.4%	
MIDUS P4 Site						
UCLA	–	–	–		41.1%	
University of Washington	–	–	–		32.4%	
Georgetown University	–	–	–		26.4%	
Marital status						
Married	70.7%	4957	73.0%	3121**	72.7%	686*
Divorced / widowed / separated	21.6%		18.3%		17.6%	
Never married	7.7		8.7		9.6%	

(Continued)

Table 1. (Continued)

	MIDUS 2 sample		O*NET subsample		Biomarker (allostatic load) subsample	
	N = 4963		N = 3127		N = 688	
	% or mean (median; std)	N	% or mean (median; std)	N	% or mean (median; std)	N
Education		4919		3099***		680***
≤ High school	32.8%		28.0%		21.6%	
Some college or Associate's degree	29.9%		30.6%		27.5%	
College degree or more	37.3%		41.4%		50.9%	
Income-to-poverty ratio	5.3 (4.3; 4.4)	3843	6.2 (5.1; 4.6)	2391***	6.3 (5.2; 4.6)	672***
Currently employed	64.5%	4940	94.3%	3127***	94.9%	688***
Outcomes						
Allostatic load	–	–	–	–	1.7 (1.6; 1.0)	688
Imputation flag for allostatic load	–	–	–	–	7.1%	688
Negative work–family spillover	10.1 (10.0; 2.8)	2730	10.2 (10.0; 2.7)	2294	10.3 (10.0; 2.7)	634
Positive work–family spillover	11.6 (12.0; 3.0)	2727	11.7 (12.0; 2.8)	2294	11.9 (12.0; 2.8)	634
Episodic memory	–	–	0.1 (–0.01; 1.0)	2609	0.2 (0.1; 0.89)	659
Executive function	–	–	0.3 (0.3; 0.9)	2373	0.4 (0.4; 0.8)	620

Notes: *Significant at $0.01 < p \leq 0.05$ level; **significant at $0.05 < p \leq 0.01$; ***significant at ≤ 0.001 . Compared to total MIDUS 2 sample (N = 4963).

Alienation in work

The measure of work alienation was not based, as is often the case, on the respondent's own subjective assessment of his or her work. We rely on the depiction of worker characteristics and requirements reported in the O*NET, which is an up-to-date revision of the US Dictionary of Occupational Titles (detailed information about the O*NET program is provided online at <https://www.onetcenter.org/overview.html>). The O*NET consists of objective ratings of a wide assortment of job characteristics, work contexts and occupational requirements associated with specific occupations. O*NET ratings are objective in the sense that they are derived using data from randomly selected job incumbents (not our study subjects) in each occupation, then summarized and vetted by occupational analysts to generate quantitative values for each assessed attribute (<http://www>.

onetcenter.org/dl_files/AnalystProcUpdate.pdf). A recent use of O*NET scoring in a study of cognitive function can be found in Fisher et al. (2014).

Each O*NET value is essentially a composite score reflecting input from other job incumbents, occupational experts and analysts. In this regard, O*NET scores roughly parallel the procedure that was employed in the study by Kohn and Schooler (1983) where the occupations were rated by a cadre of independent researchers so as to derive an index of the ‘substantive complexity’ of a given job.

In a similar way, the following seven job qualities were used to operationalize less alienating jobs that would typically provide engaging work activities as compared with more routine job performance. Our selected job qualities were identified based on a factor analysis of an initial set of 21 job characteristics harvested from the second cycle of O*NET (2004) based on Standard Occupational Classifications of study participants’ main occupation to ensure historical alignment with MIDUS 2 data collected in 2004. The job characteristic items selected included items thought to be indicative of intrinsic engagement in the actual work performed, as well as items that were initially seen (and tested in the factor analysis) as being peripheral to the fundamental concept of work alienation (e.g. items reflecting other ‘work qualities’ such as conflict at work, work pace, noise and time pressure). As hypothesized, items loading on a first rotated factor reflected theoretical aspects of work alienation including creativity, autonomy, reasoning, independence and complex decision-making (see the online appendix A for details of the factor analyses). Items included in our measure of work alienation were initially rated by the judges on a 100-point scale, with the definitions of each scale offered to raters as shown below (the scoring being reversed for our purposes so that a high score equals high alienation):

1. Independence: ‘Occupations that satisfy this work value allow employees to work on their own and make decisions’.
2. Creativity: ‘Workers on this job try out their own ideas’.
3. Autonomy: ‘Workers on this job plan their work with little supervision’.
4. Complex problem-solving: ‘Developed capacities are used to solve novel, ill-defined problems in complex, real-world settings’.
5. Reasoning, analyzing information and decision-making: ‘Analyzing information and evaluating results to choose the best solution and solve problems’.
6. Thinking creatively: ‘Developing, designing, or creating new applications, ideas, relationships, products, or systems, including artistic contributions’.
7. Freedom to make decisions: ‘How much decision-making freedom without supervision does the job offer?’.

Based on these item scores, we developed a summary index of the alienated or unalienated quality of the occupation in question with each positively worded item reflecting unalienated work. A total score was calculated by z-scoring each of the seven component items and then summing the z-scores. Those missing more than half the items (≥ 4) were assigned a missing score ($N = 365$, all of whom were missing three items: Independence, Creativity and Autonomy). There were $N = 119$ who were missing only ‘Freedom to make decisions’ – but for these, we imputed 0 (the z-score mean) when summing to

create the overall alienation score. The item scores were then reverse-coded to create the total alienation score, with *a higher score indicating greater alienation*. The alpha reliability for the seven-item scale was 0.95.

Biological measures

The biomarker substudy provided the information that allowed for examination of the extent to which alienated work may impact internal physiology as assessed by ‘allostatic load’, a summary index of multi-systems biological risks. Indices of allostatic load have been widely used in recent studies of the biological indicators of health risks (Juster et al., 2010). Consistent with previous work, the measure of allostatic load was designed to summarize dysregulation across multiple physiological systems.

The biomarkers were selected on theoretical grounds based chiefly on their known role as components of major regulatory systems. We thus provide evidence regarding the respondent’s physiology from a cumulative, multi-systems perspective using a model that has been demonstrated to be reliably measurable and consequential (e.g. see Karlamangla et al., 2014). The concept of allostatic load is that of an index of the wear and tear induced over time as the individual responds to alternating demands on the person’s resources.

The allostatic load score is composed of indicators of: (1) *cardiovascular functioning*, including resting systolic blood pressure, pulse pressure and resting pulse rate; (2) *sympathetic nervous system* activity, including overnight urinary measures of epinephrine and norepinephrine; (3) *parasympathetic nervous system*, including heart rate variability parameters: low-frequency spectral power, high-frequency spectral power, the standard deviation of R-R (heartbeat to heartbeat) intervals and the root mean square of successive differences; (4) *hypothalamic pituitary adrenal axis* activity, including an overnight urinary measure of the hormone cortisol and a serum measure of the hormone dehydroepiandrosterone sulphate; (5) *indicators of inflammation*, including plasma C-reactive protein, fibrinogen, and serum measures of interleukin-6 and the soluble adhesion molecules E-selectin and intracellular adhesion molecule-1; (6) *indicators of lipid/fat metabolism*, including high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, triglycerides, body mass index and waist–hip ratio; and finally (7) *measures of glucose metabolism*, including glycosylated hemoglobin, fasting glucose and the homeostasis model of insulin resistance.

The measure of allostatic load used here reflects an approach developed previously for use with MIDUS 2 data (Gruenewald et al., 2012). For each of the seven systems, a risk score was computed by calculating the proportion of individual biomarker indicators for which the participants’ values fell into the high-risk quartile ranges – an approach implemented to avoid giving greater weight to systems for which more parameters had been feasibly measured. ‘High-risk’ was defined as the upper or lower quartile of the biomarker distribution, depending on whether high or low values of the biomarker typically confer greater risk for poor health outcomes. System risk scores were continuous and could range from 0 to 1 (indicating 0–100% of system biomarkers in the high-risk range for the given participant). An allostatic load summary score was computed as the sum of the seven system risk scores (thus, a possible range from 0 to 7; Gruenewald et al., 2012). Allostatic load scores were computed for participants with information on at least six of the seven systems, and 90.5% of participants had data for all seven

systems. Alternative approaches to scoring allostatic load have also been developed by our group and others, and have been shown to yield nearly identical results to use of the index described here (Wiley et al., 2016).

In addition, we incorporated medication data into three systems: cardiovascular, glucose metabolism and lipid metabolism. Participants on relevant medications were scored as being in the high-risk quartile for those systems regardless of the measured biomarker values (i.e. anti-hypertensive medication = high-risk for systolic blood pressure; heart rate reducing medications = high-risk for resting heart rate; diabetes medications = high-risk for fasting glucose and glycosylated hemoglobin; use of statins, cholesterol absorption inhibitors, niacin and/or bile acid sequestrants = high-risk for LDL cholesterol; and use of fibrates = high-risk for serum triglycerides.)

The prediction that those who were engaged in more alienated work would exhibit higher allostatic load is consistent with earlier studies that have shown an association between higher allostatic load and perceived lack of personal control, subordinate status, or high stress at work (Hellhammer et al., 2004; Schnorpfeil et al., 2003; see also McEwen and Seeman, 1999), though none of these studies focused specifically on alienation in work.

Psychological measures

The major thrust of the Kohn/Schooler studies was that the substantive complexity of work had a significant positive effect on the cognitive flexibility of adult men. We predict a similar association, both for men and women; namely, that engagement in self-involving, unalienated work will be associated with more positive overall cognitive performance. Recent evidence documents biological grounds for the prediction regarding potential cognitive effects of work experience, showing that elements of allostatic load are associated with lower scores on episodic memory and executive function (Lachman et al., 2014).

The present data provide two cognitive measures for a test of the prediction that high scores on work alienation are associated with poorer cognitive performance, controlling for the relevant background variables. The cognitive measures were obtained through telephone interviews (conducted after a brief hearing check) using the Brief Test of Adult Cognition by Telephone (BTACTION) and the Stop and Go Switch Task (SGST), which are designed to capture key aspects of cognitive functioning and to be especially sensitive to aging-related changes (Lachman et al., 2014; a detailed description of the interview procedure is provided in Karlamangla et al., 2014). Two summary measures of cognition have been created in the relevant literature cited above from these data, based on exploratory and confirmatory factor analysis: an episodic memory measure (immediate and delayed word recall) and an executive function measure (focusing on verbal fluency, flexibility and speed of cognitive processing).

Family relations

We predicted, finally, that alienation in work would have unfavorable associations with an index of the positive and negative ‘spillover’ from work experience to family life. The

spillover from work to family was indexed by responses (all the time; most of the time; sometimes; rarely; or never) to four positive and four negative statements regarding such potential effects of work on family life, as follows:

On the positive side:

1. The things you do at work help you deal with personal and practical issues at home.
2. The things you do at work make you a more interesting person at home.
3. Having a good day on your job makes you a better companion when you get home.
4. The skills you use on your job are useful for things you have to do at home.

On the negative side of family spillover:

1. Your job reduces the effort you can give to activities at home.
2. Stress at work makes you irritable at home.
3. Your job makes you feel too tired to do the things that need attention at home.
4. Job worries or problems distract you when you are at home.

The alpha reliability for the positive spillover score was 0.74; and for the negative spillover, 0.84.

Covariates

Models included the following covariates: age at MIDUS 2, sex, marital status (married, divorced/widowed/separated, never married), ethnicity (white vs non-white), income-to-poverty ratio (household income relative to the US government-defined poverty level for a household of that size), education (less than high school, high school, college) and employment status (employed vs not currently employed).

Analysis. We initially examined bivariate correlations between work alienation and the biological, psychological and social measures. We then fit multi-variable, multi-level, mixed linear regression models to control for clustering within two non-hierarchical levels: families (since MIDUS participants include siblings) and job classifications. There are 209 unique job classifications represented in the MIDUS sample and no one classification had more than 45 MIDUS participants. Regression models were fit separately for the various outcomes of interest, including allostatic load, measures of cognition (episodic memory and executive function), and positive or negative work–family spillover. These models were adjusted for age, race (non-white vs white), male (vs female), income-to-poverty ratio and marital status (currently married, divorced/widowed/separated vs never married). Models for allostatic load were additionally adjusted for a flag indicating whether or not one of the allostatic load subscales was imputed. Models were repeated, adjusting for education in light of known relationships between education and eligibility for higher vs lower status jobs and the related differences in jobs' alienation

Table 2. Intercorrelations of work alienation and major dependent variables for the total MIDUS sample, and for the clinically based allostatic load sample.

Variable	Alienation	Allostatic load	Executive function	Episodic memory	Negative family effect
1. Alienation	–				
2. Allostatic load	0.09	–			
3. Executive function	-0.26	-0.28	–		
4. Episodic memory	-0.11	-0.20	0.34	–	
5. Negative family effect	-0.09	-0.09	0.08	0.04	–
6. Positive family effect	-0.13	0.01	-0.00	0.05	0.03

Notes: The N's vary from cell to cell, being smallest in the case of the clinically based sample that produced the allostatic load score ($N = c. 650$). The remainder of the N's are based on questionnaire and telephone samples ($N = 2000+$). Since the N's vary rather widely, the significance of the R's do as well. Thus, for example, the r of -0.09 for the relation between alienation and negative family spillover is significant at the 0.001 level, but the r of 0.09 between allostatic load and alienation is significant ($p = 0.03$). Since the N's are basically consistent, however, across rows and columns (in the 600 range for allostatic load; and in the 2500 range for the larger sample), we have omitted the specific N's and significance levels in the interest of space and legibility. **Bold** items are significant at $p < 0.05$.

characteristics. We also examine models adjusting for current employment (yes/no), examining the question of whether job alienation characteristics were differentially associated with outcomes for those not reporting current employment. We found no interactions between our measures of alienation and current employment status; models reported here include only the main effect term for employment. Since gender is frequently associated with substantively different occupations in a distinctly sex-based work culture and history, we also examined regression models for major outcomes by gender. Since the clinic-based physiological data were derived from three different national sites, we used site as a control in regressions to assess whether there were significant differences based on site; none were found.

Results

As Table 1 illustrates, the average age of our sample was 52.1 years. The MIDUS sample is largely white (91.6%) and 49.8% male, with a large majority being married (72.7%). There is reasonable diversity with respect to educational attainment (21.6% high school or less, 27.5% some college or Associate's degree, and 50.9% college degree or more). Scores for alienation, its components and our major outcomes (allostatic load and cognitive function) all show reasonably normal distributions (skewness < 1 in all cases), with a slight skew toward higher scores for positive work to family spillover.

Table 2 presents the intercorrelation matrix showing the relationship of the alienation score with dependent variables in the three domains (the biological, psychological and social measures), as well as the associations among the latter (see the online appendix for intercorrelations for all variables in the analyses). For the most part, the correlations are rather low and in the expected direction (with the N's varying as noted).

Biological correlates of alienation in work

Allostatic load was the key measure in the biological domain, serving as a comprehensive index of the person's physiological status. We expected that those with the higher total alienation scores would exhibit higher scores on allostatic load, reflecting the physiological and social psychological toll that low autonomy and routinized work might exact in the daily performance of relatively unfulfilling tasks.

Table 3 presents the relevant allostatic load comparisons via regressions that take direct account at the outset of two background factors that commend themselves as potentially powerful determinants of work effects: namely, the differences between men and women, and the differences in educational background. With regard to sex, we know that there are very different work circumstances and expectations for men and women, with likely complications for work outcomes; and education clearly involves a co-linearity with job type that could, at least to a certain degree, be said to basically define the skills that are needed to perform unalienated work. Thus, it seemed wise to view the results both with and without education in the equation. Table 3 shows the outcomes for men and women independently, as well as showing regression outcomes with and without earlier education in the equation.

The results regarding allostatic load exhibited in Table 3 are reasonably clear, despite the complications and provisos expressed above. First, for the women, work alienation is not significantly associated with allostatic load whether or not education is included in the regression (columns 1 and 3 in Table 3). For the men, the story is rather different: the association between allostatic load and work alienation is significant when education is not included in the regression (the estimate is 0.026, significant at the 0.02 level); though, when education is included in the equation for the men, the resulting estimate (as expected) is reduced to marginal significance (one-tailed test; $p = 0.09$).

We also examined the relation between allostatic load and each of the individual work qualities embodied in the work alienation index (e.g. autonomy at work, or the complexity of it, etc.). That analysis by each work quality again revealed no significant associations for women (see the online appendix for details). For men, however, those in jobs low in independence, creativity, autonomy and freedom to make decisions had significantly higher allostatic load without adjustment for education; with adjustment for education, independence remains significant, and creativity and autonomy remain marginally significant (see the online appendix for details). For men, there is, it would seem, some physiological 'price' to pay for the alienated quality of work, a price that is here independent of important background factors (e.g. age and income). As indicated earlier, educational background is on the trickier side, partly because it is presumably education that helps to provide the skills that make it possible for workers to perform the autonomous and substantively complex work that is involved in unalienated labor, hence there is a danger of over-controlling in the analysis by removing earlier educational preparation. There is the further point that if education is important for the men, it does not appear to be so for the women for whom the differences in alienated labor are relatively insignificant in connection with allostatic load.

Table 3. Regression outcomes, by sex (with and without educational background in the equation), showing the association of allostatic load scores with work alienation (and background controls).

Alienation and background variables	Without education		With education	
	Female (N = 308)	Male (N = 287)	Female (N = 304)	Male (N = 284)
Alienation	0.004 (0.010)	0.026 (0.011)*	0.001 (0.011)	0.019 (0.011) [~]
Age	0.041 (0.006)***	0.036 (0.006)***	0.040 (0.006)***	0.036 (0.006)***
Race (non-white vs white)	0.182 (0.195)	0.117 (0.223)	0.182 (0.194)	0.193 (0.225)
Income-to-poverty ratio	-0.017 (0.014)	0.018 (0.014)	-0.014 (0.014)	0.024 (0.014) [~]
Married	-0.032 (0.198)	-0.295 (0.187)	-0.056 (0.200)	-0.281 (0.185)
Divorced, widowed, separated	-0.178 (0.220)	-0.310 (0.228)	-0.220 (0.222)	-0.309 (0.226)
Education				
≤ high school vs coll. +	-	-	0.145 (0.162)	0.374 (0.156)*
some coll. vs coll. +	-	-	0.139 (0.150)	0.360 (0.135)**
UCLA (vs Georgetown)	0.054 (0.146)	0.217 (0.142)	0.044 (0.148)	0.202 (0.144)
Uni of Washington (vs Georgetown)	-0.006 (0.153)	0.282 (0.151) [~]	-0.026 (0.154)	0.255 (0.150) [~]
Imputation flag for allostatic load	0.580 (0.230)*	0.447 (0.200)*	0.566 (0.230)*	0.357 (0.202) [~]
Currently employed	0.078 (0.229)	-0.283 (0.299)	0.080 (0.235)	-0.292 (0.296)
Model fit statistics:				
Random effect variance (p-value)	0.336 (0.02)	0.596 (< 0.0001)	0.334 (0.02)	0.565 (< 0.0001)
Family	0.031 (0.3)	0.119 (0.05)	0.053 (0.2)	0.085 (0.1)
Occupation				
Pseudo-R ²	0.47	0.82	0.48	0.79

Notes: [~]Significant at 0.05 < p < 0.10; *significant at 0.01 < p ≤ 0.05 level; **significant at 0.05 < p ≤ 0.01; ***significant at ≤ 0.001.

Cognitive outcomes

A primary interest in the psychological domain concerned the potential cognitive implications of alienated work experience, taking our cue in good part from the work of Kohn and his colleagues who have documented the cognitive flexibility they find to be associated with the performance of substantively complex work. Their studies, in their own way, mirror our interest in objectively described alienated working conditions as they connect beyond the work-life itself. Our cognitive measures of executive function and episodic memory are significantly associated with the alienation scores, both for men and for women, as shown in Table 4 (the N's in this case being considerably larger since it is not the clinic-based allostatic load data that are at issue). We note that a control for the respondent's education is again included, on the assumption that level of education is on its face presumably a significant determinant of cognitive performance. With or without the control for education, we find that the total score for alienated work is significantly associated with lower scores on both executive function and episodic memory. Age and non-white status, also included in the model, are significant in the expected negative way; but income and marital status are not.

Family relations

Given that our view of work alienation emphasizes low intrinsic satisfaction in work, we expected that such lack of engagement and personal fulfillment would extend its reach well beyond the workplace and would be reflected in what has been called 'work-to-family spillover' (Grzywacz et al., 2002). As noted earlier, the spillover could be positive, and hypothetically associated with low work alienation (e.g. 'the things you do at work make you a more interesting person at home'), or they could be negative and associated with alienated labor (as in, 'your job reduces the effort you can give to activities at home').

We examined these alternatives by way of regression analyses for both the total sample and independently for men and for women, with the customary controls for background factors, including a control for educational level. Results for the alienation score are presented for the men and women in Table 5. They show that neither of our hypotheses, regarding both the positive and the negative spillover of work alienation to family life, works out quite as we anticipated and the results are different for the men and the women. For the men, high work alienation scores are (as expected) significantly associated with low positive spillover, but, contrary to prediction, there is no connection of work alienation with negative spillover. For the women, *low* negative spillover is associated with *greater* work alienation, again a surprise; and there is no significant tie with positive spillover. These results are difficult to interpret but they are not unique. Grzywacz et al. (2002) report similar findings contradicting their hypotheses regarding spillover, noting, for example, that 'less, rather than more, education was associated with less negative spillover from work to family'. Education is clearly playing an especially important role in our own case as far as the women are concerned: note, for example, the significant negative coefficients relating to education and positive spillover for the women. Thus, as in the case of Grzywacz et al. (2002), higher education among women is associated with lower positive spillover from work to family.

Table 4. Regression coefficients for correlates of alienation (and background controls, including education) with cognitive measures of executive function and episodic memory for males and females (total MIDUS sample).

	Executive function		Episodic memory	
	Female (N = 921)	Male (N = 857)	Female (N = 1032)	Male (N=913)
Alienation	Regression coefficient (standard error)			
	-0.015 (0.005)**	-0.011 (0.005)*	-0.012 (0.005)*	-0.014 (0.006)*
Age	-0.023 (0.003)***	-0.024 (0.003)***	-0.017 (0.003)***	-0.020 (0.003)***
Race (non-white vs white)	-0.581 (0.090)***	-0.263 (0.110)*	-0.251 (0.107)*	-0.207 (0.112)~
Income-to-poverty ratio	0.008 (0.006)~	0.004 (0.006)	0.004 (0.007)	-0.002 (0.007)
Married vs never married	-0.078 (0.086)	0.083 (0.099)	-0.050 (0.103)	-0.083 (0.106)
Divorced, widowed, separated vs never married	-0.186 (0.095)*	0.038 (0.124)	-0.020 (0.114)	0.013 (0.131)
Education				
≤ high school vs coll. +	-0.481 (0.068)***	-0.789 (0.076)***	-0.308 (0.080)***	-0.416 (0.079)***
some coll. vs coll. +	-0.284 (0.061)***	-0.408 (0.071)***	-0.083 (0.074)	-0.192 (0.075)*
Currently employed	-0.148 (0.098)	0.300 (0.119)*	-0.089 (0.116)	-0.095 (0.126)
Model fit statistics:				
Random effect variance (p-value)	0.188 (< 0.0001)	0.181 (0.003)	0.282 (< 0.0001)	0
Family	0.023 (0.03)	0.009 (0.2)	0	0.013 (0.2)
Occupation	0.56	0.48	0.37	0.13
Pseudo-R ²				

Notes: ~Significant at 0.05 < p < 0.10; *significant at 0.01 < p ≤ 0.05 level; **significant at 0.05 < p ≤ 0.01; ***significant at ≤ 0.001.

Table 5. Regression coefficients for alienation (and background controls, including education) with measures of positive and negative work-family spillover (for males and females).

Alienation and background variables	Positive work-family spillover		Negative work-family spillover	
	Female (N = 1031)	Male (N = 926)	Female (N = 1031)	Male (N = 926)
Alienation	Regression coefficient (standard error)			
Age	-0.023 (0.020)	-0.062 (0.020)**	-0.041 (0.018)*	-0.007 (0.016)
Race (non-white vs white)	0.020 (0.009)*	0.013 (0.010)	-0.055 (0.010)***	-0.060 (0.009)***
Income-to-poverty ratio	-0.903 (0.302)**	0.207 (0.361)	-0.468 (0.310)	-0.705 (0.335)*
Married vs never married	0.001 (0.023)	0.039 (0.021)~	0.030 (0.023)	-0.010 (0.020)
Divorced, widowed, separated vs never married	0.509 (0.308)~	0.497 (0.327)	-0.568 (0.314)~	0.496 (0.308)
Education	0.234 (0.337)	0.375 (0.400)	-0.323 (0.345)	0.036 (0.377)
≤ high school vs coll. +	-1.269 (0.252)***	-0.359 (0.257)	-0.119 (0.252)	0.149 (0.229)
some coll. vs coll. +	-0.338 (0.228)	-0.188 (0.237)	-0.204 (0.228)	-0.304 (0.214)
Currently employed	1.106 (0.440)*	0.136 (0.432)	0.369 (0.449)	1.206 (0.409)**
Model fit statistics:				
Random effect variance (p-value)	0.142 (0.4)	1.948 (0.003)	0.179 (0.4)	0
Family	0.883 (0.005)	0.546 (0.009)	0.241 (0.08)	0
Occupation	0.15	0.35	0.10	0.07
Pseudo-R ²				

Notes: ~Significant at 0.05 < p < 0.10; *significant at 0.01 < p ≤ 0.05 level; **significant at 0.05 < p ≤ 0.01; ***significant at ≤ 0.001.

In sum, alienation in work is pertinent for family life in that, for men, high alienation is associated (as expected) with lower positive spillover; but for women, it is associated with lower negative spillover. The lower negative spillover associated with high alienation is something of a surprise; the basis for it, as well as its inherent significance (commented on below), remains to be established – in good part because (as Ross and Wright, 1998, point out) the bulk of the literature on work effects does not directly compare men's and women's work. At a minimum, the results are a reminder that the coherence of 'good outcomes' from unalienated labor is not to be taken for granted, since education, and the special circumstances of male versus female participation in the work force, also appear to play a role in steering the outcomes in question.

Our data certainly reinforce the view that the alienation variable as it bears on spillover is different for the men and the women. An examination of our distribution of job classifications for women and for men suggests one possible basis for these results. In this sample, as seems likely to be the case more generally, the women are concentrated not in the elite category of 'executive, administrative and managerial' positions, but in the 'professional specialty' and 'technical and related support' categories (i.e. in the lesser ranks of the white-collar world). That concentration, coupled with the on-going home-related burdens that often still characterize the working world for women, offer a potential explanation for the women's negatives depicted in Table 5. It would appear that, for the women, the greater demands of their relatively unalienated work coupled with generally lower job status plus possible continuing home-centered duties are translated into more negative spillover effects in family life. The same pattern does not hold for the men, where indeed the positive spillover scores are associated, as expected, with low alienation – with work that involves high autonomy and complex engagement.

Conclusion

We have explored the associations between work experience and measures that tap three domains of potential consequence bearing on the person's biological, psychological and social life. We did so through the lens of alienation conceived in terms of social learning theory as explicated in detail a good many years ago (Seeman, 1959). That work reviews the several dimensions of alienation deriving from the work of classical sociologists (e.g. Durkheim, Simmel, Max Weber and Marx, of course) – dimensions of alienation that have also been successfully implemented in empirical work in a variety of important domains in relation to health outcomes, political protest, learning in schools and correctional institutions, and the like. As noted earlier, however, to date, work on alienation has largely focused on relationships to self-reported psychological and physical health. There has been relatively little work examining relationships between work alienation and objectively measured biological or cognitive outcomes, or a focus on relationships to dimensions of work–family balance. The present work sought to document and encourage the view that research on work alienation can be enhanced by expanding the focus to include a broader set of correlates from the biological, psychological and social domains. Alienated labor is thus conceived, in keeping with the basic Marxian view, as a form of self-estrangement, where one's activity is effectively externalized with little possibility of self-expression or personal fulfillment through work. As noted earlier, others

have dealt with very similar issues; for example, Marmot (2004) stresses the significance of the sense of control at work in determining health consequences (in our case, a comparable component is the 'autonomy' that the work allows); and for Kohn (1990) and Fisher et al. (2014) the focus is on the greater cognitive flexibility that is encouraged by the 'substantive complexity' or 'mental work demands' of the occupation (captured in our alienation index by the work's 'complexity' and 'reasoning' requirements).

Our results are consistent with (and, we would argue, more comprehensive than) earlier reports. Using a nationally representative sample and a clinically based medical examination, along with well-tested interview and work analysis measures, we have been able to show that work alienation exhibits its 'effect' in all three of the biopsychosocial domains. For example:

1. In the biological realm, higher allostatic load – an index of physiological dysregulation that portends downstream morbidity – is modestly but consistently associated with high alienation in work. That is true only for the men, and we find similar male–female distinctions (see below) which argue for the need to keep in view the unique circumstances that still surround women's engagement in the labor force (particularly, perhaps, at the relatively higher ranks).
2. In terms of psychological effects, work alienation is associated with poorer performance on cognitive indices of 'executive function' and 'episodic memory'. Again, however, there are differences in the results for men and for women: the unalienated women showing significantly better cognitive performance than the men with respect to memory; and the men better performance on executive function – with both of these being significantly related to work alienation. It is not clear why this sex difference should be so, but it is certainly not surprising that women would differ from men with respect to 'work and its discontents'. Women have had, and still have, different work histories, circumstances and expectations; and these are likely to affect their work experience and its outcomes. More attention to such differences is certainly in order.
3. Where social relations are concerned, the findings concern work-to-family 'spillover' – meaning, the perceived positive or negative influence of work experience on family life. We hypothesized that the experience of engaging (unalienated) work would translate into more positive and less negative 'spillover' into family affairs. But, as noted above, things are more complicated than that – especially, again, for the women, where we find that favorable (low) alienation scores are associated with relatively high negatives on the spillover from work to family. Pending further work in this arena, we interpreted these findings in light of the clear differences between men and women (both in our sample, and more generally) in the specific lower ranking occupations that even the better-located women inhabit and their overall more encumbered circumstances with regard to work and family duties.

Beyond these specific findings, and the lessons they may hold for efforts to improve the workplace (e.g. by advancing opportunities for greater autonomy, or by paying attention to opportunities for more creative engagement by workers), we believe that the

alienation perspective allows for a richer view of work experience, as well as encouraging (as in our tripartite biopsychosocial division) a broader vision of the potential social and psychological consequences of work experience. New research also speaks to the question of how we can better ‘disalienate’ work as a means of reducing many of the negative health consequences of alienated work (Kociatkiewicz et al., 2020). As Kociatkiewicz and colleagues discuss and illustrate with two examples of more collective work structures, there:

are ways to arrange work which enhance perceptions of agency and meaning, which we regard as evidence of disalienation (which is itself) a purposeful process, based on principles of workplace democracy and held together as a result of continual labours. It is not a state which, once achieved, can be assumed, but an orientation to work and organize which requires continual cultivation and effort. (Kociatkiewicz et al., 2020: 20)

Before concluding, there are several limitations to the current work that should be acknowledged. First, there is the question of causal inference. We speak, in the previous sentence, of the ‘consequences’ of work experience, and the title of this work focuses on the ‘costs’ of alienated labor, both of which clearly imply that the character of the work causes the outcomes in question. Though we do believe that, at least in important degree, the causal imputation is a correct one, we cannot document it with the present data; and, it is certainly likely that the ‘reciprocal effects’ view adopted by Kohn and by Schooler, on the basis of longitudinal studies, is the most reasonable one. It holds that the respondent’s prior cognitive flexibility and competence are part of the set of abilities that lead to achieving and succeeding in substantively complex work; hence, the association is present at the outset, but at the same time the job experience itself (doing complex autonomous work) is likely to increase the level of intellectual functioning of the worker.

Second, there is the issue of using objective versus respondent-based measures of alienation. The issue is a long-standing one, especially in the Marxist literature where the insistence is that Marx’s version of alienation had reference not to the social psychology of the respondent (who may or may not have a veridical view of his or her own circumstances, there being plenty of room for ‘false consciousness’), but to the objective conditions of powerlessness and loss of self-realization in the workplace. But the issue arises irrespective of whether one uses the concept of alienation or not, as is evident in the report of Andel et al. (2011), which used both self-reported and occupation-based measures of job control to test their association with cognitive performance, finding that low scores for job control on both measures were associated with poorer cognitive performance (see also Marquie et al., 2010). The Kohn and Schooler studies used measures of substantive complexity that were independent of the respondent’s view of the matter (as we do here), and there are obvious advantages (as well as disadvantages) in that procedure – the most important advantage being that keeping the independent variables (job characteristics) and dependent variables (e.g. family spillover or psychological well-being) at a distance to their source can minimize instrument contamination.

Though much remains to be done – for example, regarding the correlation between subjective and objective measures of work experience and the relative, independent contributions of each; confirming the reach of alienated labor in affecting the workers’

lifestyle and health for both men and women; and clarifying the causal chain, as well as the choices regarding appropriate theory – the strengths of the present work reside chiefly in the fact that it is based on a national sample; uses appropriate and tested clinical measures for the physiological and social psychological outcomes; uses independently derived measures of the alienation variable and the dependent variables; and opens up for empirical review a broader perspective of research bearing on the alienative potential of a central aspect of the life course – namely, work experience.

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Supplementary material

The supplementary material is available online with the article.

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