Individual Characteristics and Employment Outcomes among People with Disabilities: A Critical Review of the Literature[1]

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Abstract

We present a critical overview of the recent literature on employment outcomes for individuals with disabilities and how they vary by individual characteristics. Our review follows the social model of disability which posits that outcomes depend on three domains: health, personal characteristics, and environmental characteristics. We document the extent to which studies meet features of an "ideal research design" given the social model of disability. We find that despite a wealth of research on employment outcomes among individuals with disabilities, a small minority of these studies estimates the relationship between individual characteristics and employment while controlling for the other factors that also effect employment, making it difficult to draw causal inference from the magnitude of the estimated effects. Most studies are also focused on a narrowly defined disability population, making it difficult to generalize findings to the larger population or to draw comparisons across studies. Our review concludes with critical recommendations for future research and data collection in this area.

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Introduction

Over the last few decades, enormous advances in medicine and technology have made it feasible for people with very significant, chronic health conditions to work productively. Expectations of the disability community to participate fully in social activities, including work, have kept pace, as embodied in the Americans with Disabilities Act (ADA) and ADA Amendments Act (ADAAA). Yet, the preponderance of the empirical evidence (Rupp and Stapleton, 1998; Bound and Burkhauser, 1999; Houtenville, Stapleton, Weathers, and Burkhauser, 2009; Kaye, 2010) from several large nationally representative surveys of the American population suggests that as a group, people with disabilities have become economically less self-sufficient, their employment rates have declined; their reliance on public benefits has increased and, their household incomes have fallen further behind those of other American households.

While there is a persistent gap in the employment rate of working-age people with and without disabilities, some people with disabilities have fared better than others with respect to their employment outcomes. For instance, the June-September 2005 SIPP estimates revealed a wide-range of employment rates by disability type: 26.2 percent for people with severe vision difficulties, 57.2 percent for people with severe hearing difficulties, 27.7 percent for people with severe speech difficulties, 19.5 percent for people with severe difficulty walking, 41.2 percent for people with mental or emotional conditions (Brault, 2008). Estimates using the 2008 Current Population Survey (CPS) reveal that the difference in employment rates between people with and without disabilities vary substantially by demographic characteristics and educational attainment. The employment rate of people with disabilities as a percentage of the employment rate of those without disabilities is (a) lowest among non-Hispanic African Americans, (b)

increases with education, and (c) and is higher for younger age-groups. Data from the 2008 ACS reveals a substantial range in the relative employment outcomes across the states. The employment rate of people with disabilities as a percentage of the employment rate without disabilities ranged from 40.1 percent in Kentucky to 67.0 percent in Wyoming (U.S. Census Bureau, 2010).

The variation of employment outcomes across subgroups represents an opportunity to learn about the factors that reduce the employment gap and points to possible avenues for the development of policy-, program-, and service delivery-related interventions. But surprisingly little is systematically known about which groups have fared relatively well, and why. Are the barriers to progress primarily lack of marketable skills, access to quality services and technology, less supportive family structures, financial disincentives, or personal characteristics that are a disadvantage in the labor market?

This paper presents an overview of the recent literature on employment outcomes for individuals with disabilities and how they vary by individual characteristics. We organize our review following the social model of disability which posits that outcomes depend on three domains: health, personal characteristics, and environmental characteristics. Our review focuses on health and personal characteristics and we include frequencies for the number of studies examining particular individual or environmental characteristics, the populations studied, and the extent to which studies meet features of an "ideal research design" for testing the relationship between individual characteristics and employment outcomes for persons with disabilities. We overwhelmingly found that despite a wealth of research on employment outcomes among individuals with disabilities, a small minority of these studies estimates the relationship between individual characteristics and employment while controlling for the other factors that also effect

employment, making it difficult to draw causal inference from the magnitude of the estimated effects. We also found a substantial amount of variation in the populations studied – for example across type of disability or health condition, geography, or receipt of vocational rehabilitation services, making it difficult to generalize findings to the larger population or to draw comparisons across studies. Our review concludes with critical recommendations for future research and data collection in this area.

Existing Literature Reviews

There are many existing reviews of the literature on employment outcomes for people with disabilities. However, there has not yet been a synthesis of the literature on the relationship between individual characteristics in particular and employment outcomes across disability type. Some authors have synthesized findings on the employment outcomes of subpopulations of individuals with disabilities while ignoring individual characteristics (Franche, Cullen, Clarke, Irvi, Sinclair & Frank, 2005; Khan, Ng, & Turner-Stokes, 2009; van Velzen, van Bennekom, Edelaar, Sluiter, & Frings-Dresen, 2009; Williams, Westmorland, Lin., Schmuck, & Creen, 2007). Other researchers who do include individual level characteristics do not compare employment outcomes across disabilities but instead focuses on discrete disability populations: e.g., epilepsy (Smeets, van Lierop, Vanhoutvin, Aldenkamp, and Nijhuis, 2007); spinal cord injury (Lindal, Huynh, & Biering-Sorensen, 2007); psychiatric disability (De Silva, McKenzie, Harpham, , & Huttly, 2005; Wewiorski, & Fabian, 2004); and brain injury (Nightingal, Soo, & Tate, 2007; Ownsworth, & McKenna, 2004). Other reviews that do look across disability populations unfortunately focus on discrete topics like racial/ethnic rehabilitation outcome disparities (LeBlanc & Smart, 2007) and social support (Chronister, Chou, Frain, & Cardoso, 2008) without looking at the concurrent impact of other individual level characteristics.

Finally, most systematic reviews do not apply theoretical principals to assist in organizing their efforts or explaining the results with a few exceptions (e.g., de Croon, Sluiter, Nijssen, Dijkmans, Lankhorst, & Frings-Dresen, 2004; Ownsworth & McKenna, 2004). De Croon et al. uses a theoretical perspective drawn from the International Classification of Functioning, Disability and Health (ICF) to explore the misfit between functional capability and work environmental demands for people with rheumatoid arthritis while Ownsworth and McKenna posit a pre-trauma/early recovery/long-term adjustment model to explain employment outcome potential following traumatic brain injury. Without applying theoretical constructs to guide systematic reviews the reader is often left with what seems like a random set of variables that are arbitrarily classified.

Our review of the literature on individual characteristics and employment outcomes of individuals with disabilities contributes to the existing literature by (1) considering studies across all disability populations, and (2) providing a theoretical framework and ideal research design against which to assess the state of the literature. We discuss this theoretical framework in the next section.

Theoretical Framework

The variation of employment outcomes across subgroups represents an opportunity to learn about the factors that reduce the employment gap and points to possible avenues for the development of policy-, program-, and service delivery-related interventions. But surprisingly little is systematically known about which groups have fared relatively well, and why. Are the barriers to progress primarily lack of marketable skills, access to quality services and technology, less supportive family structures, financial disincentives, or personal characteristics that are a disadvantage in the labor market? To help answer these questions we frame our research by

blending the social model of disability with labor economic theory. In doing so we follow the International Classification of Functioning, Disability and Health (ICF), and consider three domains. The first is "health conditions"— physical and mental characteristics that underlie disability[6]. The second is "personal characteristics"—individual characteristics that potentially impact employment outcomes. These include demographic characteristics (e.g., age, sex, race, marital status and parental status) as well as characteristics of "human capital" and "social capital." Human capital is marketable knowledge and skills gained through formal education, training and experience. Social capital refers to the nature and strength of an individual's social relationships (e.g., with family, friends, community organizations, co-workers and employers), as well as the culture embodied in those relationships. The third domain is "environmental characteristics"— characteristics of public infrastructure, which can be service and support programs, including state vocational rehabilitation agencies, income transfer and benefits programs, such as SSDI, SSI and Medicare, transportation systems, and local labor markets.

This theoretical framework supports two overarching hypotheses that guide the literature review to further understand how health conditions, demographics, human capital, and social capital are related to employment outcomes:

H1. Employment outcomes for individuals with disabilities vary with the individual's health conditions, holding personal and environmental characteristics constant.

The medical model of disability focused attention on this first hypothesis, but ignored the roles of personal characteristics and the environment (Chan et al. 2009; The Lancet, 2009). Findings from research guided by the medical model likely confounded the employment effects

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[6] It is important to note that we are not equating health conditions with disability, but instead using health conditions as a starting point to access the broadest number of papers in the literature on disability since all disability begins with an underlying health condition. We recognize that not all health conditions lead to a disability.

of health conditions with the employment effects of personal and environmental characteristics, because the prevalence of health conditions is correlated with these characteristics (for example, see Fombonne (2003) for autism, Kendler and Walsh (1995) for schizophrenia, and CDC (2011) for diabetes). Our research will comprehensively test the assumptions on how health conditions affect employment outcomes, paying close attention to isolating the effects of health conditions from the effects of personal and environmental characteristics associated with health conditions.

H2. Employment outcomes for individuals with disabilities vary with the individual's demographic characteristics, human capital, and social capital, holding health conditions and characteristics of the environment constant.

Our second hypothesis addresses the personal characteristics that social scientists identify as being the key determinants of employment outcomes, often without regard for the health conditions of the individual, but usually accounting for the role of at least some aspects of the environment. Human capital has been a central concept of labor economics theory for many decades, and investment in human capital at younger ages has been shown to be a key determinant of future labor market success (Ashenfelter and Layard, eds., 1987). Numerous studies have also examined the effects of sex, race and age on employment outcomes for people with disabilities, holding human capital constant, primarily for the purpose of assessing the effects of labor market discrimination (Livermore et al., 2000). With regard to social capital, time allocation and household production theory expand on theories in labor economics to incorporate the influence of an individual's family and friends, community, and networks. While social capital has not been typically been included in models of the labor market, there is growing recognition of its role in determining employment outcomes, especially for working-age people with disabilities (Chronister, J., Chou, C. C., Frain, M., & Cardoso, E. 2008; Paraponaris, A., Teyssier, L.S., and Ventelou, B. 2010).

This literature review is the first of a three-phase iterative research project of the Individual Characteristics Rehabilitation and Research Training Center (IC-RRTC) funded by the National Institute for Disability Rehabilitation and Research (NIDRR) at the U.S. Department of Education. The goal of first phase is to produce an assessment of existing research on how health conditions and personal characteristics are related to employment outcomes among individuals with disabilities, identifying gaps in the literature. The second phase of the research will attempt to fill the identified gaps in the existing literature using existing data. The third phase is planned to conduct and analyze a national survey to address critical evidence gaps identified in the first two phases.

Methodology

Keyword searches of bibliographic databases (ERIC, EconLit, PsycINFO, Social Work Abstracts, SocIndex) between 2006 and 2010 were conducted by Hunter College library faculty and staff to identify relevant abstracts. Searches were done for abstracts that mentioned disability or any chronic conditions and employment or labor market outcomes (see AppendixTable 1 for detailed search instructions). Eighteen thousand five hundred eighty five (18,585) abstracts were identified.

A number of smaller databases (National Bureau of Economic Reseach Working Papers, Urban Institute, Mathematica Policy Research, University of Michigan Retirement Research Center, National Center for Dissemination of Disability Research, Rehabilitation Research & Training Center on Blindness and Low Vision University of Mississippi, National Rehabilitation Information Center REHABDATA database, National Clearinghouse for Rehabilitation Training Materials Search) were used to search the grey literature between 2006 and 2010. Two hundred ninety nine (299) papers were identified in the grey literature.

This abstracts of the entire set of documents that resulted from this initial search were reviewed to confirm the relevance of the documents for inclusion for more in-depth review. Many of the documents were excluded due to a variety of reasons. Some documents were selected due to use of the word "employ," where the word "employ" was just used to refer to the application of an intervention. An example would be a document titled "The efficacy of employing physical therapy to ameliorate pain" which did not address employment as an outcome in any way. Another reason for excluding a document was that it was a newspaper or magazine and did not report research. After this initial review, 2,077 articles continued to fit inclusion criteria for more in-depth review.

To conduct this more detailed review, 14 reviewers (principal investigators, research staff and graduate students) were trained to apply a consistent set of standards. An abstract review manual and at least five "gold standard" abstract reviews served as the basis for training. All reviewers had to reach >95% accuracy on the "gold standard" abstracts before being released to review abstracts. Each abstract was read by one reviewer and coded for identifying: people with disabilities; specific employment outcomes; specific impairments; specific individual characteristics and; specific environmental characteristics. Reviewers also coded type of study (quantitative, qualitative, theory), and type of data (survey, administrative, intervention).

Table 1 summarizes selected findings from the abstract review. Studies were identified as relevant if their abstracts mention three features: the study includes individuals with disabilities or chronic health conditions, it examines employment as an outcome, and it mentions individual characteristics. Of the 2,077 abstracts read, 673 met these three conditions. However, 112 of these studies were opinion pieces or theoretical pieces and 121 used qualitative methods. We selected the 440 quantitative studies to include in a full-text review. We limited the current review to

quantitative studies because our goal was to assess the state of the literature in its ability to make

population inferences on differences in employment outcomes by individual characteristics.

Identifying differences by individual characteristics requires multivariate analysis.[7]

[Insert Table 1 about here]

For the full text review of quantitative studies, we used Ph.D. level researchers who

participated in a similar training process as the abstract reviewers. Full texts were coded on:

country studied; specific data used (CPS, SIPP, NHIS, RSA-911, SSA-TRF, other); sample

characteristics (previously employed, race, gender, occupation, geographic location); type of

sample (population based, convenience, other); the types of disability populations; sample size;

type of research design (experimental, quasi experimental cross-sectional, quasi experimental

longitudinal, systematic review-meta analysis, other); statistical methods (descriptive, other

univariate, multivariate); specific employment outcomes; hypothesis 1 (health) variables;

hypothesis 2 (personal) variables; hypothesis 3 (environmental) variables. All full text coding

was checked for accuracy by a second reviewer with a Ph.D. If there was a disagreement with

the original coding, a third reviewer was brought in to arbitrate the decision. This resulted in the

final inclusion of 324 articles that utilized quantitative methods.

Findings

Table 2 summarizes the populations studied and the methods used in the 324 studies

included in the full-text review. Most of the studies were limited to individuals with a single

health condition or disability, with only 16 percent of the studies including two or more not

limited to a particular disability group. To facilitate comparisons, we grouped the populations

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[7] The qualitative studies are being reviewed separately, because while lacking the potential for inference, they could be informative if they revealed potentially important barriers or facilitators to employment that are not well studied in the quantitative literature.

studied into sixteen mutually exclusive categories. The most frequently studied population, individuals with cognitive-psychiatric impairments (e.g. depression, schizophrenia, bipolar disorder, and anxiety, mood, or personality disorders), were included in 90 studies. Individuals with alcoholism or addictions were the second most frequently studied population followed by the catch all category, individuals with "other chronic health conditions," which includes conditions that do not fall into one of the other categories like heart disease and chronic pain and other chronic conditions. Individuals with cognitive-intellectual conditions, such as autism were identified in 30 studies, followed by individuals with orthopedic conditions, such as back injuries, rheumatoid arthritis, and musculoskeletal conditions who were identified in 21 studies.

[Insert Table 2 about here]

The 324 studies whose full-texts were reviewed also differed in methodology across several features, including research design, statistical methods, sources of data, and sample size. Thirty-three studies (10 percent) relied on experimental research design, in which some individuals in the study were assigned to a "treatment group" receiving the treatment or service of the study's interest, while other individuals were assigned to a "control" group either not receiving any treatment or receiving an alternative treatment. The gold standard for experimental designs is randomized control trial (RCT), where individuals are randomly assigned to either the treatment or control group, so that any differences in outcomes can be attributed to differences in the treatment. Three-quarters (24) of the 33 experimental studies used RCTs while one-quarter (8) did not. In studies that do not use random assignment, researchers cannot rule out the possibility that some or all of the observed differences in outcomes between treatment and control groups may be due to underlying and often unobserved differences in the characteristics of the two groups (such as ability or motivation). It is in research on the effectiveness of services

such as vocational rehabilitation (VR) or benefits such as health insurance, disability insurance (DI) or Supplemental Security Income (SSI) that this is of most concern.

A majority of the papers (88 percent) relied on non-experimental research design, though there was a great degree of variation in their specific methodologies, ranging from descriptive analyses to sophisticated quasi-experimental methods. About two-thirds of these used cross-sectional data while about a third used longitudinal data. Longitudinal data may be preferred due to the dynamic nature of health, disability, and employment. Statistical methods varied between multivariate analysis (226 or 70%), and descriptive or univariate statistics. Univariate analysis may be adequate in RCTs, due to random assignment of individuals. However non-RCTs relying on univariate or descriptive evidence cannot make unbiased causal inferences from their findings, because estimated correlations may be due to underlying differences in other characteristics. For this reason, multivariate analysis is the preferred and fortunately most commonly observed statistical methodology in our sample of studies.

The third methodological dimension we examined across the studies is the type of data used. For the results of a study to be widely generalizable, population based data are necessary. These data are typically collected by surveys administered by the federal government. A random sample of individuals (within geographic and other clusters) is interviewed and when combined with probability weights provided by the survey agency, the data are nationally representative. However only 22% (70) of the studies in our sample used population based data, and some of these used U.S. data and others used data from other countries. Another 18% (59) used administrative data. Administrative data typically come from a government agency providing services (like VR) or benefits (like DI), or an employer or insurance company. A benefit of administrative data over population based data is that the full population of individuals served by

the particular agency is in the dataset. This often means that samples are large, and non-response and measurement error are not concerns. However because selection into the agency or firm is not random, and likely reflects the individual's health, employment, or motivation, results from administrative studies cannot be generalized beyond the population in the dataset. The majority of studies in our sample, 60 percent (195) used data from samples of convenience. These samples are typically not randomly selected like population based data, nor do they represent a full population, like administrative data. Examples include a survey of individuals discharged from a rehabilitation facility or a sample of individuals recruited for an intervention.

Given the prevalence of studies using samples of convenience, it is not surprising that the distribution of sample sizes in the studies used is highly skewed to the right. Figure 1 plots the distribution of sample sizes. While the mean sample size is 87,384, the median is 451 and 58% of the studies used samples with fewer than 1000 observations. The larger samples are in many of the administrative datasets (e.g RSA-911) and population based national surveys, while the smaller samples are typically in the samples of convenience. While these samples of several hundred observations or smaller may be adequate in RCTs, they typically do not have the statistical power necessary to estimate models comprising individual characteristics and other covariates.

[Insert Figure 1 about here]

We now turn to describing the methods in the literature as they pertain to our two research hypotheses. We begin our review for each hypothesis discussing the characteristics of an ideal research design to test the hypothesis.

Studies of the Relationship between Health Conditions and Employment Outcomes

We first describe the state of the literature on our first hypothesis, that *employment outcomes for individuals with disabilities vary with the individual's health conditions, holding personal and environmental characteristics constant.* The full-text review revealed 131 quantitative studies that tested the relationship between health conditions and employment. Table 3 provides statistics on how well they meet various features of an "ideal research design" for testing this hypothesis. Our first ideal research design feature is that studies must include individuals with different health conditions in order to estimate differences in employment outcomes by health condition. However, 66 percent of the studies estimating employment outcomes by health condition only included one health condition. Only 12 percent (n=16) include three or more conditions. Consistent with the findings in Table 1 which tabulate the populations that were studied, the conditions most frequently studied were cognitive-psychiatric conditions, followed by chronic health conditions, alcohol/substance abuse, orthopedic impairments and cognitive-intellectual conditions.

[Insert Table 3 about here]

The second ideal feature is that when estimating employment differences attributable to health conditions, studies should control for other factors that could affect employment, including demographics, human capital, social capital and environmental characteristics. It is well known that the prevalence of certain health conditions may vary by age, race, income, and gender (for example, see Fombonne (2003) for autism, Kendler and Walsh (1995) for schizophrenia, and CDC (2011) for diabetes). Not controlling for these factors may confound the

estimated differences in employment attributed to a particular health condition. Of the 131 studies we identified examining the relationship between health conditions and employment outcomes, 69 percent (91) controlled for at least one demographic variable, 49 percent (64) controlled for at least one demographic and human capital variable, 34 percent (45) controlled for at least one demographic, human capital, and environmental variable, and only 15 percent (20) controlled for at least one demographic, human capital, environmental and social capital variable.

The third ideal design feature is that the results of the study should be generalizable to an identifiable population. This necessitates the use of population based data or administrative data from a relevant group. Thirty-three percent (n=43) of the 131 studies of health conditions used population based data. These datasets included the Health and Retirement Study (n=4), which is a longitudinal survey of individuals 50 and older, the National Health Interview Survey (n=3), the National Longitudinal Survey of Youth (n=2), and the National Longitudinal Transition Study (n=2), which follows youth with disabilities into their young adult life. An additional 21 percent (n=27) used administrative data. Seven of these used data from the Rehabilitation Services Administration's 911 data, which has data on all closed State vocational rehabilitation clients. Because the file contains the full population of State VR clients, whose cases are not active, the sample size is quite large, even for low frequency conditions. However, estimates from it cannot be generalized to all individuals with disabilities because individuals who have never used state VR services are not represented in the data.

Our final design ideal for studies testing H1 is the inclusion of multiple employment outcomes. While employment itself is the primary outcome of interest, salary or wages, hours, benefits, and retention are likely to differ between people with and without disabilities

(Houtenville et al, 2013), and more needs to be learned about how large these differences are and why they persist. Few of the studies met this condition and instead focused solely on employment or lack of employment. Employment or lack of employment was studied by 73% (96) of the studies. Hours or part time work was the second most frequently examined outcome studied by 21 percent (27) of the studies, followed by wages, salary or income (20 percent or 26), and retention (12 percent or 15). We also coded benefits, promotions, and factors that may bring someone further from or closer to being employed, including disability insurance receipt and VR participation, but very few studies examined these as outcomes.

How well does the literature concurrently meet all four of our ideal research conditions? Table 4 shows that among the 45 papers that compared employment outcomes across multiple health conditions, only seven control for at least one demographic, human capital, social capital, and environmental variable. When we limit the studies further to those that are generalizable due to the use of population based or administrative data, we are left with four studies. Finally, only one paper meets the additional condition of examining multiple employment outcomes.[8]

[Insert Table 4 about here]

Studies of the Relationship between Personal Characteristics and Employment Outcomes

The second hypothesis is that *employment outcomes for individuals with disabilities vary with the individual's demographic characteristics, human capital, and social capital, holding health conditions and characteristics of the environment constant.* As we did with our first hypothesis, we reviewed all quantitative studies that examined differences in employment outcomes by these characteristics, among individuals with disabilities or chronic health

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[8] el-Guebaly, Nady, Shawn Currie, Jeanne Williams, JiLian Wang, Cynthia A. Beck, Colleen Maxwell, and Scott B. Patten. "Association of mood, anxiety, and substance use disorders with occupational status and disability in a community sample." *Psychiatric Services: 58(5)* 659-667.

conditions regardless of methodology. The "ideal research design" for testing this hypothesis was slightly different than that for testing H1. First, to increase generalizability to as many individuals with disabilities as possible, the sample would include a broad spectrum of individuals with disabilities, rather than focus on one health condition. As with H1, the best studies will control for health conditions, other personal characteristics, and characteristics of the environment. They will also use population based data or administrative data from a relevant group, and they will examine multiple employment outcomes.

Our literature review revealed 228 papers that used quantitative tools to examine the link between some individual characteristics and employment outcomes. Demographic variables had the highest frequency, appearing in 205 studies, followed by human capital variables, which appeared in 166 studies and social capital variables, which appeared in 70 studies. Figure 2 displays the number of studies that examined a particular demographic, human or social capital variable. It shows that age and gender are the most studied demographic variables, education is the most studied human capital variable, and social capital most often focuses on marital status.

[Insert Figure 2 about here]

Table 5 presents statistics separately on studies examining demographics, human capital and social capital. About 20 percent of these papers meet our first ideal research design by using what we consider a broad definition of disability to identify their sample. We defined "broad" to mean that the sample included individuals from at least three of the health condition groups listed in Table 3 or that the sample included all individuals with disabilities, even if it was not separately examining different employment outcomes by health condition. Consistent with our finding in studies of H1, a majority of the papers examining H2 variables use a sample that is

limited to one disability group, and that group is usually individuals with cognitive psychiatric disabilities or chronic health conditions.

[Insert Table 5 about here]

The next panel of Table 5 illustrates the extent to which the studies meet the second ideal research design of controlling for the other domains that may affect employment outcomes. Roughly 40 to 50 percent of the papers controlled for health conditions, though the share that control for all three of the other domains range from 10 percent among studies examining demographics to 29 percent among studies examining social capital.

The third ideal research design feature for H2 is that the studies use population based or administrative data, so that the results of the study are generalizable to a population. About 40-45 percent of the studies met this standard, depending on the kind of H2 variable being examined. The last ideal research design feature against which we assess the literature is examining multiple employment outcomes, and here our findings are similar to those for H1 studies. The majority of studies (70-80 percent) studied employment, while much fewer studied other employment outcomes including wages, hours, or retention.

How well does the literature concurrently meet our four ideal research conditions? Table 6 displays the number of H2 papers, by type of individual characteristic studied, which concurrently met *all* four of our ideal research conditions. The table shows that although there is a sizable quantitative literature examining the differences in employment outcomes by demographic characteristics (205 papers), human capital (166 papers) and social capital (70 papers) and employment, only a small minority of the studies estimates these relationships thoroughly and in a way that maximizes external validity. When applying the criteria that studies

use a broad definition of disability only 17 percent to 20 percent of the studies, depending on the individual characteristic being studied, meet the criteria. The percent of studies that also meet the second criteria of controlling for health conditions, other individual characteristics, and features of the local environment, falls to between five and 14 percent. Only nine papers meet the additional criteria of using population based or administrative data and between five and nine papers meet the additional criteria of examining multiple employment outcomes, depending on the type of individual characteristic studied.

[Insert Table 6 about here]

Implications and Discussion

There was great methodological diversity in the research that informed the development of our "ideal" research models. Seventy percent or 226 of the 324 of the full-texts read used multivariate analysis. This method is superior to descriptive or univariate statistics that can lead to biased causal inferences because estimated correlations may be due to underlying differences in other unmeasured variables. Twenty two percent or 70 papers used population based data and 18% or 59 papers used administrative data. Both administrative and population based data are superior to samples of convenience because the results are generalizable to either the total population or a definitive administrative population (e.g., social security disability beneficiaries). Only 35% (97) of the papers used longitudinal data which is preferable over cross-sectional because it captures the dynamic aspects of disability and employment.

From this critical review of the literature it is evident that there is an extensive body of research on individual characteristics and employment outcomes for people with disabilities. Our abstract review process identified 440 papers that "made the cut" for full text review that were

quantitative and focused on how the individual characteristics of people with disabilities were related to employment. Even after subjecting the full texts to more demanding inclusion/exclusion criteria, 324 full texts remained. However, the apparent extensiveness of this literature belies the fact that very little of it can answer the questions our research set out to answer. After applying the most stringent criteria set forth by our "ideal" research models, between one and 14 percent of the papers could address our research questions. To answer the first hypothesis that *employment outcomes for individuals with disabilities vary with the individual's health conditions, holding personal and environmental characteristics constant* one out of 131 (1%) papers survived. A greater share of papers met the "ideal" research model we set forth to test the second hypothesis that *employment outcomes for individuals with disabilities vary with the individual's demographic characteristics, human capital, and social capital, holding health conditions and characteristics of the environment constant.* For demographic characteristics 12 of 205 (6%) papers remained. Ten out of 166 (6%) papers "made the cut" in the human capital area and two of the 70 (3%) of the social capital papers remained.

We observed in a number of papers certain research practices that made it difficult or impossible to address our research questions. There were two research practices that did not allow us to evaluate the influence of certain demographics on employment outcomes. One practice involved first conducting univariate analyses on a set of demographic variables to simplify the multivariate analysis by eliminating demographic factors that are not significantly related to employment at the univariate level. This practice is not advisable, because a variable that is not significantly related to an outcome at the univariate level may have an influence when combined with other variables in a multivariate analysis. Other studies treated demographic factors as control variables in their multivariate analyses but did not report estimates for these

control variables. For our purposes the first practice is the most limiting because it may result in biased estimates of the influence of individual characteristics on employment outcomes, whereas the second practice does not lead to biased estimates but the authors would have to supply coefficients for unreported variables if effect sizes are to be estimated. Another practice that disqualified a number of studies from consideration was the inclusion of persons with disabilities and persons without disabilities in the multivariate analyses without estimating the influence of individual characteristics on people with disabilities separately. This research practice can assist in understanding the factors that contribute to differences in employment between persons with disabilities and persons without disabilities, but it cannot assist in understanding how the individual characteristics of *persons with disabilities* are related to employment outcomes.

Existing survey and administrative data offer several avenues to fill some of the gaps in the literature while meeting features of our ideal research design. The first is comparing employment outcomes across disabilities or health conditions. Both the Rehabilitation Services Administration (RSA) and the Social Security Administration (SSA) have administrative data sets that include extensive information regarding impairments, disabilities and health conditions -- the RSA's 911 files have 19 impairments and 36 health conditions. The RSA 911 data base is relatively simple to exploit because RSA makes these files (without information that could identify individuals) readily available to researchers whereas the SSA administrative files are more difficult to access due to imposition of extensive security clearances. There are also opportunities with survey data to fill this gap. Any national survey (e.g., ACS and CPS) that includes the six disability questions related to vision, hearing, mobility, cognition, self care and activities of daily living could be exploited by comparing employment outcomes across these categories or across any combination (there are 46 non-ordered possible combinations) of these

categories since survey respondents can respond affirmatively to any one or all of these categories. There are other national surveys that have extensive impairment and health condition questions in addition to the six questions. For example the Survey of Income and Program Participation (SIPP) has numerous functional questions related to hearing, sight, communicating, mobility, self care, activities of daily living, work disability, cognition and social/emotional functioning in addition to questions regarding certain specific health conditions (i.e., learning disability, intellectual disability, developmental disability, Alzheimer's disease, other mental/emotional including depression and anxiety). The National Health Interview Survey has a number of limitation questions related work, personal care, and activities of daily living. When limitations are identified, respondents are asked about health condition(s) causing the limitation(s). In the 2011 NHIS there are 18 fixed categories of health conditions and 19 additional health condition categories including two other impairment categories.

Another gap in the literature is that very few studies focus on the relationship between social capital and employment outcomes, other than the studies documenting marital status. Two supplements that are regularly conducted as part of the Current Population Survey (CPS) can partially fill this gap. The Civic Engagement Supplement includes a number of questions regarding involvement in empowerment and political activities, engagement with groups or networks, sharing information and communication with neighbors, and level of social cohesion and inclusion. The Volunteer Supplement gets at social capital by asking about the level of involvement in the community via the frequency of volunteer activity, the type of organizations where the volunteering took place, and the types of volunteer activities.

Although not part our ideal research design, use of longitudinal data can greatly expand the scope of research on the dynamic nature of disability and employment. A number of studies

made use of such data including the National Longitudinal Survey of Youth (NLSY), the Health and Retirement Study (HRS), the National Longitudinal Transition Study (NLTS) and the Panel Study of Income Dynamics (PSID). While the NLSY and NLTS are limited to transition age youth and the HRS is limited to Americans nearing and entering retirement, the PSID is not restricted by age or condition. Taken together, these datasets have much untapped potential for informing policymakers on issues related to individual characteristics and a broad set of employment outcomes including retention, unemployment, and long-term earnings.

Even with the research potential in existing national datasets, our review points to the need for new data collection efforts to fill the knowledge gap on employment outcomes for persons with disabilities on an ongoing basis. While existing large national datasets such as the CPS, ACS, and NHIS have untapped potential, they have important limitations. First, none of these surveys ask about social capital, workplace supports, or about features of the local environmental that qualitative studies indicate could be important determinants of employment outcomes. In addition, the CPS and ACS do not ask about health conditions and while the NHIS asks about conditions, it only does so if respondents indicate they have functional limitations. More importantly these datasets are limited by the fact that they are cross-sectional. As just discussed, existing longitudinal datasets can be further exploited to examine the dynamic aspects of disability and employment outcomes for individuals. However, given the age restrictions or limited samples of individuals with chronic health conditions or disabilities in these datasets, we believe there is a need for a similar longitudinal study targeted to individuals with or at risk for disabilities. Much can be learned from the history of the design and funding of the PSID to inform the war on poverty and the HRS to address issues related to the aging of the baby

boomers, to fund and design a dataset with the goal of informing policy makers and practitioners on how to best improve employment outcomes for persons with disabilities.

To fill the employment and disability information gaps identified in this paper such a longitudinal study would follow young adults while they prepare for entering the world of work and adults during their early, mid and late career phases. In addition, this survey would capture the experiences of individuals with developmental as well as latter onset disabilities and have a sufficient number of participants to track employment and disability dynamics across many health conditions and impairments.

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Table 1: Studies in Abstract Review by Various Inclusion Criteria

Abstract Review of Keyword Hits

Abstract Mentions:	Number of Studies	
Disability or Chronic Health Conditions	1715	
and employment outcomes	986	
and individual characteristics	673	
Methodology		Percent
Quantitative methods	440	65%
Qualitative methods	121	18%
Theory/Opinion	112	17%
Full-text review of quantitative literature		
Total Papers Read	440	
Met inclusion criteria	324	

Table 2: Characteristics of Quantitative Studies in Full-Text Review

	Number	Percent
Population Studied		
Population not limited by condition	52	16%
Cognitive-psychiatric Impairment	90	28%
Alcohol/Substance Abuse	36	11%
Cognitive-intellectual Impairment	30	9%
Chronic Health Conditions	45	14%
Mobility impaired	28	9%
TBI or Acquired Brain Injury	22	7%
Orthopedic Impairment	21	6%
Manipulative/Fine Motor Impairment	7	2%
Respiratory Impairment	7	2%
Other Physical Impairment	16	5%
Blind	13	4%
Visually Impaired	15	5%
Deaf	11	3%
Hearing Impaired	13	4%
Deaf and Blind	5	2%
Communicative disorders	5	2%
Research Design		
Experimental	33	10%
Non-Experimental - Cross Sectional	184	57%
Non-Experimental - Longitudinal	100	31%
Theory/Lit Reviews	7	2%
Statistical Methods		
Multivariate Analyses	226	70%
Univariate or Descriptive	98	30%
Type of Data		
Population Based Sample	70	22%
Administrative	59	18%
Convenience/RCT/Other	195	60%
Total Number of Studies	324	

Figure 1: Distribution of Sample Size in 324 Studies Included in Full-Text Review
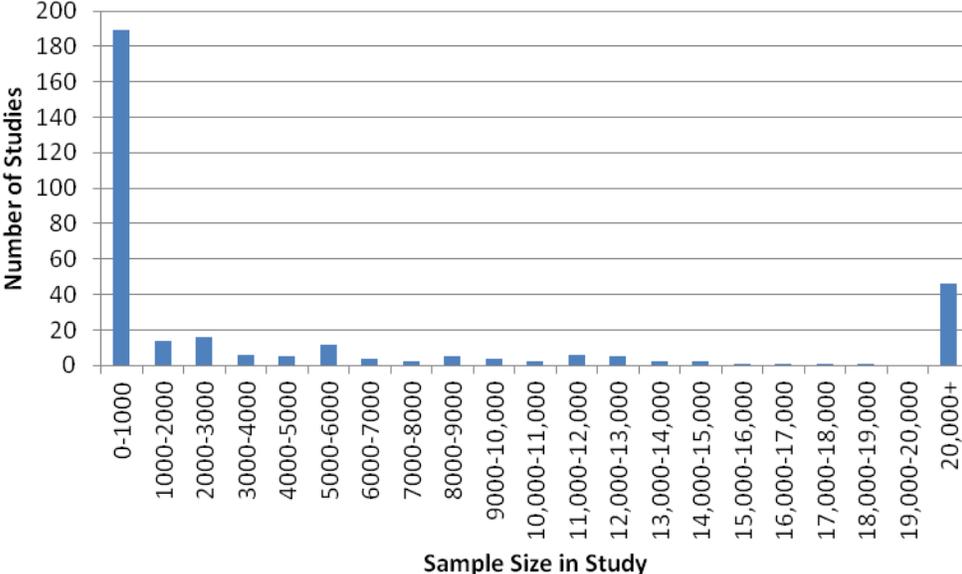
Table 3: Studies Examining Differences in Employment Outcomes by Health Condition

	Number	Percent
All Studies	131	
Health Condition/Disability Studied		
Cognitive-Psychiatric	72	55%
Chronic Health Conditions	38	29%
Alcohol/Substance Abuse	34	26%
Orthopedic	18	14%
Cognitive-Intellectual	15	11%
Communicative	6	5%
Respiratory	7	5%
Other Physical Impairment	5	4%
Blindness	5	4%
Other Visual	8	6%
Mobility	5	4%
Acquired Brain Injury	8	6%
Deafness	3	2%
Hearing Loss	6	5%
Deaf & Blind	1	1%
Number of Conditions		
One	86	66%
Two	29	22%
Three or more	16	12%
Controls for:		
Demographics	91	69%
& Human Capital	64	49%
& Environment	45	34%
& Social Capital	20	15%
Type of Data		
Population Based Sample	43	33%
Administrative	27	21%
Convenience	61	47%
Dependent Variable Examined		
Employment	96	73%
Wages	26	20%
Hours	27	21%
Retention	15	11%

Table 4: Studies Examining Differences in Employment Outcome by Health Condition Meeting Our Ideal Research Design

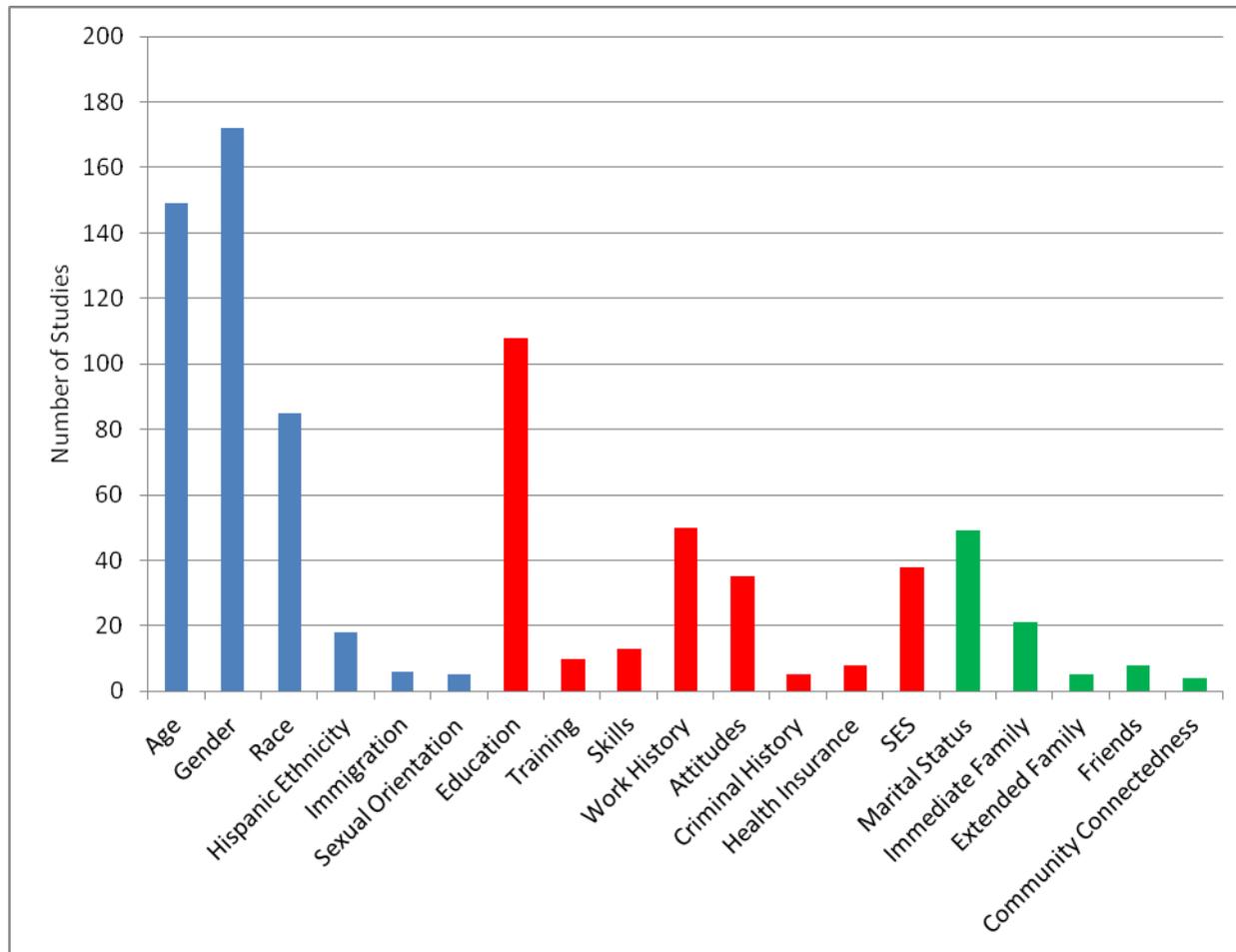|	Number	Percent
All Studies	131	
1. Compares multiple health conditions	45	34%
2. And controls for demographics, human and social capital, and environment	7	5%
3. And uses population based or administrative data	4	3%
4. And examines multiple employment outcomes	1	1%

Figure 2: H2 Variables

Table 5: Studies Examining Differences in Employment Outcomes by Personal Characteristics ("Hypothesis 2")

Among Studies Testing The Relationship between Employment and:

	Demographics		Human Capial		Social Capital	
	Number	Percent	Number	Percent	Number	Percent
All Studies	205		166		70	
Broad definition of disability	42	20%	33	20%	12	17%
Controls for:						
Health Conditions	91	44%	70	42%	34	49%
& Demographics	91	44%	64	39%	32	46%
& Human Capital	64	31%	64	39%	28	40%
& Environment	45	22%	45	27%	20	29%
& Social Capital	20	10%	20	12%	20	29%
Type of Data						
Population Based Sample	48	23%	30	18%	18	26%
Administrative	45	22%	35	21%	9	13%
Convenience	112	55%	101	61%	43	61%
Dependent Variable Examined						
Employment	158	77%	131	79%	51	73%
Wages	35	17%	32	19%	1	1%
Hours	35	17%	25	15%	12	17%
Retention	16	8%	18	11%	3	4%

Table 6: H2 Papers Meeting Our Ideal Research Design						
	Studies Examining Employment Outcomes and:					
	Demographics		Human Capital		Social Capital	
All Studies	205		166		70	
1. Broad Definition of Disability	42	20%	33	20%	12	17%
2. And controls for health conditions, demographics, human and social capital, and environment	10	5%	10	6%	10	14%
3. And uses population or administrative data	9	4%	9	5%	9	13%
4. And examines multiple employment outcomes	5	2%	9	5%	5	7%

Appendix Table 1: Bibliographic Database Search Instructions

(disab* OR ((Alcohol AND (Abus* OR Depend*)) OR alcoholism OR alcoholic) OR Amputat* OR "Anxiety Disorder" OR "Panic Disorder" OR Agoraphobia OR "Social Phobia" OR "Obsessive Compulsive Disorder" OR "Acute Stress Disorder" OR "Posttraumatic Stress Disorder" OR Arthritis OR Rheumatism OR Asthma OR Allerg* OR "Attention-Deficit Hyperactivity Disorder" OR "ADHD" OR Autism OR "Blood Disorder" OR Cancer" OR Cardiac OR Circulatory OR "Cerebral Palsy" OR Congenital OR (Birth AND (Injury OR defect)) OR "Cystic Fibrosis" OR (depression OR depressive) OR "Mood Disorder" OR "Bipolar Disorder" OR "Dysthymic Disorder" OR "Cyclothymic Disorder" OR "Diabetes Mellitus" OR (digestive OR colitis OR ileitis OR "irritable bowel") OR "drug abus*" OR (drug and Dependen*) OR "Eating Disorder" OR "Anorexia Nervosa" OR "Bulimia Nervosa" OR "End-Stage Renal Disease" OR Genitourinary OR Epilepsy OR "HIV" OR "AIDS" OR "Immune Deficien*" OR "Mental Illness" OR (Mental* AND Retard*) OR "Multiple Sclerosis" OR "Muscular Dystrophy" OR Parkinson* OR "Neurological Disorder" OR "Personality Disorder" OR "Personality Disorder Cluster A" OR Paranoid OR Schizo* OR Shcizotyp* OR "Personality Disorder Cluster B" OR (Antisocial AND disorder) OR (Borderline AND personality) OR (Histrionic AND disorder) OR (Narcissistic AND disorder) OR "Personality Disorder Cluster C" OR (Avoidant AND disorder) OR (Dependent AND disorder) OR "Obsessive Compulsive" OR Polio* OR (Respiratory AND Disorder) OR (Psychotic AND Disorders) OR "Delusional Disorder" OR Schizophrenia OR "Schizophreniform Disorder" OR Schizoaffective OR (Learning AND Disab*) OR "Spinal Cord Injury" OR Stroke OR "Traumatic Brain Injury")

AND

(employ* OR job OR labor OR labour)