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THE EFFECTS OF TEENAGE WORK QUALITY ON DELINQUENCY

A Thesis in

Criminology

by

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ABSTRACT

Studies of the potential risks and benefits of youth employment in the past have focused on the average hours of work involvement, largely ignoring whether job quality matters. However, research focusing on youth work shows substantial variability in the quality of these early work experiences, such as rate of pay, length of employment, job satisfaction, supervisor age, and learning opportunities. Yet much of the research on youth employment typically uses hours worked as the main predictive variable, finding that youth who work moderate hours (i.e., average 20 or less hours per week) are less likely to be delinquent than those who work intensive hours (i.e., average more than 20 hours a week) or who do not work at all. Little research has examined how the quality of youth employment influences delinquency, and scholars have not yet modeled these relationships using analyses of within-person change to more fully address issues of spuriousness and selection.

The purpose of this study is to extend research on youth employment by examining the effects of the quality of work on juvenile delinquency. I extend prior research in four ways: First, using longitudinal data from the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97), I estimate both random and fixed effects models to assess whether changes in employment status and work intensity impact changes in delinquency during adolescence. Secondly, borrowing from criminological theory and past research, I assess whether changes in job duration, supervisor age, job satisfaction and rate of pay predict changes in delinquency among those youth who are employed. Little research has examined the quality of youth work and that which does exist has not utilized random and fixed effects modeling to test work quality effects. Further, many of these studies of quality are based on small or non-representative samples whereas the NLSY97 is large and nationally representative, allowing for testing of subgroup differences. Third, building on prior research, I consider whether the effect of work

quality on delinquency is moderated by family socioeconomic background. In particular, I estimate the relationship between work experience measures and delinquency in separate models for low parental education youth and high parental education youth, and then compare the equality of these estimates. Finally, again building upon prior research, I consider whether school performance mediates the effect of work quality on delinquency.

Results show that higher hourly pay, higher job satisfaction and older supervisors significantly reduce levels of delinquency. However, once controls for unobserved time-stable characteristics are controlled for in the fixed effects models, these relationships largely disappear, with supervisor age retaining marginal significance. The effect of supervisor age is partially moderated by parental education level, indicating that youth with parents with low levels of education are less delinquent when working for older supervisors. GPA was not found to mediate the relationships between the work experience measures and delinquency. Overall, the results suggest that work is unlikely to act as a turning point for most youth already engaged in delinquency. However, for disadvantaged youth, working in jobs with older supervisors may provide additional informal social control which works to reduce levels of delinquency.

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INTRODUCTION

Research on youth employment has found evidence of both positive and negative effects on youth achievement and delinquency, depending on the amount of time spent at work. For instance, when youth average only moderate hours at work (i.e., 20 hours or less during the school year), employment has been found to have a positive effect on academic achievement (D'Amico 1984; Mroz and Savage 2006; Staff and Mortimer 2007). Several studies have also found that youth who are able to balance both school and work activities during the majority of the high school years are more likely to earn a BA/BS degree, compared to youth who work intensively or not at all (Mortimer 2003). This combination of moderate work hours during the school year is especially advantageous to the long-term educational attainment of youth with lower educational promise (i.e., low grades and aspirations in the 9th grade) or those coming from low socioeconomic backgrounds (Mortimer 2003; Staff and Mortimer 2007; 2008). However, those who work intensively during the school year (i.e., averaging more than 20 hours per week) are less likely to be engaged in school, have lower grade point averages and educational expectations, and are more likely to be delinquent, engage in substance use, and get in trouble with the police (Bachman and Schulenburg 1993; Steinberg, Fegley, and Dornbusch 1993; Mortimer et al. 1996; Wright et al. 1997; Schoenhals et al. 1998; McMorris and Uggen 2000; Paternoster et al. 2003; Marsh and Kleitman 2005; Apel et al. 2007, 2008; Monahan, Lee, and Steinberg 2011). Taken together, past research has led to the general consensus that youth employment is typically only harmful when hours increase beyond a moderate level. When hours are limited, therefore allowing youth to more easily balance the demands of work and school, negative effects disappear and in some cases moderate hours of work can be beneficial.

The vast majority of prior research on youth employment defines work in rather simplistic terms, typically by focusing on the effects of hours worked during the school year on delinquency and school performance. As noted previously, youth work is typically measured as hours worked, with a distinction between moderate and intensive hours worked during the school year. This is primarily due to data limitations (i.e., most studies do not ask detailed questions about the quality of work) as well as the common assumption that most youth jobs are low quality (but see Mortimer 2003 and Hirschman and Voloshin 2007 who show substantial variability in the quality of youth jobs). Despite more comprehensive datasets with intricate measures of employment, such as the NLSY97 or the Youth Development Study, studies often do not deviate from using the simplistic “hours worked” measure to assess the relationship between youth employment and adjustment.

Theoretically, there are reasons why various quality measures of youth work should be important for delinquency outcomes. Specifically, Sampson and Laub’s (1993) age-graded social control model suggests that different institutions provide social control throughout the life course which inhibit criminal behavior. According to Sampson and Laub, these institutions are parents and school in adolescence and then work and marriage during the transition to adulthood. However, just having a connection to these institutions is not enough to prevent criminal behavior; the bonds must be of high quality as well. For example, a strong child-parent bond is developed through consistent discipline, supervision, emotional attention given to the child, and the child feeling an emotional bond toward one or both parents. In adulthood, a bond with work arises from employment characterized with obligations, expectations, and interdependent social networks (Sampson and Laub 1993). Though employment is considered an important institution of social control in adulthood, it is consistent with the theory that working in a “high quality” job

during high school could potentially provide a meaningful source of social control. This may especially be true for youth who have weak attachments to parents and school. Alternatively, a low quality job could provide little source of attachment and perhaps weaken attachments to parents and/or school. Sampson and Laub stress the importance of the quality of the work in forming the attachment in adulthood, and so for a similar attachment to form in adolescence, the quality of work should also matter. I develop this theoretical argument more fully in the subsequent section.

I use data from the 1997 National Longitudinal Survey of Youth (NLSY97) to examine the relationship between employment and delinquency among youth in high school. The NLSY97 is a nationally representative longitudinal study that is designed to document the transition from school to work. Because of this focus, an extensive set of questions about employment and delinquency are asked each year, making it ideal to study work quality and the effects of changes over time in quality. To more fully address selection factors related to both work and crime, I use random and fixed effects models to assess within-individual changes in hours worked, duration (weeks worked), supervisor age, pay rate and job satisfaction for high school aged students and the effects these changes have on delinquency. Additionally, the moderating influence of socioeconomic status and the mediating influence of GPA on the relationships between these work experience measures and delinquency are evaluated. Past research has shown that youth from disadvantaged backgrounds benefit more from work, even when that work is intensive, and have less negative school and delinquency outcomes (Mortimer 2003; Staff and Mortimer 2007; 2008). Potentially, more disadvantaged youth may value employment more than their peers. Therefore different levels of SES may impact the relationship between work quality measures and delinquency in different ways. Due to the extensive research

identifying an association between work and educational outcomes, it is possible the effect of work quality on delinquency may be partially or fully operating through GPA. If involvement in certain types of work lowers grades, then lower grades may weaken the social control of the school, making engagement in delinquency more likely. Conversely, if involvement in work has no effect or raises GPA, then the social control of the school remains intact or becomes stronger, reducing the likelihood of delinquency.

In the following sections, I first outline the competing theoretical arguments behind youth employment research, followed by a review of the prior literature which has examined the general effects of youth employment on delinquency, substance use, and academic achievement. I then review key studies which have addressed how the quality of youth work is related to achievement and adjustment, specifically those including measures of supervisor age, job satisfaction and rate of pay. Next, I provide a description of the data, measures, and analytic strategy. I then present the results and conclude with a discussion of the implications and study limitations.

THEORETICAL ARGUMENTS

While there are several theoretical explanations for why the relationship between work in adolescence and delinquency could be positive, negative or null, Sampson and Laub's theory of age-graded social control drives the theoretical framework of this study. According to Sampson and Laub, attachments to various institutions, which change throughout an individual's life, provide social control and inhibit criminal behavior. In adolescence, parents and the school act as the primary institutions of informal social control. As young people transition to adulthood, the institutions that provide informal social control shift to employment and intimate partnerships.

For youth involved in work during adolescence, the parental and school attachments may weaken as the attachment to employment increases. This shift could have both positive and negative effects on delinquency. For instance, youth involved in low quality work that provide little in mentorship or transferable skills are likely to have higher levels of delinquency. In addition, youth unsatisfied with work, who are working for younger supervisors or paid low wages may not form any kind of attachment to their work. Therefore, while the act of working decreases the attachment to parents and school, no attachment is formed with work; resulting in weak work related social control. Employment could also provide youth with “premature affluence” as they are able to gain money to be used for discretionary purposes. The money from work may then instill a sense of economic independence leading to a too rapid movement into adult-like roles (Bachman 1983). Moving into these adult-like roles could further diminish the attachment to parents and school, which in turn would weaken the effects of informal social control (Hirschi 1969; Staff and Uggen 2003).

Conversely, involvement in work could be beneficial (i.e., delinquency reducing) for youth involved in high quality work, especially for youth who are not as invested in school. Higher quality work experience can improve facets of work readiness, such as time management, relating and working with others, and punctuality (Mortimer 2003). Research shows that teenagers who report that their jobs provide opportunities to learn new job-related skills show lower rates of deviance, substance use, and arrest in adolescence (Staff and Uggen 2003). Youth with older supervisors, who are more satisfied with work, who are paid well and who remain in the same job for an extended period of time are more likely to form an attachment to work, therefore creating a possible important source of informal social control.

While Sampson and Laub only discuss work as an institution of social control for adults in their age-graded theory, it is likely that it could operate in the same way for youth when the work is of high quality. In their theory, Sampson and Laub emphasize that the mere existence of a bond does not inhibit criminal activity, but that the bond must also be of high quality:

Similarly, employment alone does not increase social control. It is employment coupled with job stability, job commitment, and mutual ties to work (that is, employee-employer interdependence) that should increase social control and, all else being equal, lead to a reduction in criminal and deviant behavior. (1993: 140).

The remainder of their explanation and test of their theory uses the term “job stability” to refer to all three (stability, commitment, mutual ties) of the features important to the formation of social control quoted above. Job stability is operationalized as a composite scale of employment status, employment stability (duration), and work habits which ranges from poor to good where poor work habits are characterized by unreliable performance and little effort and good work habits are characterized by reliable performance and where the individual is considered an asset by the employer. It would follow that if work were to operate as an institution of social control for youth as well, then the quality of work would theoretically also matter in the formation of a bond strong enough to influence problem behaviors. In certain situations, engagement in high quality work may be important as a substitute for the social control which should come from parents and school. For example, youth who feel as though their educational prospects are limited and therefore would lack school as an institution of social control. Youth less invested in school are more likely to be drawn to work, creating the potential for employment to replace school as an institution of social control.

However, both the theoretical explanations for why work would have a positive or negative effect on delinquency depending on the quality are subject to selection issues.

According to self-control theory, for instance, youth with low self-control should be attracted most towards employment as it provides immediate rewards (i.e. pay, satisfaction), whereas the rewards from education are much more long term (Gottfredson and Hirschi 1990). Due to high levels of impulsiveness, these youth are most likely those who move quickly from one job to the next, regardless of the quality of the work, as opposed to those who stay with the same job for a longer duration. Low self-control youth are also more likely to participate in delinquency due to the same desire for immediate gratification and elevated levels of impulsiveness.

The competing arguments of age-graded social control versus self-control highlight the necessity of properly testing a causal relationship between youth employment and delinquency. While both theories could feasibly predict the same outcome, the mechanisms behind the outcome would differ. For example, if youth working in high quality jobs had lower levels of delinquency, it could be that employment acted as an institution of social control *or* that youth able to obtain higher quality jobs have higher levels of self-control, which would also contribute to lower levels of delinquency. In a typical regression model, it is unlikely that this difference could be determined. As can be seen in the following paragraphs, much of the prior research has employed traditional regression techniques and as a result the authors are unable to completely rule out selection due to self-control as the mechanism behind their results.

PRIOR RESEARCH

The research examining the effects of youth employment on delinquency is extensive, with much of the literature pointing towards the importance of the number of hours worked on

adolescent adjustment. Bachman and Schulenberg (1993) found that longer hours worked was associated with higher levels of smoking, drug use, aggressive behavior and trouble with the police. Similarly, Steinberg, Fegley and Dornbusch (1993) examined the effect of transitioning from one work type to another, finding that non-workers who moved into intensive work had higher levels of delinquency, school misconduct and drug use. Importantly, this relationship was not found for the transition between moderate work and intensive work or moderate work and not working. Other research has positively linked work intensity with delinquency (Wright et al. 1997) as well as alcohol use (Mortimer et al. 1992; 1996; McMorris and Uggen 2000).

One key limitation of prior studies on work intensity and youth adjustment is the threat that the relationship may be spurious. In their study of how work intensity relates to school performance, Schoenhals and colleagues (1998) found that adverse effects of intensive work became statistically nonsignificant once pre-existing differences between youth selecting into intensive work versus moderate work were controlled using lagged variables. Along a similar line, Staff and colleagues (2010) used the Monitoring the Future data to examine the work intensity and delinquency relationship. The authors concluded that youth who were unemployed but desired intensive work had higher levels of delinquency, suggesting that pre-existing factors that lead youth to desire different levels of employment may also influence levels of delinquency. Using the NLSY97 data with random and fixed effects models to test for spuriousness, Paternoster and colleagues (2003) also concluded that the relationship between intensive work and delinquency was due to pre-employment differences. The same group continued this line of research, using again random and fixed effects models and group-based trajectory models to control for pre-existing differences (Apel et al. 2007; 2008). In general,

these studies suggest that work intensity was not causally related to delinquency, arrest, substance use, school suspension or grades.

Job Quality

As previously stated, research addressing the impact of various measures of work quality on studies of youth employment has been limited. Studies that have assessed work quality effects on juvenile delinquency tend to highlight aspects such as job satisfaction, rate of pay, job stability, industry, and opportunities to learn (Allan and Steffensmeier 1989; Mortimer 2003; Staff and Uggen 2003). In this study, I focus on four elements of job quality measured in the NLSY97: duration, supervisor age, job satisfaction, and rate of pay. Justification for each measure is outlined below.

According to age-graded social control theory, the longer a youth remains in a single job, the higher the likelihood some level of attachment would form. Mortimer and colleagues (1992) found that longer duration was associated with higher grade point average and “higher” educational expectations as well as reduced school problem behavior in boys. Mihalic and Elliot (1997) found that while duration was negatively related to substance use it was also negatively related to bonding with friends and family. Compared to youth working for long durations and moderate hours (steady workers), Mortimer (2003) found that youth working intensive hours but with short durations were more likely to have school problem behaviors. Additionally, those working intensive hours and long durations were not significantly different from steady workers, suggesting an importance of the length of employment. Potentially, youth who move quickly in and out of work would be unable to form meaningful mentoring relationships with supervisors or fully acquire new skills.

While employment has the potential to provide youth with adult mentors and useful job skills, research by Greenberger (1988) found that youth instead were working under supervisors only a few years older than themselves and this small age gap encouraged deviant behaviors in order to gain the admiration of these older peers. Contrary to the findings of Greenberger (1988), most teenagers report that their jobs do provide opportunities to learn new job-related skills, soft skills, and be mentored by an older supervisor or coworker; skills found to be negatively associated with substance use in 12th graders (Mortimer 2003; Staff and Uggen 2003). In an examination of the differences between informal and formal work, Apel and others (2006) found that movement into informal work (i.e., babysitting, lawn care) was associated with problem behaviors and substance use for some subgroups of people, theorizing the effect may be due in part to the little supervision or adult mentoring that is characteristic of many informal jobs. It seems clear that supervisor age is an important aspect of youth employment, but the effect and direction of the relationship is still unclear.

Youth more satisfied with their job may form greater attachments to work, thereby creating another institution of social control. When work is able to be balanced with school and other activities and marketable skills can be learned, youth are likely to be more satisfied with their employment. Staff and Uggen (2003) find that jobs that have more learning opportunities and jobs that complement school were associated with lower levels of school deviance, alcohol use and arrest. Conversely, the authors also find that jobs providing youth with greater autonomy, higher social status among peers and higher wages increase the same measures of deviance. This suggests that the same characteristics signifying quality work for adults may have adverse effects for youth. Additionally, when a youth's job is connected to their desired future career or provides opportunities to learn new skills, Bachman and Schulenberg (1993) find that

the use of drugs and alcohol is less likely. Youth employed in jobs with lower levels of job-related stress are likely to be more satisfied with their work. Past research has shown that higher levels of job stress are linked with higher overall levels of distress (Shanahan et al. 1991). Youth better able to balance the demands of school and work (i.e., reducing job-related stress) are found to have better overall mental health (Mortimer et al. 2002). However, a study by Wright and Cullen (2000) found that there was no relationship between skills learned from a job or the overall work environment and work-related delinquency. Instead, it was delinquent coworkers and a higher propensity for delinquency which predicted involvement, suggesting support for a spurious argument in which already delinquent youth select in to jobs with delinquent peers.

Associated with job satisfaction, rate of pay could have positive or negative effects on youth outcomes. While higher rates of pay would most likely lead to higher levels of job satisfaction, having access to large amounts of discretionary income as a youth could result in delinquency. Mortimer and colleagues (2002) found that youth more satisfied with their wages had higher levels of well-being. Allan and Steffensmeier (1987) found a negative relationship between jobs with low wages and property crime for juveniles, however the authors conclude their measure of low wage jobs is likely measuring the effect of the availability of full time work and not actually reflective of the impact of wages. Conversely, higher wages were found to be related to higher levels of deviance in Staff and Uggen's (2003) examination of job quality measures.

Overall, research indicates that various elements of job quality are associated with lower levels of delinquency in adolescence, but research in this area is still lacking. As with a large amount of the less contemporary research on youth work intensity, studies of youth work quality have yet to adequately address the spurious explanation. Of the studies discussed above, Staff

and Uggen (2003) take the most steps to attempt to rule out a spurious explanation, including controls for grades, socioeconomic status and prior deviance. However, the authors do not use a fixed-effects analysis strategy in order to more confidently conclude that selection into work of varying degrees of quality is not driving the relationship with deviance. In fact, when looking at the effects of work intensity on delinquency, Paternoster and colleagues (2003) specifically compared estimates of models including controls and lagged delinquency measures with random and fixed effects analyses. The positive relationship between intensive work and levels of delinquency and substance use becomes null once unobserved heterogeneity is controlled in the random- and fixed-effects models. While it is now believed that the effects of work intensity are largely spurious, the research on job quality suggests that elements of work quality may matter. However, to date no study has fully tested for the existence of a spurious relationship with models designed to control for unobserved heterogeneity.

Family socioeconomic background as a moderator

Several studies of youth employment have specifically studied the impact of family socioeconomic background on selection into work and work quality as well as the differential associations between work experiences and educational outcomes, delinquency, and mental health for youth from varying socioeconomic backgrounds. Mortimer (2003) found that youth of parents with low education perceived more advancement opportunities in their jobs, earned more money overall, felt they gained status from their job, and believed their work supported their school performance. However, these youth also had higher levels of work related stress. Several of these job quality measures also were shown to influence alcohol use, efficacy and depressive affect in the 12th grade. Youth achieving status from their job and those with high autonomy had

higher levels of alcohol use. Youth reporting more work related stress scored higher on the depressive affect scale and lower on the efficacy scale. Additionally, those with higher earnings and wage satisfaction had increased levels of global efficacy and lower levels of depressive affect. Taken together, given that socioeconomic status seems to influence selection into certain types of work, then it may also influence the relationship between work and delinquency.

Staff and Mortimer (2007; 2008) similarly examined youth employment in high school and its effects on educational attainment and wages in adulthood. In both studies the authors found that youth from lower socioeconomic backgrounds who worked in steady jobs (moderate hours; high duration) were more likely to earn a Bachelor's degree and earned more money than their lower SES counterparts by age 31. Disadvantaged youth were more likely to be in jobs that were either sporadic in nature or required a large time investment. Entwisle and colleagues (2000) had a similar finding, showing that youth of parents with less than a high school education were less likely to get a job than youth of parents with some college or more. However, when these youth did work, while at certain ages there were more likely to hold semiskilled rather than unskilled jobs, they worked more hours per week. This suggests that although lower SES youth are less likely to be employed, when they do work, they work intensively relative to their higher SES peers.

Youth from lower socioeconomic backgrounds may place a higher value on their employment and therefore develop a stronger bond to work. Especially in situations when the wages earned are not used as discretionary income, but instead are used to contribute to family finances. In one study of mostly disadvantaged youth, at age 17, 58 percent of low SES youth contributed wages to their families compared to 15 percent of high SES youth (Entwisle et al. 2000).

There is a clear indication from prior research that family socioeconomic background could influence the relationship between elements of work quality and delinquency. The studies described above have shown that work experiences are different for youth from less advantaged backgrounds and so it is important to examine that relationship in this research as well. However, there is still the possibility that a mediating relationship may also exist between work quality and delinquency in addition to the moderating relationship detailed in the previous paragraphs. Specifically, a youth's academic performance has also been shown in prior research to have an influential impact on later job characteristics.

GPA as a mediator of the relationship between work quality and delinquency

Much of the literature has focused specifically on the impact of employment during the school year with regards to educational attainment. A greater investment in work while in school is associated with earlier departure from formal schooling (Tienda and Ahituv 1996). However, other research suggests that this effect is strongest for youth averaging longer than twenty hours per week, with intensive workers obtaining fewer months of higher education as well as having an increased likelihood to engage in substance use and delinquency (Greenberg and Steinberg 1986; Steinberg et al. 1993; Steinberg and Dornbursch 1991; Mortimer and Johnson 1998; McMorris and Uggen 2000; Mortimer et al. 2003; Apel et al. 2006; Staff et al. 2010). The time commitment to work diminishes a youth's school engagement as they return from work tired, having to stay awake later to complete assignments, and therefore have more difficulty participating in school (Committee on the Health and Safety Implications of Child Labor 1998). When youth believe that their work is interfering with school, they show higher levels of

depressed mood, higher rates of misconduct, a reduced sense of well-being, increased alcohol use and higher rates of arrest (Mortimer et al. 2002; Staff and Uggen 2003).

However, moderate youth employment has been found to have a positive effect on academic achievement (Mroz and Savage 2006). Several studies have found that youth able to balance both school and work can enhance their long-term educational attainment (Mortimer 2003; Staff and Mortimer 2007; 2008). Youth working moderately are found to be more involved in school activities than non-workers or intensive workers, have higher GPA's and lower rates of high school dropout (D'Amico 1984; Staff et al. forthcoming). Youth working moderate hours and working steadily are more likely to attend college and complete a four year degree (Carr et al. 1996; Mortimer 2003; Staff and Mortimer 2007; Bachman et al. 2011).

An association between work intensity and educational outcomes is clear and so it needs to be examined when studying work quality as well. Potentially, the suggested relationships between work quality features and delinquency may be operating through school performance. That is, the quality of work impacts educational performance, which in turn impacts levels of delinquency. For example, jobs that require longer hours would take away time that could be put towards schoolwork, which could negatively impact grades. Jobs that are short in duration may not allow youth time to learn how to balance both school and work, again causing grades to suffer. When a youth works in a lower quality job, they may be more frustrated that they have to balance their work responsibilities with school responsibilities and grades could fall as a result. As grades begin to suffer, youth may begin to disengage at school due to being labeled as a poorly performing student. Once a youth disengages from school, it no longer works as an institution of social control and youth may increase their involvement in delinquent activity as a

result. However, the level of mediation would likely vary across job quality measures, with GPA operating as a mediator for some measures, but not for others.

THE CURRENT STUDY

Many of the past studies of youth employment have been limited in their ability to examine more than just hours worked due to the survey design of the data used for analysis. However, the NLSY97 is unique in that it asks detailed employment questions about hours worked, duration, and various work quality measures not commonly found across longitudinal datasets of youth. These questions are asked annually in surveys of a nationally representative sample of just under 9,000 youth. While the NLSY97 is a commonly used dataset, few studies analyzing the data have taken advantage of these detailed work quality measures.

Hours worked is the main variable which has been used to represent youth employment in past literature. As I will address in the following section, much of this research has examined the effects of not working compared to working less than or more than 20 hours in a week. In this study, I use random and fixed effects analyses in order to examine whether or not *changes* in employment status and hours significantly impact delinquency. While changes in hours worked has been examined in the past, it is less frequently analyzed longitudinally and the effects have typically only been assessed between individuals, not within. Secondly, the effect of work duration, supervisor age, job satisfaction and rate of pay on delinquency will be examined as proxies for job quality among youth who are employed. Third, the moderating effect of socioeconomic status on the relationships between elements of job quality and delinquency will be evaluated. Lastly, whether or not GPA mediates the work-crime relationships will be assessed using a mediation model.

DATA

Sample

The data come from the 1997 National Longitudinal Survey of Youth. The ongoing survey is designed to document the transition from school to work to adulthood, collecting information on, among other items, labor market behavior, delinquency, substance use and educational experiences over time. The nationally representative sample contains 8,985 youths interviewed annually since the initial round. Households in the cross-sectional sample were selected using a stratified multistage area probability sample. First, 147 primary sampling units were selected from which 1,748 sample segments were drawn. Next a subset of 96,512 household units were chosen, from which screening interviews were completed in 75,291 households to identify household members eligible to participate (i.e., aged 12 to 16). Additionally, a supplementary sample was designed to oversample black and/or Hispanic or Latino respondents, resulting in 8,985 cohort members. In the initial round, one parent of the youth respondent was selected in order to provide information on items such as family background, income, child/parent health, expectations and family situation. Currently, the study is in its 16th year of data collection¹.

The current study utilizes data from rounds 1-7 in order to isolate each respondent during their high school years, with an overall retention rate of 86.3 percent by round seven. In an examination of attrition effects of the NLSY97 using rounds 1 through 9, researchers found attrition to be non-random with respect to socioeconomic status and early adult outcomes, but data showed only small amounts of variation in parent's education level and household income for those who remained in the study and those who attrited (Aughinbaugh and Gardecki 2007). While the present study does not address work-crime relationships in early adulthood, potential

¹ See Moore et al. (2000) for a detailed explanation of the survey and sampling techniques

bias due to socioeconomic status could be present and should be noted. Levels of attrition were similar across the two sample types as well as across gender and so it does not appear that one particular group was dropping out of the sample more than others².

Dependent Variables

Delinquency. A delinquency variety scale was constructed using seven of the delinquency items from the NLSY97. The items measure the prevalence of carrying a gun, destroying property, stealing above or below \$50, attacking another person, selling drugs and other property crime for each year using a binary measure indicating involvement in an activity. Items were summed to create a scale ranging from 0 to 7, with higher values indicating participation in more delinquent behaviors (Cronbach alpha ranges from .61 to .71 depending on the year of high school).

Independent Variables

Hours Worked. The average number of hours worked per week was constructed by calculating the average number of hours respondents indicated they had worked during the school year (September 1-May 31). In each round of the survey, respondents were asked to indicate for each week out of the year the average number hours worked (i.e. 52 separate variables per year). The variables that corresponded to the weeks of the school year were then averaged together to create an overall measure of average hours worked in a year. It is important to isolate work during the school year as it could be associated with different outcomes than summer work when youth don't have to balance both work and school responsibilities. Similarly, only formal employment was included in the workers category, excluding unofficial jobs (such as babysitting or lawn care) which are typically structured differently. Formal employment is

² The NLSY97 provides information about why participants dropped out of the study, coded as refused (858), not locatable (256), other reason (51), deceased (37), unavailable (26) or too ill (2).

defined in the data as a job in which the youth was working as an employee and had an on-going relationship with a particular employer. Youth in unofficial jobs are referred to as “freelancers” where youth do one or a few tasks for several people but do not have an official boss. As is common practice in youth employment research, these averages were split between more than 20 hours and less than or equal to 20 hours, creating a final three category variable of non-workers, moderate hours and intensive hours³.

Duration. Duration was constructed based on questions about the start and stop dates of each formal job respondents worked in a survey year. Again, this measure was limited to work duration during the school year. Based on the cut points determined for the school year, youth could have worked a maximum of 38 weeks. The school year was measured as the first week in September through the last week in May. The survey asked separate questions for the start and stop dates of each job held in a year and youth were allowed to specify up to 7-11 jobs depending on the round of the survey. The start and stop date variables were coded to correspond to a continuous week count which began in the first week of January of 1996 and ran through the remainder of the survey. For jobs which began or ended between school years, the dates were truncated. That is, if a job ended in the summer, it was coded as the value for the last week of that school year. If a job began in the summer and did not end before the school year began, it was coded as the first week of the following school year. Job duration was then calculated by subtracting the starting week from the ending week for each job held in each year. The total duration was determined by summing across all jobs held in a year in order to measure the total number of weeks in a specific school year in which youth were employed. A dummy variable for duration was then created to specify “high” versus “low” duration, using the sample median

³ Hours worked was also examined as a continuous variable and results that were significant and positive remained significant and positive. In cases when hours worked was not significant, the direction remained the same.

weeks worked as the cut point. For this sample, the median number of weeks worked during high school was 14, and so those working above 14 weeks were coded “1” for high duration, and those working 14 weeks or less were coded as “0” for low duration⁴.

Supervisor Age, Pay, and Satisfaction. Each of the quality measures compared workers to other workers and therefore youth who never worked during high school were excluded from the measures. Supervisor age is a binary variable coded “supervisor age 24 and below” versus “supervisor age 25 and older”. The age-crime curve as well as crime statistics show the 15-24 year old age range as the most delinquent, and so 24 was chosen as the cut point⁵. The NLSY97 allows youth to identify (depending on the year) up to 11 different work experiences in the past year. Thus, for each respondent the supervisor age is the average age across jobs. Averaging across all jobs for each respondent each year was done for all of the quality measures. Hourly rate of pay was transformed by taking the natural log of the values. Finally, job satisfaction was originally coded on a five point Likert scale, with 1 representing highest satisfaction. This measure was reverse coded so that higher values represent higher levels of satisfaction. It should be noted that the questions for supervisor age and job satisfaction were only asked of respondents who had a job duration of at least 13 weeks. Therefore, the sample size decreases substantially in these analyses due to list wise deletion of workers who were employed for shorter time periods. The NLSY97 asked these questions for each job and so while some respondents may have worked more than 13 weeks total (reflected in the duration variable described in the previous section), if none of their jobs lasted longer than 13 weeks, they were

⁴ The coding for duration is modeled after Mortimer (2003). However, when kept as continuous variable, the results remain significant and positive. In models where the binary variable is not significant, neither is the continuous.

⁵ The results for models of supervisor age are somewhat sensitive to the coding scheme. Keeping supervisor age as a continuous variable produces results that are in the same direction and similar magnitude, but are not significant. Additionally using the median as the cut point as was done with duration also differs in a similar manner to the continuous variable. However, the median age for supervisors was 38, well above the age that we would theoretically expect offending to be occurring and so including supervisors between 25 and 38 in the “young supervisor” measure would mask the effects of supervisors still at prime offending ages.

not asked the question. While this poses several problems with the interpretation of the data, youth working at least 13 weeks at a single job would likely be more attached to their employment than those working for shorter periods of time. Therefore any results found from these analyses would be considered more conservative.

Grade Point Average. Official transcript data for high school years was used as the measure of academic achievement. GPA ranges from .5 to 4.0, with an average score of 2.9 for the sample. Unfortunately, the GPA measure had a sizeable amount of non-response. Official transcripts were requested from the last high school of record during waves two and seven, however survey staff were only successful in collecting high school transcripts for 6,232 of respondents. Missing data mostly results from student or school refusal of consent for the release of transcripts and in some cases the student was still enrolled in high school at the time of the request or the school was unable to locate the record (U.S. Bureau of Labor Statistics).

Analytic Strategy

The analysis that follows is comprised of four parts. First, I use random and fixed effects negative binomial regression models in order to examine the within and between individual effects of employment status and intensity on delinquency. The delinquency measure is a count variable that is skewed to the left, with most respondents indicating they did not engage in any delinquent behavior, creating an overdispersed measure. The negative binomial regression is a modified Poisson model for count outcomes that allows for overdispersion of the dependent variable (Long 1997). Comparing the results of the random and fixed effects models show the difference in effects once unobservable heterogeneity has been controlled. A Hausman (1978) test is used to compare these results as well as the results of all of the subsequent random and fixed effects models. The Hausman (1978) test examines whether the person effects and the

explanatory variables are uncorrelated. A large, significant value of the X^2 statistic indicates that the fixed-effects model is preferred. Next, limiting the sample to workers only, I again use both random and fixed effects regression to examine the impact of the four different measures of quality on delinquency. Each of the measures is included into a model with hours worked individually, and then included together in full, final models. The random effects models include controls for grade in school, race, sex, and parent's education. These models are measuring between individual differences in changes in work experiences over time. In all models, a variable for grade is included in the model to account for time. Unlike random effects models, fixed effects analysis assumes that there are unobserved person effects that are correlated with the causal variable. The model controls for individual characteristics which are time stable to address possible heterogeneity bias. Therefore, characteristics such as sex and race are accounted for in the analysis, while not having to be formally included into the regression equation (Allison, 2009).

The third part of the analysis examines whether parent's education plays a moderating role in the relationships between the work experience measures and delinquency. I split the parent's education variable into a binary measure that separated parents with an average of 12 years or less of school and then more than 12 years, representing high school or less and more than high school. The full fixed effects regression model is then run twice, once limiting the sample to only youth of parents with low educational attainment and then again limiting the sample to youth of parents with high educational attainment. The results are then compared using a z-test to determine if parent's education level significantly influences the relationship between the work quality measures and delinquency. Lastly, I use the full fixed effects regression model to examine a potential mediating relationship. Specifically, GPA is first included as the

dependent variable and then is included into the delinquency models in order to determine whether or not it mediates the relationships between the work quality variables and delinquency.

RESULTS

Worker Status

Both weighted and unweighted descriptive statistics are shown in Table 1 for the entire sample, just those employed during high school, and those in the mediation model. Due to the large amount of missing data for the GPA measure, descriptive statistics are presented to show how the sample is affected. The analyses were not weighted and so the descriptive tables show the differences between the actual sample and the corrected sample. Most notably, when the weight is applied, the percent of the sample that is black or Hispanic is reduced. The sampling frame of the NLSY97 included an oversample for minority youth and so they are overrepresented in the data and therefore in the analyses presented here. The unweighted sample was about 53 percent white, 26 percent black and 21 percent Hispanic, compared with the weighted values of about 71 percent, 15 percent and 13 percent, respectively. The sample of workers only and the mediation sample are closer to approaching the corrected values, with about 60 percent white, 20 percent black and 17 percent Hispanic for the unweighted analyses. The other measures, however, are largely unaffected by the absence of a weight. The largest difference is in the delinquency level of workers only, where the unweighted sample is slightly higher than the weighted sample. Additionally, when comparing across models, the mediation model sample is more delinquent than the other two samples. Across samples both weighted and unweighted, parent's average education level hovers around 13, indicating the average respondent had parents who were at least high school graduates. Respondent's average GPA was

2.9 and a large majority of working youth (95.3%) worked for a supervisor who was 25 or older, which contradicts the belief that youth typically work for supervisors only slightly older than themselves. On average, workers are satisfied with their job; the mean score of satisfaction a 3.6 on a 5 point scale. The average logged hourly pay rate was 6.4, which translates to about \$6.45 per hour, above the federal minimum wage of \$5.15 for a majority of the survey years⁶. The median split used to create the duration variable is somewhat affected in the mediation model, with about 55 percent of workers falling into the low duration group compared with 50 percent in the unweighted workers only sample. Lastly, most employed youth work moderate hours (72.3%) compared with intensive hours, and this difference is not changed much with the loss of cases due to the inclusion of GPA.

The entire sample begins with 25,830 observations of respondents across 7,956 individuals during high school. When the work variables are included into the model and the sample is restricted to workers only, the number drops substantially to 6,494 observations across 4,315 individuals and the mediation model further reduces the sample size to 4,387 observations across 2,987 individuals. Samples sizes of the analyses of the individual work quality measures vary as the amount of missing data changes depending on the measure being tested. The sample size represented in the table represents the sample when all work variables are included into the same model. Table 2 shows the number of non-workers, moderate workers, and intensive workers by grade. In the 9th grade, most students were not working (80.7%) but those who were mostly worked 20 hours or less. By 10th grade, nearly 30 percent of youth had moved into moderate

⁶ Federal minimum wage was raised to \$5.15 on September 1, 1997. However the first round of the NLSY surveys about the year 1996, in which the minimum wage was \$4.75. Additionally, the 1997 change to minimum wage was accompanied by a subminimum wage of \$4.25 which was created for employees under 20 years of age during the first 90 consecutive days of employment.

Table 1. Unweighted and Weighted Descriptive Statistics

	Entire Sample		Workers Only		Mediation Model	
	Unweighted %/Mean (SD)	Weighted %/Mean (SD)	Unweighted %/Mean (SD)	Weighted %/Mean (SD)	Unweighted %/Mean (SD)	Weighted %/Mean (SD)
Sex						
Female	48.8%	48.7%	47.4%	48.4%	48.7%	48.5%
Male	51.2%	51.3%	52.6%	51.6%	51.3%	51.5%
Race						
White	52.7%	70.5%	59.5%	71.8%	61.8%	77.4%
Black	25.5%	15.4%	21.3%	14.6%	20.7%	11.7%
Hispanic	20.8%	12.9%	18.3%	12.4%	16.8%	10.0%
Other	.9%	1.2%	.8%	1.2%	.71%	.89%
Delinquency	.50(1.1)	.52(1.1)	.54(1.1)	.49(1.0)	.55(1.1)	.57 (1.1)
Parental Education	12.6(2.9)	13.0(2.7)	12.8 (2.7)	13.0(2.6)	12.9(2.6)	13.3(2.5)
GPA					2.9 (.67)	2.9 (.67)
Supervisor Age						
16-24			4.7%	4.4%	4.9%	4.6%
25+			95.3%	95.6%	95.1%	95.4%
Job Satisfaction			3.6(1.0)	3.6 (1.0)	3.6(1.0)	3.6 (1.0)
Logged Hourly Pay			6.4(.32)	6.4 (.32)	6.4 (.31)	6.4 (.31)
Duration						
Low			50.3%	49.3%	55.3%	54.3%
High			49.7%	50.7%	44.7%	45.8%
Hours						
Moderate			72.3%	72.5%	74.2%	74.6%
Intensive			27.7%	27.5%	25.8%	25.4%
N	25,830		6,494		4,387	

Table 2. Worker Status by Grade

	Percent (N)
9 th grade	
Not working	81.9 (5,510)
Moderate hours (1-20)	15.0 (1,005)
Intensive hours (21 or more)	3.1 (210)
10 th grade	
Not working	65.3 (5,065)
Moderate hours (1-20)	28.1 (2,176)
Intensive hours (21 or more)	6.6 (511)
11 th grade	
Not working	45.3 (3,584)
Moderate hours (1-20)	40.8 (3,233)
Intensive hours (21 or more)	13.9 (1,102)
12 th grade	
Not working	31.4 (2,120)
Moderate hours (1-20)	42.0 (2,841)
Intensive hours (21 or more)	26.6 (1,797)
Total across waves	29,154

work with about 64 percent still unemployed. In 11th grade, the sample is mostly working, with about 43 percent in moderate work and 14 percent working more than 20 hours in a week.

Finally by the 12th grade, those youth remaining in school have largely shifted towards employment with only about 31 percent not working, 42 percent working moderate hours and about 27 percent working intensive hours.

Looking first at the influence of work intensity on delinquency, Table 3 shows the results of random and fixed effects analyses. All of the coefficients in the negative binomial models have been exponentiated in order to ease interpretation and those values are what is presented in all of the following tables. Similar to output for logit models, values above one reflect positive relationships and values below one represent negative relationships. Exponentiated confidence intervals are also presented. Results from the random effects analysis are shown in Model 1. Compared to when youth are not working, working moderately increases the expected count of delinquency by a factor of 1.09, or by approximately 9 percent. Working intensively, compared to not working, increases the expected count of delinquency by 12 percent ($p < .01$). There is no difference in the expected count of delinquency when youth are working moderately compared to when they work intensively. Model 1 also reveals how sex, race, and parental education is related to delinquency. Compared to females, the expected count of delinquency for males was higher by a factor of 2.0 ($p < .001$). Black and Hispanic youth were significantly less delinquent than white youth, with the expected count of delinquency about 21 percent lower for Black youth and 12 percent lower for Hispanic youth ($p < .001$; $p < .01$). While increases in parent's average level of education are significantly, positively related to delinquency, it increases delinquency by a factor of 1.0, which is essentially a zero percent change ($p < .05$). Additionally, as youth progress through school, they become significantly less delinquent compared to delinquency levels in the 9th grade ($p < .001$).

Model 2 in Table 3 shows estimates from the fixed effects model. Recall that fixed-

effects models control for all unobserved sources of heterogeneity bias, but they do not allow for the inclusion of time-invariant predictors. When controlling for unobserved factors, the positive effects of moderate and intensive work diminish substantially to statistical non-significance. The non-finding for worker status in the fixed effects model indicates that the effect of work hours may be spurious, as youth did not experience significant changes in delinquency scores when moving from one status to another. The results of the Hausman test are significant, indicating that the fixed effects model is preferred to the random effects model, further supporting the

Table 3. Random and Fixed Effects Negative Binomial Regression of Worker Status on Delinquency

	Model 1 Random Effects (N=7,949)		Model 2 Fixed Effects (N=4,273)	
	e ^b	C.I.	e ^b	C.I.
Hours worked (ref. non-workers)				
Moderate	1.09**	[1.04 , 1.14]	1.04	[.98 , 1.10]
Intensive	1.12**	[1.04 , 1.21]	1.04	[.95 , 1.13]
Grade (ref. 9 th)				
10 th	.78***	[.74 , .82]	.75***	[.71 , .79]
11 th	.54***	[.51 , .57]	.50***	[.47 , .53]
12 th	.36***	[.33 , .38]	.33***	[.31 , .36]
Sex (ref. female)	2.00***	[1.84 , 2.12]		
Race (ref. white)				
Black	.79***	[.73 , .87]		
Hispanic	.88**	[.79 , .97]		
Other	.99	[.66 , 1.47]		
Parent's Education	1.00*	[1.0 , 1.02]		
Constant	5.17***	[3.87 , 6.92]	6.7***	[5.62 , 7.95]
Hausman X ²			128.8	
			(p<.001)	

* $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 1 has 25,754 observations with an average of 3.2 observations per person. Model 2 has 14,622 observations with an average of 3.4 observations per person.

notion that unobserved sources of heterogeneity are contributing to the significant associations between work hours and delinquency.

Work Quality Measures

Next, I examine the effect of the duration of work on delinquency, limiting the sample to only occasions when youth reported holding a formal job during the school year. Results are shown in Table 4. Beginning with the random effects model, compared to when youth work for

Table 4. Random and Fixed Effects Negative Binomial Regression of Duration on Delinquency

	Model 1 Random Effects (N=4,938)		Model 2 Fixed Effects (N=1,049)	
	e ^b	C.I.	e ^b	C.I.
Hours worked (ref. moderate)	1.03	[.94 , 1.14]	1.07	[.86 , 1.13]
Duration (ref. low)	1.11*	[1.02 , 1.21]	1.06	[.95 , 1.18]
Grade (ref. 9 th)				
10 th	.83**	[.73 , .95]	.80*	[.67 , .96]
11 th	.55***	[.48 , .62]	.53***	[.44 , .63]
12 th	.37***	[.32 , .43]	.40***	[.33 , .48]
Sex (ref. female)	1.97***	[1.78 , 2.19]		
Race (ref. white)				
Black	.76***	[.67 , .87]		
Hispanic	.93	[.80 , 1.08]		
Other	1.21	[.67 , 2.18]		
Parent's Education	1.02*	[1.0 , 1.04]		
Constant	7.57***		8.6***	[4.96 , 14.9]
Hausman X ²			10.6	
			(p<.06)	

p* < .05; *p* < .01; ****p* < .001

NOTE: Model 1 has 7,899 observations with an average of 1.6 observations per person. Model 2 has 2,547 observations with an average of 2.4 observations per person.

low durations, working high durations leads to higher scores on the delinquency scale by a factor of 1.11 (*p*<.05). Hours worked (i.e., moderate versus intensive hours) is not significant, however in the previous model a significant relationship was only found when comparing moderate and intensive workers to non-workers. A close examination of the confidence intervals for the work hours variable in Model 1 of Table 3 indicates that working moderate hours as compared to intensive, or vice versa, does not produce significantly different levels of delinquency. Therefore

we would not expect to see a significant relationship appear once non-workers are removed and moderate and intensive workers are only compared to one another. Limiting the sample to only occasions when youth are employed does not drastically changed the effects of grade, as delinquency continues to decrease as youth progress through school ($p < .001$). However there is no longer a significant difference between the delinquency levels of Hispanic youth compared with white youth. The results of the fixed effects analysis presented in Model 2 show that duration is not significantly related to delinquency once unobserved factors are taken into account. The Hausman test is marginally significant, suggesting that the fixed effects model

Table 5. Random and Fixed Effects Negative Binomial Regression of Job Satisfaction on Delinquency

	Model 1 Random Effects (N=5,371)		Model 2 Fixed Effects (N=1,519)	
	e ^b	C.I.	e ^b	C.I.
Hours worked (ref. moderate)	1.03	[.95 , 1.12]	.99	[.89 , 1.10]
Job Satisfaction Grade (ref. 9 th)	.93***	[.90 , .67]	1.01	[.96 , 1.06]
10 th	.81**	[.70 , .94]	.69***	[.57 , .83]
11 th	.59***	[.51 , .68]	.47***	[.39 , .58]
12 th	.38***	[.33 , .45]	.33***	[.27 , .40]
Sex (ref. female)	2.06***	[1.86 , 2.28]		
Race (ref. white)				
Black	.81**	[.71 , .92]		
Hispanic	1.0	[.86 , 1.15]		
Other	1.15	[.68 , 1.96]		
Parent's Education	1.03**	[1.01 , 1.05]		
Constant	12.7***	[5.9 , 27.2]	13.8***	[7.89 , 24.0]
Hausman X^2			48.9	
			($p < .001$)	

* $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 1 has 10,073 observations with an average of 1.9 observations per person. Model 2 has 3,791 with an average of 2.5 observations per person.

again is preferred over a random effects model.

Moving to the additional quality measures that are not typically measured in youth

employment studies, Table 5 shows first the results for job satisfaction. Again, work intensity is not significantly related to levels of delinquency. However, when youth work in jobs they find more satisfying, the expected count of delinquency is reduced by a factor of .93, or about seven percent ($p < .001$). The relationships between the demographic variables and delinquency remain largely the same as in Table 4. As with Tables 3 and 4, when fixed effects are used in Model 2, the significant relationship between job satisfaction and delinquency disappears. Again, the Hausman test indicates that the fixed effects model is preferred.

Table 6. Random and Fixed Effects Negative Binomial Regression of Logged Pay Rate on Delinquency

	Model 1 Random Effects ($N=5,767$)		Model 2 Fixed Effects ($N=1,768$)	
	e^b	C.I.	e^b	C.I.
Hours worked (ref. moderate)	1.04	[.96 , 1.12]	.98	[.89 , 1.08]
Logged Pay Rate	.79***	[.70 , .88]	.92	[.79 , 1.07]
Grade (ref. 9 th)				
10 th	.84**	[.76 , .93]	.80***	[.70 , .91]
11 th	.59***	[.53 , .66]	.54***	[.47 , .61]
12 th	.41***	[.36 , .46]	.38***	[.33 , .45]
Sex	2.06***	[1.87 , 2.26]		
Race (ref. white)				
Black	.79***	[.70 , .89]		
Hispanic	.93	[.81 , 1.06]		
Other	1.20	[.73 , 1.98]		
Parent's Education	1.02*	[1.0 , 1.04]		
Constant	44.30***	[17.6 , 111.2]	19.10***	[6.9 , 52.7]
Hausman X^2			21.7	($p < .001$)

* $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 1 has 11,375 observations with an average of 2.0 observations per person. Model 2 has 4,657 observations with an average of 2.6 observations per person.

Logged rate of pay is examined in Table 6. The random effects model is again presented first in Model 1, showing that increases in logged hourly pay decrease delinquency by a factor of

.79, which translates to a 21 percent decline ($p < .001$). Much like the previous models, this finding does not hold up in the fixed effects analysis. The magnitude of the estimate decreases to an 8 percent decline in delinquency and is reduced to non-significance. Like the previous models examining work quality measures, the Hausman test shows the fixed effects model is preferred.

Table 7 presents the results for supervisor age. Compared to occasions when youth are working for younger supervisors, working with a supervisor over age 25 significantly reduces delinquency by a factor of .68, or by 32 percent ($p < .001$).

Table 7. Random and Fixed Effects Negative Binomial Regression of Supervisor Age on Delinquency

	Model 1 Random Effects (N=5,256)		Model 2 Fixed Effects (N=1,474)	
	e ^b	C.I.	e ^b	C.I.
Hours worked (ref. moderate)	1.03	[.94 , 1.12]	.98	[.89 , 1.10]
Supervisor Age (ref. under 25)	.68***	[.58 , .79]	.69***	[.57 , .83]
Grade (ref. 9 th)				
10 th	.82**	[.70 , .95]	.68***	[.56 , .82]
11 th	.60***	[.51 , .70]	.48***	[.39 , .58]
12 th	.39***	[.33 , .46]	.33***	[.27 , .41]
Sex	2.03***	[1.84 , 2.25]		
Race (ref. white)				
Black	.82**	[.72 , .93]		
Hispanic	.98	[.85 , 1.13]		
Other	1.3	[.76 , 2.23]		
Parent's Education	1.03*	[1.01 , 1.05]		
Constant	17.3***	[7.13 , 41.8]	23.1***	[12.4 , 43.0]
Hausman X ²			20.7	
			($p < .001$)	

* $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 1 has 9,729 observations with an average of 1.9 observations per person. Model 2 has 3,654 observations with an average of 2.5 observations per person.

When moving from a supervisor 24 years or below to an older supervisor, the fixed effects analysis in Model 2 shows a decrease in delinquency of 31 percent ($p < .001$). Taken together, the

results in Table 7 suggest that older supervisors, specifically those who have begun their descent along the age-crime curve, are associated with lower levels of delinquency among youth working in those situations. Further, the fact that within-individual change occurs suggests that the association between supervisor age and delinquency is not due to spurious, time-stable factors.

In Table 8, I include all of the quality measures in random and fixed effects models. In the random effects analysis, logged pay rate, job satisfaction, and supervisor age all remain significant ($p < .001$).

Table 8. Full Random and Fixed Effects Negative Binomial Regressions

	Model 1 Random Effects ($N=4,315$)		Model 2 Fixed Effects ($N=789$)	
	e^b	C.I.	e^b	C.I.
Hours worked (ref. moderate)	1.06	[.95 , 1.18]	1.08	[.87 , 1.21]
Duration (ref. low)	1.06	[.96 , 1.16]	.95	[.84 , 1.09]
Logged pay rate	.72***	[.60 , .86]	1.07	[.80 , 1.42]
Job Satisfaction	.92***	[.88 , .96]	1.00	[.93 , 1.07]
Supervisor Age (ref. under 25)	.67***	[.56 , .81]	.78†	[.60 , 1.01]
Grade (ref. 9 th)				
10 th	.78*	[.64 , .95]	.62**	[.46 , .84]
11 th	.54***	[.44 , .65]	.41***	[.30 , .56]
12 th	.37***	[.30 , .46]	.30***	[.21 , .43]
Sex	2.03***	[1.80 , 2.27]		
Race (ref. white)				
Black	.75***	[.64 , .87]		
Hispanic	.98	[.83 , 1.15]		
Other	1.46	[.78 , 2.76]		
Parent's Education	1.03*	[1.0 , 1.05]		
Constant	166.50***	[36.2 , 764.9]	12.70*	[1.8 , 89.5]
Hausman X^2			47.1	
			($p < .001$)	

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 1 has 6,949 observations with an average of 1.5 observations per person. Model 2 has 1,828 observations with an average of 2.3 observations per person.

Further, the effect sizes of each do not differ greatly from the individual models. In the full fixed effects model supervisor age is reduced to marginal significance, with the effect reduced from 31

percent lower delinquency levels compared to younger supervisors to 22 percent lower ($p < .10$). The Hausman test indicates that the fixed effects model is preferred over the random effects model. The results of the full fixed effects model indicate that some of the relationship between supervisor age and delinquency may be due to spurious factors. However, due to the issue of missing data on the other quality measures, when all are included in one model, the sample size suffers a sizeable reduction from the individual models.

Family Background as a Potential Moderator

Past research has shown that youth from disadvantaged backgrounds benefit more from work, even when that work is intensive, and have less negative school and delinquency outcomes (Mortimer, 2003; Staff & Mortimer, 2007; 2008). Potentially, more disadvantaged youth use their income to help support their families, instead of as discretionary income, and therefore value the employment more than their peers. This strong attachment to work could then act as another institution of social control which prevents involvement in delinquency. In the analyses shown here, parental education level is used as a proxy for socioeconomic status.

The Hausman test in the previous analysis showed that the full fixed effects model was preferred over the full random effects model. Because of this, only the fixed effects model will be examined for moderation effects. The full fixed effects model found a marginally significant association between supervisor age and delinquency. In order to determine if parental education has a moderating effect on the relationship between work and delinquency, four models are estimated. The first two models restrict the sample to those with parents who have completed 12 years of school or less. Model 1 estimates the direct effect of working for low SES youth, therefore using both workers and non-workers while Model 2 examines workers only and looks at the effects of the work quality variables. The third and fourth models are estimated restricting

the sample to youth with parents who had an average of more than 12 years of education. Again, Model 3 estimates the direct effect of working while Model 4 restricts the sample further to just workers to estimate the effects of work quality.

Table 9 shows the results of these models. For youth who have parents with low levels of education, there is not a significant difference between working and not working in levels of delinquency. However, some aspects of job quality impact the delinquency of working low SES youth. When working in jobs of longer duration, the expected count of delinquency was reduced by a factor of .75, or 25 percent ($p < .01$). Additionally, when working for older supervisors, the expected count of delinquency was reduced by a factor of .43, about 57 percent ($p < .001$). The effect for grade remains the same, with transitioning to higher grades reducing the expected delinquency count compared to ninth grade.

For youth who have parents with high levels of education there was also no direct effect of working on levels of delinquency. However, unlike the low SES youth, none of the work variables had a significant effect on delinquency. However, the effects of duration and supervisor age (significant for low parental education youth) switch direction, indicating that high duration and older supervisors would increase the expected count of delinquency. In order to compare the work quality effects between low and high SES youth, a z-test was performed between Models 2 and 4, with any significant differences found between the estimates indicating that a moderating relationship exists (Paternoster et al. 1998). We see a significant difference between the effects of duration and supervisor age for youth with parents of low and high education levels. The

Table 9. Fixed Effects Parental Education Moderation Models

	Model 1		Model 2		Model 3		Model 4		z-test for Models 2 and 4
	e ^b	C.I.	e ^b	C.I.	e ^b	C.I.	e ^b	C.I.	
Employed	1.07	[.98, 1.17]			1.01	[.94, 1.10]			
Hours worked (ref. moderate)			1.06	[.83, 1.33]			1.02	[.82, 1.26]	0.23
Duration (ref. low)			0.75 **	[.61, .93]			1.09	[.92, 1.29]	-2.74
Logged pay rate			0.97	[.60, 1.57]			1.23	[.86, 1.77]	-0.78
Job Satisfaction			0.98	[.88, 1.10]			0.99	[.91, 1.08]	-0.08
Supervisor Age (ref. under 25)			0.43 ***	[.27, .68]			1.03	[.74, 1.43]	-2.99
Grade (ref. 9 th)									
10 th	0.72 ***	[.67, .78]	0.49 **	[.32, .75]	0.78 ***	[.72, .83]	0.85	[.53, 1.34]	-1.69
11 th	0.50 ***	[.45, .55]	0.39 ***	[.23, .59]	0.50 ***	[.46, .54]	0.48 **	[.30, .78]	-0.81
12 th	0.33 ***	[.29, .37]	0.28 ***	[.16, .46]	0.35 ***	[.32, .38]	0.36 ***	[.22, .59]	-0.74
Constant	4.15 ***	[3.28, 5.24]	57.80 *	[2.4, 1381.3]	10.9 ***	[7.96, 15.36]	4.70	[.29, 76.9]	1.16

* $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: Model 2 has 803 observations with an average of 2.3 observations per person. Model 4 has 947 observations with an average of 2.3 observations per person.

effect of grade is not significantly different between the two groups. These results suggest that parental education level moderates the effects of duration and supervisor age on delinquency⁷.

School Performance as a Potential Mediator

Potentially, the effect of work and work quality on delinquency could operate through grade point average. The more time invested into work, the more likely for work to become a distraction and for school performance to decline. Likewise, if a job is of high quality (i.e., good pay, high satisfaction, older supervisor), then youth may disengage from school and focus more on their job, leading to lower GPA scores. GPA in turn could impact levels of delinquency as those with higher GPA's tend to be most invested in school and therefore more susceptible to the informal social control educational institutions provide, reducing involvement in delinquency. Youth with lower GPA's tend to be less invested and lack informal social control, leading to higher levels of delinquency.

In order to test for a mediation effect, I first re-estimated the full random and fixed effects models, limiting the sample to those who have GPA data. As previously mentioned, this measure suffers from a large amount of missing data and so when included into a model it causes a reduction in sample size. Due to the loss of cases, a model including GPA cannot be compared with one that does not limit the analysis to those with the GPA information because what could seem like mediation effects could actually be the result of a lower sample size and therefore less statistical power. Table 10 shows the new full model estimates for the random effects analysis in Model 1. When the sample is limited to only those with GPA data, the random effects results remain relatively the same, however, supervisor age is no longer significant in the fixed effects

⁷ In supplementary analyses, GPA was also included into the low SES models in order to determine if it mediated the effects of duration and supervisor age on delinquency. There was little change in the magnitude of the estimates. For supervisor age, the magnitude decreased by 0.7% and for duration the magnitude decreased 0.88%. These changes were not significant.

model. The results of the Hausman test suggest that the fixed effects model is still preferred over the random effects model and so it is the only model analyzed from this point forward.

Table 10. Full Random and Fixed Effects Negative Binomial Regression with Limited GPA Sample

	Model 1 Random Effects (N=2,987)		Model 2 Fixed Effects (N=506)	
	e ^b	C.I.	e ^b	C.I.
Hours worked (ref. moderate)	1.05	[.92 , 1.20]	1.11	[.82 , 1.22]
Duration (ref. low)	1.08	[.96 , 1.20]	1.05	[.89 , 1.23]
Logged pay rate	1.13***	[.49 , .80]	1.06	[.69 , 1.65]
Job Satisfaction	.90***	[.86 , .95]	.96	[.88 , 1.04]
Supervisor Age (ref. under 25)	.64***	[.51 , .81]	.75	[.52 , 1.08]
Grade (ref. 9 th)				
10 th	.79†	[.60 , 1.03]	.96	[.63 , 1.48]
11 th	.54***	[.41 , .71]	.61*	[.39 , .95]
12 th	.41***	[.30 , .54]	.49**	[.31 , .79]
Sex	2.05***	[1.79 , 2.35]		
Race				
Black	.84†	[.70 , 1.0]		
Hispanic	1.03	[.85 , 1.26]		
Other	1.25	[.52 , 3.01]		
Parent's Education	1.02	[.99 , 1.05]		
Constant	686.80***	[64.0 , 7347.4]	10.50	[.50 , 220.2]
Hausman X ²			23.9	
			(p<.01)	

†p<.10; *p < .05; **p < .01; ***p < .001

NOTE: Model 1 has 4,387 observations with an average of 1.5 observations per person.

Model 2 has 1,149 observations with an average of 2.3 observations per person.

In order to determine whether or not mediation has taken place, GPA must first be used as the dependent variable in a model with the work measures as predictors. Because GPA is coded as a continuous variable, an OLS fixed effects regression is used. As shown in Table 11, when youth work in jobs for longer durations than shorter, GPA decreases by .04 points (p<.10). Additionally, increases in job satisfaction are associated with an increase in GPA of .03 points

($p < .01$). Having a younger supervisor did not predict GPA, but it was the only variable to have any significant relationship in the delinquency fixed effects models. Because of this null effect, we can safely rule out a mediating relationship as supervisor age would have to predict both GPA and delinquency for one to exist. Model 2 shows the delinquency fixed effects model with GPA included. While the relationships between the work variables and delinquency were not significant once the sample was limited to GPA, this could be largely due to the reduction in sample size. Therefore it is still important to analyze the effect that within person changes in

Table 11. Fixed Effects Mediation Model

	GPA <i>b</i> (SE) (<i>N</i> =3,158)	Delinquency (<i>N</i> =506) <i>e^b</i>	C.I.
Hours worked (ref. moderate)	-.01 (.03)	1.11	[.82 , 1.22]
Duration (ref. low)	-.04† (.02)	1.05	[.89 , 1.23]
Logged pay rate	.04 (.05)	1.07	[.69 , 1.66]
Job Satisfaction	.03** (.01)	.96	[.88 , 1.05]
Supervisor Age (ref. under 25)	-.06 (.05)	.75	[.52 , 1.07]
Grade (ref. 9 th)			
10 th	-.10 (.06)	.95	[.62 , 1.45]
11 th	-.12† (.07)	.60*	[.39 , .94]
12 th	-.04 (.07)	.48**	[.30 , .78]
GPA		.94	[.79 , 1.12]
Constant	2.66*** (.35)	12.35	[.56 , 271.0]

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

NOTE: The GPA model has 4,641 observations with an average of 1.5 observations per person. The delinquency model has 1,149 observations with an average of 2.3 observations per person.

GPA are not significantly related to individual levels of delinquency. Additionally, the effect sizes of the work variables are not altered by the inclusion of GPA suggesting that even if data had been available for all respondents a mediation effect would still have not taken place.

DISCUSSION AND CONCLUSION

Despite the amount of past research examining the effects of youth employment on a variety of outcomes, few studies exist which investigate how the quality of the employment impacts these relationships. For instance, Staff and Uggen (2003) found that jobs that have more learning opportunities and jobs that complement school were associated with lower levels of school deviance, alcohol use and arrest. However, the authors also find that jobs providing youth with greater autonomy, higher social status among peers, and higher wages increase delinquency. Wright and Cullen (2000) found that there was no relationship between skills learned from a job or the overall work environment and work-related delinquency. Instead it was delinquent coworkers and a higher propensity for delinquency which predicted involvement, suggesting support for a spurious argument in which already delinquent youth select in to jobs with delinquent peers. In a series of papers, Paternoster and colleagues showed that the relationship between work intensity and problem behaviors was spurious and due to selection (2003; Apel et al., 2007; 2008). Yet research that has examined the quality of youth employment has yet to fully account for potential spurious factors causing selection into work of varying quality. This research provides an examination of the effects of three underutilized measures of job quality in addition to the more traditional measures of hours worked and job duration on delinquency during high school. Using both random and fixed effects analyses, this research evaluates causal

and spurious arguments for youth employment and crime as well as potential moderating and mediating relationships.

Results indicate that while certain job quality measures reduced delinquency, these relationships were spurious. Random effects models showed that rate of pay, job satisfaction and supervisor age were significantly related to lower levels of delinquency. However, in the fixed effects models, only supervisor age was significantly related to delinquency. When youth worked with older supervisors, they had lower expected counts of delinquency compared to when they worked with younger supervisors. Throughout the analyses, Hausman tests consistently indicated that the fixed effects model was preferred to the random effects. With the exception of supervisor age, my findings suggest that past research finding significant positive and negative relationships between various measures of youth employment quality have potentially been influenced by unobserved heterogeneity bias in the models.

Additionally, a significant moderating relationship was found between parental education level and duration as well as with supervisor age in the fixed effects analysis. Specifically, youth with parents who have low education levels saw significant decreases in delinquency counts when working in longer duration jobs versus shorter duration and for older supervisors versus younger. High parental education youth did not experience these same significant relationships. Further, for these youth the direction of the coefficients changed, indicating that the factors which significantly reduced delinquency for low parental education youth actually increased delinquency for youth with more educated parents. Lastly, GPA did not have a mediating relationship in the full fixed effects model and did not significantly predict changes in the expected count of delinquency.

Taken together, the results suggest that while high quality teenage employment works to reduce delinquency for youth from disadvantaged backgrounds, it seems to have little effect on the delinquency levels of youth from higher socioeconomic backgrounds. The moderating relationship between socioeconomic status, duration, and supervisor age shows that for youth from lower parental education backgrounds, working for an older supervisor or working for longer duration decreased delinquency. Youth of parents with high educational attainment did not experience significant changes in delinquency levels. This suggests that while high quality work may not operate as a turning point for all youth, certain characteristics of work may inhibit delinquent behavior in youth from lower socioeconomic backgrounds.

Parents with 12 years or less of education may have weaker bonds with their children as they might be required to work longer hours in order to support their family, resulting in more time spent away from the home. Having an older supervisor as a work mentor may then be more important for youth with parents of low educational backgrounds because work could replace the family social bond. These youth may form stronger attachments to their older supervisors than youth who have stronger levels of parental attachment. Thus, their levels of delinquency are lowered as the attachment to work, specifically an older supervisor, would produce informal social control. For youth from more advantaged backgrounds, the null findings of the fixed effects analysis suggest that delinquent youth continue to engage in delinquency regardless of more or less positive work features. Youth from higher socioeconomic backgrounds are likely using their wages as discretionary income for recreational activities and so are less likely to place as high of a value on their job or form the same level of attachment as disadvantaged youth.

A common misconception about work in adolescence is that most youth are working in low quality jobs. However, workers in the NLSY97 sample have generally high quality jobs as

conceptualized in this research. Over 70 percent of youth worked 20 hours or less per week and the average reported hourly wage was more than a dollar higher than the national minimum wage. Youth were on average satisfied with their jobs, averaging 3.6 on a 5 point scale. Additionally, an overwhelming 95 percent majority of workers were in jobs under supervisors 25 years or older. Clearly, my research suggests that for the vast majority of youth these early experiences in work are not of poor quality.

This study is not without limitations, most of which are due to missing data issues. As stated in earlier sections, the GPA variable suffers from a large amount of missing data due to the inability of NLSY97 researchers to obtain approval for the release of high school transcript data for all respondents. This issue greatly reduced the sample size of the mediation models and likely influenced the results by diminishing the statistical power of the models. Future work with this dataset should examine the possibilities of multiple imputation to address the missing data. Additionally, the measures for hourly pay, supervisor age and job satisfaction were asked using skip patterns which eliminated respondents whose jobs were less than 13 weeks long in a given year. This missing data issue is more complex as the data is not missing at random and therefore could not be imputed.

The results of the fixed effects models compared with the random effects models suggest that some unobserved heterogeneity is driving the relationship between work quality and delinquency. Potentially, there are factors not account for in the models which influence the relationship found. For example, work by Osgood (1999) has suggested the importance of unstructured socializing and delinquency. Unfortunately, the data did not allow for the inclusion of these sorts of time use variables. Earlier theoretical arguments for the influence of self-control were presented which could also be playing a role. The data also did not allow for the inclusion

of self-control measures and so future work should look to identify and test these and other potential mechanisms. This research only examined one potential moderating relationship and one potential mediating relationship. Obviously there are many other variables which could be contributing to the relationships between the work experience measures and delinquency. For example, peer influence and time use could moderate the relationship while future expectations and aspirations could mediate the relationship. Additionally, both GPA and SES could both mediate and moderate the relationship. Future research should aim to flesh out these factors. Parental education level is only one way to conceptualize socioeconomic status and so other measures could provide different results. Finally, only three variables in the data were available to measure work quality, but prior research has highlighted other features such as levels of autonomy and opportunities to learn as important indicators of quality which future research should attempt to analyze.

This research adds to that of Paternoster and colleagues (2003) by using methods of causal analysis to test the relationship between work quality and delinquency. Similar to their findings for work intensity, this study shows that the impact of work quality on delinquency is largely spurious. My findings suggest that not only do delinquent youth select into jobs of varying intensity, they also select into jobs of varying work quality. Future research on the quality of youth employment should continue down this path, analyzing the causal relationships between work quality and other important outcomes such as substance use and educational achievement.

APPENDIX

	Logged Pay	Job Satisfaction	Supervisor Age	Duration
Logged Pay	1.000			
Job Satisfaction	.069	1.000		
Supervisor Age	.003	-.024	1.000	
Duration	.026	-.007	.027	1.000
Work Hours	.107	-.008	.013	.159

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