

Socioeconomic Status, Perceptions of Pain, and the Gradient in Disability Insurance

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There is a pronounced socioeconomic gradient in disability insurance receipt. As figure 1(a) shows, between ages 55 and 64, 18% of people with a high school degree or less receive SSDI or SSI, compared to only 4% of people with a college degree. The disparity in social insurance receipt, combined with the strong procyclicality of disability insurance applications¹ has led some researchers to suggest that the education disparity in disability insurance receipt is more a reflection of economic circumstances than true differences in ability to work.²

At the same time, reports of physical and mental pain differ markedly across socioeconomic groups. For example, those with a high school degree or less are much more likely to report musculoskeletal pain, particularly through ages 40 through 60 (joint, back, or neck pain; see figure 1b). Since musculoskeletal impairments, which are accompanied by pain, are one of the leading causes of disability insurance receipt, this leads one to wonder if there are fundamental differences in health across socioeconomic groups.

Our goal in this paper is to understand the differential experience of pain by education. We focus on musculoskeletal pain, and in particular knee pain. Knee pain is the most common joint pain, and clinical measures of knee structure can be gleaned from x-rays.

Most knee pain is related to arthritis. Our first analysis thus asks whether differential knee pain among those with fewer years of education is associated with greater prevalence of arthritis or greater impairment conditional on arthritis. Surprisingly,

¹ Maestas Nicole, Kathleen J. Mullen, and Alexi Strand, "Disability Insurance and the Great Recession," *American Economic Review*, 2015 May;105(5):177-182.

² Autor, David H, and Mark Duggan, "The Rise in the Disability Rolls and the Decline in Unemployment," *Quarterly Journal of Economics*, 2003, 118(1): 157 - 206.

x-ray assessments of knee arthritis are similar for those with more and fewer years of education, as seen in Figure 2(a). About 85% of the difference in pain reports by education are a result of differential rates of pain given arthritis, as shown in figure 2(b).

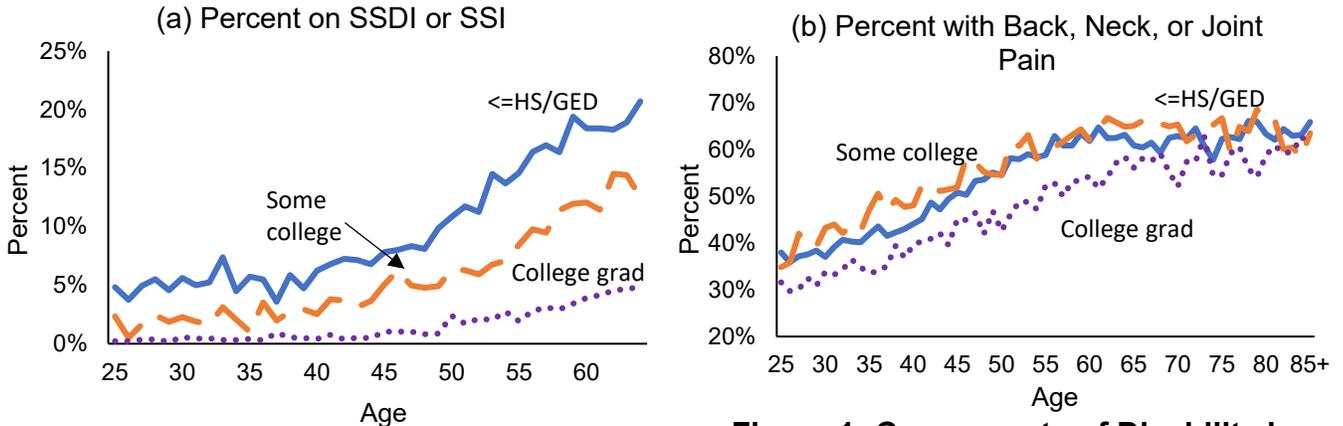
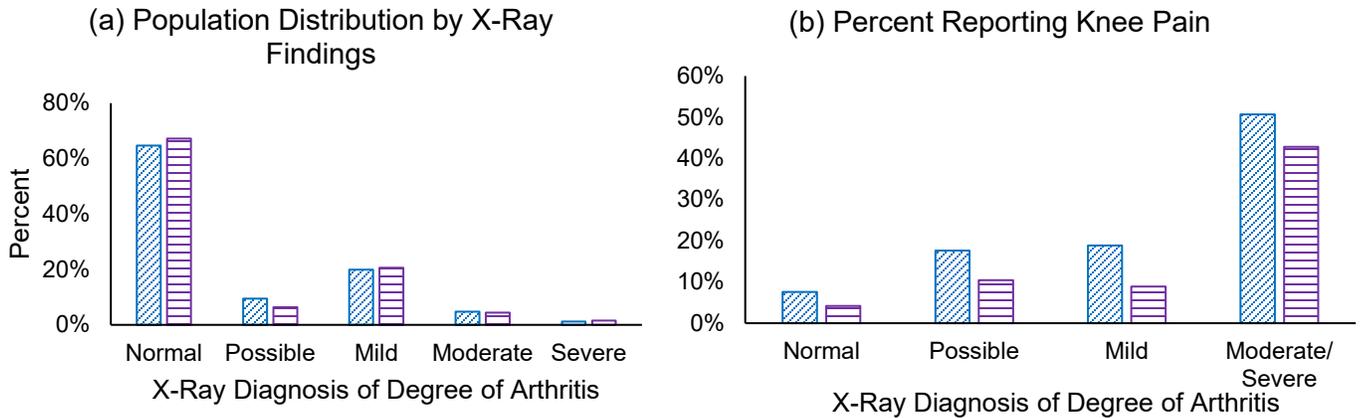


Figure 1: Components of Disability by Education and Age

Note: Data are from the National Health Interview Survey, 2009-16.

Figure 2: Severity of Knee Arthritis and Pain Conditional on Arthritis



Note: Data are from the second phase of NHANES III, 1992-94. In each chart, the unit of analysis is the knee. The first set of bars, with blue diagonal lines, are for people with a high school degree or less, while the second set of bars with purple horizontal lines, are for college graduates. The sample is people aged 60-74 responding to questions regarding knee pain and with x-ray readings.

This finding makes one question whether the pain reports are ‘real’ or whether availability of disability insurance may affect reports of pain. A variety of evidence suggests that the difference in pain is truly experienced. For example, pain reports correlate with ability to do various physical activities such as walking time and leg strength and are related to subsequent medical intervention such as receipt of a knee replacement.

Beyond differential rates of arthritis, we consider four other theories for the disparity in knee pain by education. The first theory is differences in weight. Among people aged 45-74, those with a high school degree or less have higher current and maximum weight than people with a college degree. In regression analysis, one-third of the gap in knee pain by education is a result of differential BMI by education.

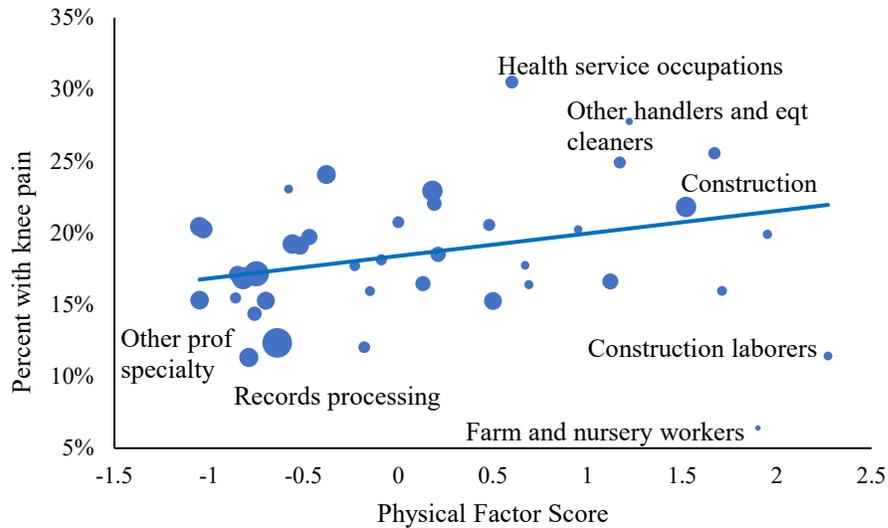
The second theory is occupational: physical requirements on jobs differ by education, and these differences lead to differential rates of knee pain. Some evidence for this is in figure 3, which relates knee pain for people aged 45-74 to the physical demands on their longest occupation, formed from the 1977 Dictionary of Occupational Titles. People in more physically demanding jobs have higher rates of knee pain at older ages, and this explains one-third of the gradient in knee pain by education.

The key question about the job demands measure is whether it is really capturing physical activity, or if instead it signals ‘good’ and ‘bad’ jobs, which affect knee pain for other reasons. The effect of job demands that we find is independent of the measures of abstract, routine, and manual jobs used in the literature³, none of which have a significant

³ Autor, David H., Frank Levy, and Richard J. Murnane, “The Skill Content of Recent Technological Change: An Empirical Exploration,” *The Quarterly Journal of Economics*, 2003, 118(4): 1279–1333.

relationship with knee pain.

Figure 3: Relationship Between Knee Pain and Physical Activity on the Job



Note: Data are from the NHANES, 1999-2004.

The third theory we test is psychological: life satisfaction is lower for the less educated, and this translates somatically into greater musculoskeletal pain. We find very little support for this theory. Nor do we find support for the theory that the general response to painful stimuli is greater among those with less education.

Overall, we conclude that the education gradient in knee pain is a result of differences in the physical demands of jobs and differences in obesity across education groups, and based on the lack of relationship to other job characteristics these relationships appear to be causal.