Social capital, friendship networks, and youth unemployment

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A B S T R A C T

Youth unemployment is a contemporary social problem in many societies. Youths often have limited access to information about jobs and limited social influence, yet little is known about the relationship between social capital and unemployment risk among youth. We study the effect of social capital on unemployment risk in a sample of 19 year olds of Swedish, Iranian, and Yugoslavian origin living in Sweden (N = 1590). We distinguish between two dimensions of social capital: occupational contact networks and friendship networks. First, ego's unemployment is found to be strongly associated with friends' unemployment among individuals of Yugoslavian origins and individuals of Swedish origin, but not Iranian origin. Second, occupational contact networks reduce unemployment risks for all groups, but especially so for Iranians. The effect sizes of the two dimensions are similar and substantial: going from low to high values on these measures is associated with a difference of some 60–70 percent relative difference in unemployment risk. The findings are robust to a number of different model specifications, including a rich set of social origin controls, personality traits, educational performance, friends' characteristics, and friendship network characteristics, as well as controls for geographical employment patterns. A sensitivity simulation shows that homogeneity bias need to be very strong to explain away the effect.

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1. Introduction

Youth unemployment is a social problem with potentially severe consequences—it triggers criminal careers (Farrington et al., 1986); it increases the risk terms of adult unemployment (Gregg, 2001), it can lead to future income losses (Nordström Skans, 2004); and it increases the risk of physical and mental ill health (Hammarström et al., 1988). In addition to being related to the general level of unemployment in a society, youth unemployment, youth unemployment has some unique causes. First, employers are often reluctant to hire youth because their productivity is yet unknown—there is only a limited track record of their performance in a job (Freeman and Wise, 1982; Skans, 2009). Second, psychological factors such as lack of motivation are important explanations of youth unemployment (Mortimer, 1994). Youths are in a fragile phase where the hardships of getting a job can cause strong feedback effects. Unemployment spells for youths will coincide with the last phases of identity formation (Hess et al., 1994), and lack of employment can cause stress and disappointment, and discourage youth from taking future work (Ellwood, 1982), creating vicious circles which further lower chances of employment (Furnham, 1985).

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We focus on a third explanation of youth unemployment that has rarely been studied: the role of social networks. Youths often have more limited occupational contact networks that are largely structured by parent's social positions. This limits their access to information about jobs, and limits their social influence. While coming of age, youths are also often dependent on friends, and friend network composition might be decisive for e.g., the motivation of finding a job. We study school leavers during approximately half a year after leaving school. We employ two key measures of relations and networks − the proportion of friends (most of which comes from the school) who are employed, and the extent of contacts with individuals within certain (high or low status) occupations − and then examine their association with the individual's own unemployment risk. These measures capture fundamentally different aspects of networks, and their simultaneous relation to (youth) unemployment has to our knowledge not been studied before. Our first prediction is that unemployed friends will increase ego's unemployment risk. Our second prediction is that contacts with high-status persons and the range of contacts within different occupations will reduce ego's unemployment risk. As youth unemployment is particularly prevalent among immigrants in Sweden (Vilhelmsson, 2002), we also examine how social network effects vary across groups of individuals of Swedish and non-Swedish background, specifically for the two large immigration groups of Iranians and ex-Yugoslavians. A central benefit of studying youths is that their occupational contact network will be structured mainly by their parents' and extended family's networks, and not by their own labor market experiences. This minimizes the possible endogeneity, i.e., that having a job leads to richer networks. This has been a limitation in previous research on social capital focusing on adults.

Sweden, widely recognized as a highly inclusive welfare state, is a particularly interesting case in point since this country has had one of the highest *relative* youth unemployment rates within the OECD (2008, pp. 89−122), i.e., compared to the adult unemployment rate. In Sweden, the school-to-work transition is known to be a drawn-out process, especially among the lowest skilled (Erikson et al., 2007).

2. Social capital and labor market opportunity

2.1. Information access, job referral and influence

Granovetter (1974) showed that recruitment in the labor market is often informal, and that acquaintances play an important role, pointing to the importance of information flows in social networks. Having personal networks with many acquaintances means that you get more information about job openings, which facilitates the job search and is likely to increase success. Fernandez et al. (2000) suggest that from an employer's perspective, recruitment through job referral networks gives access to a better pool of applicants, allows for better job-worker matches, and creates natural mentoring of new hires, which tend to reduce screening costs and increase economic returns. To the extent that unemployed individuals have unemployed friends rather than employed friends, this means that they are cut off from job referral networks, their access to information will suffer, and this relative isolation from information on job openings will decrease (re-)employment chances. This line of reasoning is connected to current economic theorizing on unemployment. Information access plays a central role in the Diamond-Mortensen-Pissarides (DMP) model of aggregate unemployment (see Andolfatto, 2008 for an introduction): workers and employers are required to gather information on available jobs and applicants qualities, respectively, which gives rise to a friction that eventually increases equilibrium unemployment levels. Job-seekers' and employers' access to good information is likely to lower aggregate unemployment by shortening periods of unemployment. The model outlined by Calvó-Armengol and Jackson (2004) also suggests that unemployment is influenced by network effects, and that information access is one key mechanism; with lack of employment this access become depressed.

Information access may have a racial or ethnic component. Holzer (1987) argued that inferior access to valuable information streams through personal contact is a major reason for higher unemployment among black American youth. To the extent that welfare dependency and unemployment among adult black individuals are high, their potential contact with labor market actors will be lower. In a case study, Fernandez and Fernandez-Mateo (2006) outline the "wrong networks" hypothesis and suggest that networks of racial minorities can be unconnected to job referrals, and that the peers of minorities may not transfer referrals at all, or not to minorities specifically. While Fernandez and Fernandez-Mateo did not find any evidence of racial biases, in another case study Petersen et al. (2000) found that ethnic minorities were cut off from employer networks.

Finally, the most straightforward network mechanism is direct influence, for example when a hiring decision is made in favor to some connected friend or acquaintance. To be able to exert influence via networks, one must reach contacts of high status (Lin et al., 1981) that have discretion to make independent decisions, which means that segregated networks without such contacts severely limits the chances of influence.

2.2. Reinforcement and proximate relations

The incentives for getting a job can be influenced by friendship relations. Akerlof (1980) developed a model of social custom, where a key mechanism is that reputation is determined both by the individual's own actions and by the proportion of the population who believe in a norm or code. If there is a cost of breaking a norm, this cost decreases when proximate others also break the norm. Drawing on Akerlof, Clark (2003) predicts that the loss in utility from becoming unemployed would be smaller for individuals with many unemployed in their proximate social context. Hedström and Åberg (2011) have likewise argued that unemployment can be thought of as a stigma that is carried with more ease if other individuals in ones

close vicinity also suffer from it. While unemployment is generally associated with losses in well-being (e.g., Korpi, 1997 and references therein), unemployment among friends may also buffer from the stresses of unemployment (Hess et al., 1994), which may be good for psychological well-being, but may reduce incentives to find work.

Additional reinforcement effects may be the reduction of everyday tediousness achieved through provision of alternative activities that increase short term utility. Having unemployed friends can substitute for workmates and be a basis for alternative activities. In sum, the more individual utility is interdependent across individuals via norms and reputations, the larger the impact of friends' unemployment on individuals' actions, especially if the overall norm of the full-time worker is strong and when individuals are strongly embedded in social relations. There are reasons to expect that reinforcement might be particularly strong in youths. Youths could hold age-specific and more generous attitudes to leisure as they generally have fewer economic obligations (e.g., own children, mortgages), and relying on parents is an option for many young adults. In a short term perspective, unemployment may not be perceived as an acute state by youths.

2.3. Social homogeneity

So far, we have discussed potential causal mechanisms of social networks on unemployment. However, it should be stressed that a number of non-causal forces can give rise to clustering of unemployment in friendship networks and/or in wider social circles, and therefore estimated associations may be spurious.

Mouw (2003) argued that effects of social capital on labor market outcomes are subject to bias because of social homogeneity (McPherson et al., 2001). Since there is a strong tendency for similar people to become friends or acquaintances, this similarity may be a driving force of social network effects rather than e.g., reinforcement or information mechanisms. For example, if social networks are homogenous on some characteristic that employers will discriminate against, entire networks of friends may end up unemployed without a reinforcing, or information effect. In order to understand the role of relations, it is important to control for social homogeneity.

3. Previous research on network effects on unemployment and marginalization

The risk of unemployment in the school-to-work transition is associated with the standard correlates of inequality, i.e., education, immigration, social background (Caspi et al., 1998; Erikson et al., 2007). Studies on effects of social networks and social interactions on labor market outcomes usually find such factors to be of importance (see Ioannides and Loury, 2004 for a review). The literature on social capital has typically been focused on the prestige or income of the first or subsequent jobs (e.g., Lin et al., 1981), i.e., conditional on having a job, while studies of network effects on unemployment specifically are scant. To our knowledge, the key reference is Sprengers et al. (1988), who studied a sample of 242 unemployed adult men using network size and occupational status of frequently contacted persons as the main indicators of social capital, and found that this was associated with higher re-employment chances. Similarly, Korpi (2001) studied adult unemployed in Sweden during the 1990s with access to some network data, and found that network size was positively associated with chances of exiting unemployment among the, but that tie strength to contacts did not play any role.

A greater number of studies however analyze unemployment risk with proxies for social relations. Lalive (2003) used a natural experiment in Austria in which the maximum duration of unemployment benefits was prolonged, which also extended the duration of unemployment. One result was that the unemployment duration increased also among those *not* entitled to benefits, and that this indirect effect must then be due to social interactions. In a British study, Clark (2003) departed from the assumption that the utility of being in a negative state such as unemployment is reduced if there is an abundance of unemployment in one's close vicinity (cf. Akerlof, 1980). Clark found that unemployment reduced subjective wellbeing (a proxy for individual utility). However, unemployment in the vicinity (in the region, household or among one's partner) reduced this negative effect, which decreased with social distance. Similarly, for employed individuals, wellbeing was lower if there was unemployment in the social vicinity. This test of social norms or customs is indirect. One way of analyzing this issue more directly is to gauge negative values towards employment. Nordenmark (1999) found that such negative values did not thrive among the unemployed with many unemployed friends any more than among the unemployed with no such friends. Nordenmark's analysis was limited to unemployed individuals, so the question of differences between the employed and unemployed in this context is still unclear.

In a US study, Bertrand et al. (2000) analyzed network effects on welfare reliance. Based on area and language-spoken-at-home fixed effects they found that being surrounded by high welfare-using co-nationals increased social welfare reliance. In lack of network data, other studies use aggregate information from surrounding geographical areas (e.g., neighborhoods) to infer network effects on various social outcomes. However, the assumption that this is a valid proxy for social relations is poorly supported. For example, the social networks of Swedish youths seem to be relatively uninfluenced by neighborhood demarcations, as the friendship networks even of ninth-graders extend well beyond the neighborhood (Edling and Rydgren, 2012). Nonetheless, this literature indicates that the chances of exiting youth unemployment depend on the extent of youth unemployment in the neighborhood generally (Hedström and Åberg, 2011).

In conclusion, there is very limited research that addresses social network effects on unemployment *per se*, and especially among youths. Virtually none use direct network measures, and at best measure only one network dimension at a time. To the best of our knowledge, there are no previous studies that measure occupational contact networks and/or friendship networks and analyze their relation to unemployment risk in non-selective populations (i.e., not focusing only on the unemployed).

4. The Swedish welfare state

Context not only matters at the micro level but also at the macro level. In the Swedish (and Nordic) welfare state, life-course risks are collectively shared to a large extent. Apart from support to those in most desperate need (social welfare), social transfers are extensive (illness, parental leave, retirement), and the public sector is large with heavily subsidized education and health care. Sweden uses the Ghent system of unemployment insurance. In practice this means full population coverage but with specific qualification criteria: the fully state-financed unemployment benefits are conditional on one year of membership in a trade-union unemployment office and one year of full-time employment during the last year before unemployment. If these conditions are not met, one receives only a transfer that is no higher than basic subsistence levels (but this is granted to anyone).

4.1. Youth unemployment in Sweden

The Swedish model of organizing the labor market implies strong trade-unions, and together with high levels of mandated employment protection, this means high employment barriers. Since the education system is only loosely coupled to the labor market, that is, without apprenticeships in the vocational secondary education, the school-to-work transition is difficult (Erikson et al., 2007). This institutional mismatching of a highly skilled and unionized labor market and a standardized educational system oriented towards producing general skills has been advanced as one explanation for the high relative youth unemployment rates in Sweden (Schröder, 2000). This combination, and the corporative organization of unemployment benefits with the primary focus on unemployed established workers, makes unemployed youth dependent on either parental support or social welfare. The latter mandates that no material possessions are held and gives a very basic level of income support.

4.2. Ethnic inequality in Sweden

The Swedish labor market is also characterized by a strong division between individuals from an immigrant background and individuals of native Swedish origin. There are gaps in employment, income, and wages that cannot be explained by human capital differences (Lundborg, 2010; Rydgren, 2004). There is direct experimental evidence of discrimination in employment (Bursell, 2007; Carlsson and Rooth, 2007). When it comes to education, immigrants are a heterogeneous group: they are at the same time more likely to drop out of school and receive low grades, but also more likely to choose the most rewarding academic tracks in upper-secondary school (Jonsson and Rudolphi, 2011). Immigrants who immigrated at young age and have Swedish schooling experience earn only marginally less than natives once these individuals are gainfully employed (Hällsten and Szulkin, 2009). Since employment chances in particular are lower for immigrants, we may expect unemployment to be more prevalent in individuals of immigrant origin and also among their friends if they share the same origins. Like in many other countries, there is a strong tendency for immigrants and individuals of Swedish background to cluster together in different neighborhoods (Andersson and Bråmå, 2004).

5. Data and methods

Data come from the survey *Social Capital and Labor Market Integration*. From a gross sample of 5695 individuals, telephone interviews were conducted on a net sample of 2942 individuals, hence a response rate of 51.6 percent.[1] Interviews were conducted by Statistics Sweden between October and December 2009. The gross sample is based on three cohorts of Swedes born in 1990: (a) all individuals with at least one parent born in Iran; (b) 50 percent of all individuals with at least one parent born in (former) Yugoslavia; and (c) a simple random sample of 2500 individuals with two Swedish-born parents. We (over) sampled individuals with a background in Iran and former Yugoslavia; firstly because we need homogeneous immigrant groups in order to identify group specific effects (sampling immigrants in general would leave us with small numbers from specific countries of origin), and secondly since Iranians and Yugoslavians are two large immigration groups with contrasting and distinct characteristics, representing the second (Yugoslavia) and fifth (Iran) largest immigrant groups in Swedish society. Yugoslavians started coming to Sweden as semi-skilled labor immigrants in the 1950s and 1960s and became permanent residents; however, the largest wave included refugees during the Balkan wars of the 1990s. Our interest in this group is because of its European origins, and rather high proportion from the working class. The Iranians started coming to Sweden after the Iranian revolution in 1979, and during the Iran-Iraq war, the majority as political refugees. Iranians are interesting because of their non-European origin. As opposed to Yugoslavians, many Iranians were highly educated; some belonged to the Kurdish minority. Both national Iranians and Kurds are embedded in highly developed organizational structures, and

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[1] The largest proportion of the non-responders was not at home (37.6%). Refusals comprised only 8.1 percent, although some proportion of those who were not at home may have been passive refusals. Response rates in Sweden have dropped in recent years mainly due to cash-card cell phones, which make it hard to contact people. The effective sample is slightly biased. Urbanity, low grades, no upper-secondary educational attainment, and low levels of parental education were associated with lower response rates. Statistics Sweden has constructed post-stratification weights, but we include all variables used to construct those weights in our regression models, and so unweighted estimates are the Best Linear Unbiased Estimator (Winship and Radbill, 1994).

Sweden is one of the cultural centers of the Kurdish population in the world. In our sample, 33 percent of the respondents with parents born in Yugoslavia are born in Sweden, whereas 73 percent of the respondents with Iranian born parents are born in Sweden.

From the net sample we select those school leavers at risk of unemployment, which excludes individuals doing military service, those who study full-time, and all those that remain in upper-secondary school. Individuals who mix studies and work are included, as are inactive and discouraged workers (see the discussion of the outcome variable below). This results in an analytical sample of 1590 individuals.

5.1. Outcome variable: unemployment

The key question on present economic activity includes the following responses: *mainly studying, mainly working, studying* and *working, military service*, or *other*. If other is reported, the follow-up question distinguishes between *keeping household, unemployed*, *on sick leave, nothing,* and *other*, leading to an open-ended question. We have coded "unemployment" and "nothing" to mark unemployment, as well as "other" to the extent that the response does not signal any active state. This definition of unemployment includes *inactive* individuals, but excludes individuals not at risk. As Mortimer (1994) noted, including inactive individuals is important because individuals who become discouraged drop out of the work force and cease to seek employment, which can bias results substantively if this group is omitted from the unemployment definition.

5.2. Measures of friends' unemployment and occupational social capital

We are interested in estimating unemployment as an effect of two independent variables: friends' unemployment and occupational social capital. Friends' unemployment is measured by a *name generator* that extracts the names of up to five friends, defined as the "people that you spend most time with," and then asks about those friends' characteristics, relations with ego (respondent), and the relations between friends. We remove friend relations based on kin as we are not interested in traditional family of origin effects.[2] Respondents were asked about the employment status of friends. From this information, we extract the proportion of unemployed in ego's network. We also control for the number of friends ego has named. To determine whether characteristics of unemployed friends matter for ego's unemployment, we divide the friends into groups and code unemployment among immigrant and Swedish friends separately.

The measures of occupational social capital are based on the *position generator* (Lin and Dumin, 1986) where respondents were asked whether they knew anyone in 40 strategically chosen occupations. This approach identifies the latent information and resources embedded in a network. Much previous research on social capital with a more direct identification involves endogenous conditioning, i.e., to observe social capital only when it has beneficial outcomes. For instance, the characteristics of contacts used to get a job. The position generator avoids this problem as no such conditioning occurs. From the position generator, we have derived a number of dimensions to measure. *Extensity* refers to the number of occupations that one can access, that is, it is a quantitative aspect of one's connectedness. *Range of occupational prestige* (highest minus lowest ranked occupation) is a measure of heterogeneity in the individual's network. Together with extensity, the range measure captures the likelihood of extracting relevant information from one's network. Based on research showing that high-ranked contacts are more important than others (Lin et al., 1981), we separate out *upper reachability*, which refers to the highest ranked occupation, using Treiman's SIOPS prestige score. Experimentation revealed that *average* and *total* accessed prestige (Van der Gaag et al., 2008) is correlated with ego's unemployment risk, and consequently they are also included. Since these factors are highly correlated, we follow the convention of using factor analysis on extensity, upper reachability, range of prestige, and average and total prestige, and we use the first factor to construct our *composite* measure of occupational social capital (Lin et al., 2001). Also due to their high correlation, it is not possible to decompose which of the components of occupational social capital that drive the association with our outcome. The name generator and the position generator generally refer to independent dimensions of social resources (Van der Gaag et al., 2008). Our analyses indicate that these measures are only weakly yet positively correlated ($r = 0.18$), and thus largely contribute independent effects on unemployment.[3]

5.3. Analytical strategy and identification

We estimate the equation

$$y_{ego} = b\bar{y}_{friend} + \phi SC_{ego} + \mathbf{X}_{ego}\omega + \bar{\mathbf{Z}}_{friend}\theta + e,\qquad(1)$$

where y is unemployment, SC_{ego} is occupational social capital, X_{ego} is a vector of ego control variables with associated coefficients ω, $\bar{\mathbf{Z}}_{friend}$ is a number of friend characteristics with associated coefficients θ, and e is an idiosyncratic error. The name

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[2] Only a minority of respondents included kin among friends. Including kin in the measures does not change the results in any substantive way.

[3] We have also run sensitivity analysis that removed information on specific occupations in the position generator in order to reduce measurement error (Hällsten et al., 2015), thus removing the occupations listed in their Table 6 (the data and outcome measures are identical). These results suggest that we tend to underestimate the social capital association with unemployment with some 25 per cent.

generator provides us with information on $\overline{Z}$ and $\overline{y}$, and the position generator provides information on SC_{ego}. We view $\overline{y}_{friend}$ and SC_{ego} as different dimensions of occupational social capital. A standard result in Eq. (1) is that b and θ are indistinguishable because of linear dependence of $\overline{y}$ and $\overline{Z}$ (Manski, 1993). Hence *b* and θ will capture both the effects of friends' characteristics ($\overline{Z}$) *and* their behavior ($\overline{y}$).[4] Recent literature has sought to further distinguish between these effects on the basis of complete network data.[5] In lack of complete network data, we devote our efforts to scrutinize whether b and θ are robust to selection on ego's and friends' characteristics, and to ego's and friends' observed homogeneity.

Our main strength is that we can observe SC_{ego}, $\overline{y}$ and $\overline{Z}$. Our data is cross-sectional which makes homogeneity bias plausible, i.e., that a degree of the relation between ego's and friends' unemployment is due to a common but neglected factor (other than unemployment). Our strategy to control for selection is to condition the estimates on a rich set of potential confounders, many of which are non-standard and thus provide stronger controls than what is usually the case. Moreover, respondents were interviewed approximately half a year after finishing upper-secondary school, in the fall of the year they turned 19. This means that their friendship networks consisted largely of school and neighborhood friends rather than newly formed friendships based on homogeneity in recent social interactions or employment outcomes (our data shows that 93 percent of friendships had lasted a year or more; this is while in school). Social homogeneity bias in the outcome of unemployment ($\overline{y}_{friend}$) is thus less likely to drive the association between friends' and ego's unemployment. Another finding reinforces this claim: the unemployment rate is 24 percent among the 93 percent of friends who have known ego for at least a year (since school) but only 8 percent in the more recently formed friendships (not shown).

This also speaks to a potential measurement bias: since the number of friendships was capped at five, and unemployed individuals may have more time available for interaction, there might be selection of unemployed friends into the name generator. Our data allows a partial test of this. About 40 percent of all respondents reported fewer than five friends, which makes sorting on unemployment status unlikely for this group since the available five slots were more than enough for reporting. When we limit the sample to individuals with fewer than five friends, the basic results are reproduced, and our examinations reveal that they were very similar to those with five friends on observed characteristics. There is a tendency for them to have lower final GPAs from elementary school (9th grade) and to come from families with lower incomes, but in terms of other characteristics, the differences are very small.

However, since friendships are more or less homogenous, friends may still be selected on factors that constitute a risk for unemployment. Even though we argue that friendship ties were not formed by employment status, relations may have been selectively dropped so that unemployed have increasingly higher shares of unemployed within their network. Our strategy is to explicitly measure such characteristics (by the term $\overline{Z}_{friend}$), and to employ a sensitivity analysis that addresses homogeneity bias due to unobserved factors (see below).

5.4. Control variables

We control for a wide range of individual, friend, and origin characteristics. Our design resemble the *premarket* approach to analyzing labor market outcomes (Neal and Johnson, 1996), that is, only control variables that are prior to the labor market are controlled for.

Data is matched to administrative registers, allowing us to construct measures of the socioeconomic status of parents (dominant class position among parents, parents' highest level of education coded in six categories, parents' household disposable earnings, and whether the father and mother are employed). Importantly, the survey asks about occupations of parents in Sweden, and in the case for immigrants, also in the country of origin. This allows us to construct an additional survey based measure of social class that captures social positions in the country of origin, in order to rule out effects of selective immigration, which is important when we compare Iranians and Yugoslavians. We apply the dominance principle (Erikson, 1984) of letting the most significant class represent the individuals' origin, first across mother's and father's class, and second across classes in Sweden and abroad.

We also have information on whether the respondent lived alone at the time of the sampling and whether parents are divorced. From school registers, we obtained information on the year of elementary school completion, school status (private or public), final GPA, upper-secondary school attendance, whether one graduated from an academic or a semi-vocational program, and the final upper-secondary GPA (the latter is used only for sensitivity analysis). We also have access to fairly detailed geographical identifiers linked to measures of local labor market size and the share of the public sector in the local labor market as well as the unemployment rate and the share of immigrants between the ages of 19 and 25 living in the same parish as the respondent. These controls are intended to capture local labor market conditions, which are obviously associated with the risk of unemployment for both ego and friends.

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[4] Social effects are intrinsically difficult to estimate. Manski (1993) outlined three different types of effects that can arise: (a) correlated effects, a spurious coincidence of ego's and friends' outcome characteristics caused by homogeneity bias as discussed in the section on social homogeneity above; (b) exogenous effects, where the outcome of ego is caused by exogenous characteristics of friends; and (c) endogenous effects, where ego's outcome is caused by friends' outcomes. The last alternative (c) corresponds to the reinforcement mechanism, whereas (b) refers to the resource type mechanism.

[5] For example, Bramoullé et al. (2009) and Lin (2010) used the characteristics of a friend's friends unrelated to ego as instruments for friend's outcomes. We lack such data.

A particularly central set of control variables is the structure of the friendship network and resources available within it ($\overline{\mathbf{Z}}_{\text{friend}}$). We gauged network density (the degree of friends that know each other) and average characteristics of friends as reported by ego in a number of dimensions: Swedish background, age, gender, religiosity, smoking behavior, risk attitude, health behavior, and the proportion of university entrants. We also included information on ego's average distrust of friends. We measured the degree of homogeneity on those characteristics based on the IQV (Agresti and Agresti, 1978) and the mean absolute deviation (following Marsden, 1987) for discrete and continuous variables, respectively.

The survey also includes indicators of personality traits of ego, among them fatalism (Rotter, 1966), self-control (Tangney et al., 2004), leadership (Mueser, 1979), and aspirations. These have well-documented associations with future unemployment. For example, Kokko et al. (2003) found that low self-control was predictive of long term unemployment as a direct effect for individuals in their mid-30s and as an indirect effect via educational attainment for individuals in their late 20s. In addition, Hess et al. (1994) discussed fatalism as a risk factor for youth unemployment, especially for marginalized youth. From the inventory of 31 items, we used factor analysis to construct three measures that we have named "well-being and control", "risk affection and frustration", and "risk aversion and conformity".

We include the number of siblings as large family size can be detrimental among low-skilled families, as well as an indicator of whether any of the parents attended university in Sweden or abroad, which is of utmost importance since half of our sample consists of individuals with at least one foreign-born parent. In line with the discussion of ethnic inequality, orientation to Sweden and Swedish culture may be an important control variable, since this may to produce a spurious correlation between immigration group membership, friends' unemployment, occupational social capital, and ego's unemployment. We created measures of the respondents' orientation to Swedish culture[6] (an index of several underlying attitudes with Cronbach's alpha = 0.74), the language used with parents (only Swedish, Swedish/other, other/Swedish, and other only), and parents' religiosity measured on a continuous scale. We also separate between individuals of different migration background: mixed origin (one immigrant, one native parent) and 1st and 2nd generation immigrants further separated by time of residency in Sweden (in case of the 2nd generation, parents' residency before birth).

Three measures of health are included: self-rated health (on a scale from very good to very poor); the amount of physical exercise ego gets during an average week; and his or her BMI (represented by a spline function). Health is an important control since employers may discriminate either statistically or via stereotypes (taste). Finally, we include controls for previous work experience, including side jobs and summer jobs and the occupational prestige of that job.

In summary, the combination of previous educational achievement and personality traits, friend characteristics, social background, demographics, own health makes, and regional conditions, makes our set of control variables rich in terms of observable heterogeneity.

5.5. Sensitivity analysis of homogeneity bias

In order to aid the interpretation of our results when there is possible homogeneity bias, we employed the sensitivity analysis outlined by VanderWeele (2011), which to the best of our knowledge has not previously been utilized in studying social effects on unemployment. It is based on the idea that clusters of unemployed friends share an unobserved risk factor U, net of all controls, with a causal effect γ on unemployment. Using probabilistic scenarios, where U is binary, this factor is prevalent $P_U(U = 1)$ among egos with all unemployed friends and $P_E(U = 1)$ among egos with no unemployed friends. The bias is thus $\gamma \times \delta$, where $\delta = P_U(U = 1) - P_E(U = 1)$, which should be compared with the estimated effect b. The hypothetical causal effect thus becomes $\beta = b - (\gamma \times \delta)$, where b is the coefficient of $\overline{y}_{\text{friend}}$ in Eq. (1). By varying the gamma (γ) and delta parameters (δ), we can determine to what degree our estimated effect is likely to be driven by selection effects under different scenarios.

Since our outcome is (a linear) probability of unemployment, γ is bounded by 0 and 1, as is the difference in the prevalence of U. The average level of youth unemployment in our sample was about 30 percentage points. We let γ vary from 0 to 0.3, where the highest unobserved factor increases unemployment by 30 percentage points, doubling it in relative terms. We also believe that a difference in prevalence of 60 percentage points is likely to be an extreme effect, and thus vary δ from 0 to 0.6 (in his illustrative analysis, VanderWeele varied δ from 0.2 to 0.6). The simulation does not provide hard evidence of homogeneity bias, but gives information on the maximally tolerable level of unobserved heterogeneity at which the causal interpretation of the observed association is compromised. In our sensitivity analyses, we used the linear measure of friend unemployment and contrast two states: one with no unemployed friends and another with 50% unemployed friends. That is, we divided b of $\overline{y}_{\text{friend}}$ by two, which is more realistic than comparing the endpoints (the untransformed b coefficient).

5.6. Imputation of missing values

We have imputed missing values due to item non-response for a number of variables in order to keep the sample size intact and not risk getting biased results. We follow the multiple imputation strategy outlined by Rubin (1987) as implemented in the Stata software (Statacorp, 2011). Item non-response was generally low, but ranged up to 50–70 *cases* out of

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[6] The following attitudinal statements were used: "Important to learn about Swedish culture"; "Trying to follow Swedish traditions"; "Raising kids according to Swedish traditions"; "Degree of affinity with Swedish culture".

1590 for some variables such as class origin, BMI, and personality variables. We used M = 100 imputations (independently imputed datasets).

5.7. Statistical models

We estimate linear probability models (LPM), where the coefficients reflect the average absolute (percentage point) difference in P(unemployment = 1) associated with a one unit difference in the independent variable(s). The main alternative, logit regressions, make problematic assumptions about the error term, which limits the comparability of estimates across models (Mood, 2009). This applies to different specifications of control variables on a constant sample, but also to comparisons across different samples and interaction effects. Linear probability models produce consistent estimates of the expected value of the proportion of unemployed conditional on covariates, i.e., E(Y|X) (Angrist and Pischke, 2009). If paired with sandwich errors robust to heteroscedasticity, they produce consistent inferences as well. We have corroborated the analyses in the paper using both average marginal effects from logit models, which are insensitive to scaling (Cramer, 2007), and give average absolute differences in probability similar to the LPM, and the procedure suggested by Karlson et al. (2012; as implemented in stata by Kohler et al., 2011). All results come out close to identical across methods, leading to the same conclusions as those presented below.

6. Results

Table 1 provides an overview of the outcome variable and the key independent variables separated by immigration group (Table A1 in the web appendix describes the full set of variables). In total, 34 percent in the sample at risk are unemployed, and this varies somewhat across the groups, with the highest level in the Yugoslavian group and the lowest level in the Iranian group. While this level may sound high, it is not far from the official unemployment rate of 25 percent in the broad age group 15–24 during the last quarter of 2009, when the survey was fielded (Statistics Sweden, 2011). As the unemployment within this age range is likely to peak immediately after finishing school at age 19, a rate above 30 percent is highly plausible.

About 40–45 percent of the respondents have one or more unemployed friend, and 10–18 percent has 2 or more unemployed friends. The average number of nominated friends is 4, out of a maximum of 5, in all three groups. The number of friends of immigrant background is also about 2 (out of 4) in the two immigration groups and close to zero in the Swedish group. Ethnic segregation in social networks is thus vast, although the two immigration groups' networks are on average 50 percent Swedish, and immigrants are by no means isolated. This result is consistent with structural contact opportunities (Blau, 1977): smaller groups are forced to interact with larger groups unless segregation is extreme (and in Sweden it is usually not). [7]

We observe clear differences in occupational social capital across the three groups. The Iranian group has the highest average level of occupational social capital, and the Swedish group the lowest. To exemplify the differences: the two immigration groups can reach 16 out of 40 occupations provided in the position generator through their social network, whereas the Swedish group only can reach 14.7 out of 40. We can see similarly small but notable differences in the other measures of occupational social capital. The levels of socioeconomic resources are strikingly different across the three groups. The income levels are more than 35 percent lower in the Iranian group compared to the Swedish group, and 20 percent lower for the Yugoslavian group. The employment rates of parents are very low in the Iranian group, about 50 percent. It is higher in the Yugoslavian group with averages around 65–70 percent, but still lagging behind the employment rates for parents in the Swedish group, which are close to 85 percent. In terms of the individuals' class origins measured in registers, the Yugoslavian group in particular is concentrated in the lowest class, with more than 60 percent in unskilled manual labor, and with low representation in the service classes. In the Iranian group, many are in unskilled manual labor, but compared to the Yugoslavian group more are in the service classes. In the Swedish group, few are in manual labor, with a majority being in the service classes. This should be contrasted with the survey measure that takes country of origin into account, where the differences across the groups are much less pronounced. For example, the Iranian group has a higher percentage in service classes than Swedes. Thus, migration into Sweden is on average associated with downward social mobility. The differences across groups are also much less pronounced in educational resources. The Iranian group stands out as having parents with very high levels of education: 25 percent have tertiary education, almost on a par with the Swedish group (30 percent). In the Yugoslavian group, educational resources are much lower, with only 14 percent of parents having tertiary degrees. Hence, in terms of labor market rewards relative to educational and social resources, parents in the Iranian group stand out as relatively deprived.

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[7] It should be noted that the number of friends of immigrant background and dummies for the Iranian and Yugoslavian group have no significant association with ego's unemployment risk when we include all our controls, which indicates that youth unemployment risks are at best weakly related to the immigrant groups *per se* (not shown).

Table 1
Immigration group characteristics.

	Yugoslavia	Iran	Sweden
Ego's unemployment[a]	0.389	0.295	0.319
Unemployment among friends			
No unemployed friends	0.582	0.624	0.52
1 unemployed friend	0.245	0.273	0.301
2 unemployed friends	0.114	0.078	0.129
3 to 5 unemployed friends	0.059	0.024	0.049
Share unemployment among friends	0.169	0.13	0.178
Number of friends	3.862	3.944	4.013
Number of friends of immigrant background	1.963	1.82	0.281
Share unemployment among friends of immigrant background	0.138	0.089	0.031
Share unemployment among friends of Swedish background	0.130	0.108	0.180
Occupational social capital			
Composite measure	0.068	0.351	−0.145
Extensity[b]	16.311	16.356	14.709
Upper reachability of prestige[b]	68.945	72.582	67.273
Range of accessed prestige[b]	49.31	52.46	47.31
Average prestige[b]	40.52	42.958	40.667
Total prestige[b]	668.713	706.48	603.129
Parents' characteristics			
Ln parents' income	5.997	5.87	6.209
Father employed	0.694	0.5	0.857
Mother employed	0.635	0.544	0.834
Parents' education[c]			
Basic education	12	11.9	2.9
Non-acad upper-secondary	50.9	30.9	30.7
Academic upper-secondary	2.8	8.7	15.1
Post-secondary	20.6	21.3	21.6
Tertiary	12.6	24.9	27
Post-grad	1.1	2.3	2.7
Parents' social class (register)[c]			
Unskilled manual	60.6	47.7	18.6
Skilled manual	13.6	8.4	13.9
Routine non-manual	3.5	4.1	6
Lower service	10.6	15.8	22.9
Upper service	7.5	16.9	31.6
Entrepreneurs	4.3	7.1	5.7
Farmers	0	0	1.3
Class origin, dominating of Sweden and Foreign (survey)[c]			
Unskilled manual	20.3	9.7	12.3
Skilled manual	27.2	18.4	22.8
Routine non-manual	5.4	5.5	7.5
Lower service	24.4	30	31.6
Upper service	13.8	21	18.4
Entrepreneurs	7.4	14.3	5
Farmers	1.4	1.2	2.3
Friends' characteristics			
# Friends (maximum 5)	3.862	3.949	4.013
Density (friends that know each other)	0.467	0.471	0.46
Average religiosity	1.864	1.620	1.358
Average risk attitude	5.268	5.238	5.497
# Smokes	1.300	1.254	1.146
Average distrust from ego	0.289	0.276	0.221
# Entered university	0.935	0.996	0.785
# Swedish	2.393	3.007	3.844
Average age	19.363	19.365	19.362
# Are over-weight	0.324	0.321	0.351
# Eats healthy food	1.763	1.991	2.113
# Exercises	2.268	2.354	2.587
Sample size	479	267	844

Note.

[a] The overall sample mean is 0.34.

[b] Included in composite measure of social capital.

[c] Dummy proportions. Notes: Individuals of mixed origins (1 Swedish parent + 1 Yugoslavian/Iranian) have been excluded from the comparison.

Table 2
Linear probability model of ego's unemployment based on friends' unemployment and occupational social capital.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Share unemployed among friends	0.377***		0.314***	0.284***	0.264***	0.243***	0.233***	0.231***	0.218***	0.220***	0.222***	0.220***	0.221***
	(7.357)		(6.081)	(5.474)	(5.086)	(4.636)	(4.426)	(4.376)	(4.027)	(4.099)	(4.124)	(4.093)	(4.116)
# friends	−0.021*		−0.013	−0.012	−0.008	−0.008	−0.004	−0.003	−0.016	−0.019	−0.015	−0.014	−0.013
	(−2.037)		(−1.285)	(−1.145)	(−0.812)	(−0.776)	(−0.366)	(−0.299)	(−0.858)	(−1.021)	(−0.808)	(−0.743)	(−0.699)
Occupational social capital (composite)		−0.096***	−0.081***	−0.085***	−0.067***	−0.066***	−0.064***	−0.062***	−0.057***	−0.048***	−0.049***	−0.051***	−0.051***
		(−8.121)	(−6.708)	(−6.925)	(−5.181)	(−5.102)	(−4.825)	(−4.594)	(−4.147)	(−3.459)	(−3.506)	(−3.651)	(−3.639)
Gender, immigration group				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Educational attainment and achievement					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local labor market conditions						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Social origin							Yes	Yes	Yes	Yes	Yes	Yes	Yes
Class origin in Sweden and abroad (survey)								Yes	Yes	Yes	Yes	Yes	Yes
Alters' characteristics and homogeneity									Yes	Yes	Yes	Yes	Yes
Ego's non-cognitive skills										Yes	Yes	Yes	Yes
Ethnic orientation											Yes	Yes	Yes
Ego's health status												Yes	Yes
Own labor market experience													Yes
N	1590	1590	1590	1590	1590	1590	1590	1590	1590	1590	1590	1590	1590

Note: Robust t-statistics in parenthesis.***p < 0.001, **p < 0.01, *p < 0.05. Multiple imputation model (M = 100).

Table 3

Main effects and linear combinations of coefficients for interactions of immigrations status and friends' unemployment and occupational social capital.

	Main effects No interactions	Interactions (linear combinations)		
		Immigration group		
		Yugoslavian	Iranian	Swedish
Share unemployed among friends	0.221*** (4.116)	0.424*** (4.427)	0.02 (0.115)	0.163* (2.455)
Occupational social capital (composite)	−0.051*** (−3.639)	−0.058* (−2.363)	−0.083* (−2.111)	−0.046** (−2.737)
Observations	1590	1590	1590	1590

Note: Robust t-statistics in parenthesis.***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. Multiple imputation model (M = 100). All models contain the full set of control variables.

6.1. The association between friends' unemployment, occupational social capital, and own unemployment

Table 2 shows estimates from linear probability models of the association between friends' unemployment and occupational social capital on ego's unemployment. In model 1, with no conditioning on other covariates, friends' unemployment is strongly associated with ego's unemployment. This model suggests that a 100 percent difference in unemployment composition is associated with an almost 40 percentage point higher unemployment risk. Given the baseline level of 30 percent unemployed within the sample, these associations are clearly very strong. Model 2 shifts the focus to the unconditional associations for occupational social capital. One unit (standardized) occupational social capital is associated with an almost ten percentage points lower unemployment risk. This is a substantial association. Over the full range of the variable, roughly 4 standard deviations (≈ 95 percent coverage), this corresponds to 40 percentage points. The effect sizes of the two social capital dimensions are thus very similar.

In Model 3, we combine these dimensions of social relations. We note that the coefficients are slightly reduced due to some overlap between the two dimensions, but that the associations are largely unique to each dimension (as stated above, the correlation across these dimensions is only 0.18).

Models 4 and beyond introduce controls and we observe the estimated decline with successively more controls; however, no single factor has a very strong effect on the estimated associations. Notably, controlling for non-cognitive abilities including fatalism does not explain any of the effect. Our theory review suggest that dense unemployment in networks could cause fatalism, which in turn could cause further unemployment, but we observe no strong indications of such a process.

The raw association between friends' unemployment and own unemployment of 0.377 in the raw model drops to 0.221 in the full model, which is still a substantial association. The occupational social capital association declines by almost five percentage points from the empty to the full model and is estimated at five percentage points in the final model.[8] This is also a substantial association and amounts to a relative association of 16 (5/30) percent per (standard) unit of occupational social capital, evaluated at the mean of unemployment in the sample (or some $[4 \times 5]/30 = 66$ percent over the whole distribution). Thus, the similarities in effect sizes remain.

6.2. Heterogeneous effects across immigration groups

Table 3 repeats the full model of Table 2 (column 13) and then introduces a model with interactions for immigration groups and friends' unemployment and occupational social capital. The displayed coefficients are linear combinations and may be interpreted as ordinary regression coefficients. We start by analyzing heterogeneity in occupational social capital across the groups. We find occupational social capital associations present within all groups, but the strongest associations are in the Iranian group, and the weakest in the Swedish group. In terms of effect size, the association is almost twice as strong for Iranians. Interestingly, the Swedish group has both the lowest return on occupational social capital and the lowest level of occupational social capital (cf. Table 1), suggesting that social capital is more important for the immigrant groups.

Turning to the friend associations, they are strongest in the Yugoslavian group. There are positive yet insignificant coefficients for youths of Iranian origin, but it should be noted that the Iranian sample is smaller with less variation in the share of unemployed friends (see Table 1), and a weak effect would therefore be expected. We also observe a weak but significant association in the Swedish group. Thus the association between friends' and ego's unemployment appears to be partially specific to the particular immigration group, at least this is what the contrast between the Swedish and the Yugoslavian group suggests. Next, we assess estimated friend unemployment associations using the sensitivity analyses following VanderWeele (2011). Table 4 shows how strong the selection among friends on an unobserved factor causing unemployment has to be in order for the effect to be non-causal. We use a comparison between 0 and 50 percent unemployment among friends to get a

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[8] With a correction for measurement error as discussed in an earlier footnote (Hällsten et al., 2015), the estimated coefficient for social capital in Model 13 is instead −0.065 with a t-value of −4.670, i.e., a 25 percent stronger association.

Table 4
Sensitivity analysis of hypothetical causal effect in the presence of latent homogeneity. Comparing friends' unemployment of 0% vs. 50%.

δ	γ											
	0.05	0.10	0.15	0.20	0.25	0.30	0.05	0.10	0.15	0.20	0.25	0.30
	All groups											
	b × 0.5 = 0.111						b × 0.5$_{95\%CI-}$ = . 058					
0.05	0.108	0.106	0.104	0.101	0.098	0.096	0.056	0.053	0.051	0.048	0.045	0.043
0.10	0.106	0.101	0.096	0.091	0.086	0.081	0.053	0.048	0.043	0.038	0.033	0.028
0.15	0.104	0.096	0.089	0.081	0.073	0.066	0.051	0.043	0.035	0.028	0.02	0.013
0.20	0.101	0.091	0.081	0.071	0.061	0.051	0.048	0.038	0.028	0.018	0.008	−0.002
0.25	0.098	0.086	0.073	0.061	0.049	0.036	0.045	0.033	0.02	0.008	−0.004	−0.017
0.30	0.096	0.081	0.066	0.051	0.036	0.021	0.043	0.028	0.013	−0.002	−0.017	−0.032
0.35	0.094	0.076	0.059	0.041	0.024	0.006	0.041	0.023	0.006	−0.012	−0.029	−0.047
0.40	0.091	0.071	0.051	0.031	0.011	−0.009	0.038	0.018	−0.002	−0.022	−0.042	−0.062
0.45	0.089	0.066	0.043	0.021	−0.001	−0.024	0.035	0.013	−0.01	−0.032	−0.054	−0.077
0.50	0.086	0.061	0.036	0.011	−0.014	−0.039	0.033	0.008	−0.017	−0.042	−0.067	−0.092
0.55	0.083	0.056	0.028	0.001	−0.027	−0.054	0.031	0.003	−0.025	−0.052	−0.08	−0.107
0.60	0.081	0.051	0.021	−0.009	−0.039	−0.069	0.028	−0.002	−0.032	−0.062	−0.092	−0.122
	Yugoslavian group											
	b × 0.5 = 0.212						b × 0.5$_{95\%CI-}$ = 0.119					
0.05	0.209	0.207	0.205	0.202	0.199	0.197	0.116	0.114	0.112	0.109	0.106	0.104
0.10	0.207	0.202	0.197	0.192	0.187	0.182	0.114	0.109	0.104	0.099	0.094	0.089
0.15	0.205	0.197	0.19	0.182	0.175	0.167	0.112	0.104	0.097	0.089	0.082	0.074
0.20	0.202	0.192	0.182	0.172	0.162	0.152	0.109	0.099	0.089	0.079	0.069	0.059
0.25	0.199	0.187	0.175	0.162	0.149	0.137	0.106	0.094	0.082	0.069	0.056	0.044
0.30	0.197	0.182	0.167	0.152	0.137	0.122	0.104	0.089	0.074	0.059	0.044	0.029
0.35	0.194	0.177	0.160	0.142	0.124	0.107	0.101	0.084	0.067	0.049	0.032	0.014
0.40	0.192	0.172	0.152	0.132	0.112	0.092	0.099	0.079	0.059	0.039	0.019	−0.001
0.45	0.190	0.167	0.145	0.122	0.100	0.077	0.097	0.074	0.051	0.029	0.007	−0.016
0.50	0.187	0.162	0.137	0.112	0.087	0.062	0.094	0.069	0.044	0.019	−0.006	−0.031
0.55	0.184	0.157	0.13	0.102	0.074	0.047	0.091	0.064	0.036	0.009	−0.019	−0.046
0.60	0.182	0.152	0.122	0.092	0.062	0.032	0.089	0.059	0.029	−0.001	−0.031	−0.061
	Iranian group											
	b × 0.5 = 0.02						b × 0.5$_{95\%CI-}$ = negative					
0.05	0.007	0.005	0.003	0.00	−0.003	−0.005						
0.10	0.005	0.00	−0.005	−0.01	−0.015	−0.02						
0.15	0.003	−0.005	−0.013	−0.02	−0.028	−0.035						
0.20	0.00	−0.01	−0.02	−0.03	−0.04	−0.05						
0.25	−0.003	−0.015	−0.028	−0.04	−0.052	−0.065						
0.30	−0.005	−0.02	−0.035	−0.05	−0.065	−0.08				†		
0.35	−0.008	−0.025	−0.042	−0.06	−0.078	−0.095						
0.40	−0.01	−0.03	−0.05	−0.07	−0.09	−0.11						
0.45	−0.013	−0.035	−0.058	−0.08	−0.102	−0.125						
0.50	−0.015	−0.04	−0.065	−0.09	−0.115	−0.14						
0.55	−0.018	−0.045	−0.073	−0.1	−0.127	−0.155						
0.60	−0.02	−0.05	−0.08	−0.11	−0.14	−0.17						
	Swedish group											
	b × 0.5 = 0.082						b × 0.5 $_{95\%CI-}$ = 0.017					
0.05	0.079	0.077	0.075	0.072	0.069	0.067	0.015	0.012	0.01	0.007	0.004	0.002
0.10	0.077	0.072	0.067	0.062	0.057	0.052	0.012	0.007	0.002	−0.003	−0.008	−0.013
0.15	0.075	0.067	0.059	0.052	0.044	0.037	0.01	0.002	−0.006	−0.013	−0.021	−0.028
0.20	0.072	0.062	0.052	0.042	0.032	0.022	0.007	−0.003	−0.013	−0.023	−0.033	−0.043
0.25	0.069	0.057	0.044	0.032	0.02	0.007	0.004	−0.008	−0.021	−0.033	−0.045	−0.058
0.30	0.067	0.052	0.037	0.022	0.007	−0.008	0.002	−0.013	−0.028	−0.043	−0.058	−0.073
0.35	0.064	0.047	0.03	0.012	−0.005	−0.023	−0.001	−0.018	−0.035	−0.053	−0.071	−0.088
0.40	0.062	0.042	0.022	0.002	−0.018	−0.038	−0.003	−0.023	−0.043	−0.063	−0.083	−0.103
0.45	0.059	0.037	0.014	−0.008	−0.03	−0.053	−0.006	−0.028	−0.051	−0.073	−0.095	−0.118
0.50	0.057	0.032	0.007	−0.018	−0.043	−0.068	−0.008	−0.033	−0.058	−0.083	−0.108	−0.133
0.55	0.054	0.027	−0.001	−0.028	−0.056	−0.083	−0.01	−0.038	−0.066	−0.093	−0.121	−0.148
0.60	0.052	0.022	−0.008	−0.038	−0.068	−0.098	−0.013	−0.043	−0.073	−0.103	−0.133	−0.163

Note: the values refer to β × 0.5 = b × 0.5 − (γ × δ) for different values of b (from Table 3), γ and δ as explained in text: b = regression coefficient of proportion unemployed among friends (multiplied by 0.5 to compare 0% and 50% unemployment), γ = effect of U (shared unemployment risk factor), δ = difference in prevalence of U among those with unemployed friends and no employed friends. Shaded areas refer to cells where the hypothetical causal effect is zero or negative. † Due to a negative coefficient, all cells are negative.

realistic case, and that is the basis for our analysis of b × 0.5 from Table 3. This shows the resulting causal effect given different scenarios; γ is the size of the causal effect of the unobserved factor and δ the proportional difference in this factor between groups with no friend unemployment and groups with friend unemployment. Values below zero show when the causal conclusion is unlikely to hold. We show results both for the point estimate and the lower confidence limit to display the uncertainty of our estimates.

Table 5
Main effects and linear combinations of coefficients for interactions with friends' unemployment, separately for immigrant and Swedish alters.

	Main effects No interactions	Interactions (linear combinations)		
		Immigration group		
		Yugoslavian	Iranian	Swedish
Share unemployment among immigrant friends	0.129* (2.337)	0.176* (2.391)	0.053 (0.326)	0.092 (1.055)
Share unemployment among Swedish friends	0.172*** (3.542)	0.326*** (3.950)	0.034 (0.214)	0.114 (1.826)
Observations	1579	1579	1579	1579

Note: Robust t-statistics in parenthesis.***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. Multiple imputation model (M = 100). All models contain the full set of control variables.

The difference between 0 and 50 percent unemployment among friends is associated with an 11 percentage points higher unemployment rate for ego. In other words, the causal effect of the unobserved component or the difference in the exposure to the component has to be quite substantial in order for at least some of the effect to be non-causal: most values of the underlying hypothetical causal effects are positive (non-grey). With the lower confidence limit, this conclusion is more uncertain because the size of the effect or the concentration can be weaker: large parts of the table space are shaded grey. However, as Table 3 revealed, this result is heterogeneous across our groups, and therefore we perform separate sensitivity analyses for each group.

In the Yugoslavian group, the selection factor and the difference in concentration of the selection factor must be rather extreme in order for the effect to be non-causal. In the point estimate, no cell becomes negative, whereas for the lower confidence limit, only the most extreme combinations of the effect γ and concentration difference δ produce a negative effect. For the Iranian group, where we could not find any association between ego's and friends' unemployment, most of the cells are of course negative. In the Swedish group, where we found a weak friend association, the results for the point estimate suggest that there might be an underlying causal effect if the selection factor/concentration is not extreme. But when we analyze the lower confidence limit, almost all cells turn negative, and so this result can easily be explained by selection. To conclude, we find that the association for the Yugoslavian group is really strong and that the sensitivity analysis points to a causal interpretation of these results. For the other groups, however, the results may be explained by unobserved selection/ homogeneity bias.

Finally, in Table 5, we analyze the friend associations further by distinguishing between friends of *immigrant* and *Swedish origin*. In the Swedish group, we find that the association is similar across friends of different immigration status, but we lose statistical power here and none of the associations are significant. (For the Iranian group, prior analyses showed no sign of a friend association). Our main focus is entirely on the Yugoslavian group, where we find that the association between friends' unemployment and ego's unemployment tends to be stronger for Swedish friends than for immigrant friends, but the difference is not significant. The key conclusion of this analysis is that we find an association for *both* types of unemployed friends in the Yugoslavian group.

7. Discussion

We have found that two dimensions of social capital—quality of occupational contacts networks and unemployment in closer friendship networks—are associated with ego's unemployment risk. The quality and quantity of occupational contacts are negatively associated with ego's unemployment risk, and there is a tendency for this association to be stronger for the immigrant groups. For unemployment among friends, we find stronger evidence of a positive association in the Yugoslavian group, weaker evidence of a positive association in the Swedish group and a zero association in the Iranian group. Hence, one conclusion is that effects of friend relations are context-dependent, whereas occupational contact relations are less so, even though such contacts are more important for immigrants than for natives. The effect sizes of these two dimensions of social capital are very similar, and substantial: going from low to high values on these measures is associated with a difference of some 60–70 percent relative difference in unemployment risk.

One caveat is that the effects may be driven by selection, i.e., that networks of unemployed friends share something we cannot observe. We can, however, rule out a number of alternative explanations. Unemployed individuals with unemployed friends may be active in labor markets with very poor conditions. However, controlling for youth unemployment levels in very local contexts, as well as for other observable geographic factors (e.g., average level of education and level of earnings) does not change the estimates. We also have strong controls for ego's educational attainment, personality characteristics, attitudes, and health, but the estimated social capital effects are robust to such controls. Controlling for social network properties and friends' characteristics does not change this conclusion. It may be that unemployment affects friendship, but given that these individuals are still so young, their friendship network is still mostly formed around neighborhoods and the school milieu rather than based on common (exclusionary) labor market experiences. Rather than reverse causality,

unobserved social homogeneity may be a more likely source of bias in our estimates, but our sensitivity analyses suggest that the friend effect in the point estimate is so strong that it would require an extremely strong confounding homogeneity factor for our findings not to be causal, at least for the Yugoslavian group. The lower confidence limit however suggests that the causal portion of the effect may be small, and so the power of our analyses is a concern. We conclude that while this clustering of unemployment may to some extent reflect friendship selection on unobservables, the rich sets of controls limits the range of potential unobservables beyond the usual and increases the causal thrust to our findings. But we cannot rule out selection and endogeneity entirely as sources of bias for the Swedish and Iranian group, and the final answer to the question of causality must await further studies.

The heterogeneous associations across immigration groups deserve special attention. First, the heterogeneous associations between ego's and friends' unemployment underline the uniqueness of certain immigration groups and the fact that the generic concept of *immigrant* is often imprecise, requiring the collection of dedicated data. We were able to identify these differences across groups because the survey we designed concentrated on only two immigration groups that were heavily over-sampled, together with a Swedish reference population. Second, in terms of substance, our analyses suggest that effects of unemployed friends were very strong among youths of Yugoslavian origin, and still positive but weak for the Swedish group. The differences in associations are thus not driven by differences in unemployment levels across groups; it is only the degree of clustering of unemployment that differs across groups. While these effects are puzzling, one can expect that the effects of social networks would vary across contexts of different configurations (Entwisle et al., 2007), and that the network structure is both influenced by and influences culture such as norms and preferences (Pachucki and Breiger, 2010). The ethnic variations we observe are in line with these suggestions, yet hard to explain sociologically since theory makes no specific predictions on the particular cultural features that generate certain network outcomes, and vice versa, except that bridging ties will be important (cf Burt, 1992). We can offer two possible explanations for the patterns involving Yugoslavian and Swedish origin. First, the group differences may be explained by segmented assimilation (Portes and Zhou, 1993), that is, that youths of Yugoslavian origin are found in segments (neighborhoods, schools) where the Swedish population counterpart is relatively deprived in terms of socioeconomic resources. A similar case could be made for individuals of Swedish origin who have non-Swedish unemployed friends; they, too, may reside in segments where the non-Swedish population is deprived in resources. Second, given this segregation, it may be that resources available in co-ethnic environments shield against the effects of unemployment among in-group friends. There was a slight indication of this pattern among youths of Iranian origin. Lacking further direct information on risk factors however, such as friends' socioeconomic resources in the family of origin and in the segments, we cannot explore this line of explanation further.

Our study's main strength is that we provide evidence based on direct measurement of social capital, where we measure both friendship and occupational contact networks separately, while much of previous research has relied on proxies of social interaction. However, we cannot separate what Manski (1993) denotes exogenous and endogenous social effects. The former involves effects of common risk factors; the latter involves the reinforcement mechanism of unemployment itself. The crucial question, then, is to what degree this youth unemployment is detrimental to future life chances. On the one hand, to the extent that reinforcing processes are present, they will continue as long as the friendships survive, which will routinize behavior with a scarring as the effect. On the other hand, we observe individuals at a point in their lives when they are entering adulthood and where context and conditions change rapidly. Nonetheless, the paper strongly indicates that social capital, both in terms of friends outcomes and behaviors and quality of occupational contact networks, is an important factor for in order to understand unemployment risk among youths.

Acknowledgement

Table A1. Descriptive statistics of sample before imputation.

Variable	N	Mean	SD	Min	Max
Ego's unemployment (0/1)	1590	0.34	0.474	0	1
Friends' unemployment					
1 unemployed friend	1590	0.315	0.464	0	1
2 unemployed friends	1590	0.144	0.351	0	1
3 to 5 unemployed friends	1590	0.052	0.222	0	1
# friends	1590	3.993	1.15	0	5
Share unemployment among friends	1590	0.193	0.233	0	1
Occupational social capital					
Composite measure	1590	−0.014	0.985	−3.675	2.709
Sample categories					
Female	1590	0.513	0.499	0	1

(*continued on next page*)

(continued)

Variable	N	Mean	SD	Min	Max
Yugoslavian	1590	0.238	0.426	0	1
Iranian	1590	0.121	0.326	0	1
First generation	1590	0.064	0.245	0	1
Ego's educational achievement and attainment					
GPA, 9th grade	1590	0.021	0.905	−3.366	1.761
Graduation year, 9th grade	1590	2005.9	0.214	2005	2007
Did not finish 9th grade	1590	0.006	0.082	0	1
Independent school, 9th grade	1590	0.069	0.254	0	1
Own schooling (ref = Acad. upper-sec.)					
Elementary	1590	0.086	0.28	0	1
Voc. upper-sec.	1590	0.593	0.491	0	1
Ego's geo-spatial employment patterns					
Urban municipality					
ln local labor market size	1590	12.219	1.468	7.867	14.079
Size of public sector in local labor market	1590	0.305	0.044	0.228	0.451
Employment level in parish among 19−25 year olds	1590	0.6	0.098	0	1
Unemployment level in parish among 19-25	1590	0.047	0.022	0	0.123
Percent relative poor in parish (OECD definition)	1590	0.132	0.07	0.024	0.583
Percent on social welfare	1590	0.052	0.041	0.001	0.291
Percent immigrant in parish	1590	0.177	0.124	0.022	0.744
Ego's Socio-economic origin					
Father employed	1590	0.757	0.428	0	1
Mother employed	1590	0.762	0.425	0	1
Parents' education (ref = Elementary)					
Non-acad upper-secondary	1586	0.373	0.483	0	1
Academic upper-secondary	1586	0.125	0.331	0	1
Post-secondary	1586	0.201	0.4	0	1
Tertiary	1586	0.223	0.416	0	1
Post-grad	1586	0.019	0.138	0	1
Any parent attended university	1553	0.571	0.494	0	1
Ln parents' income	1586	6.114	0.459	1.609	9.734
Parent's do not live together	1590	0.363	0.481	0	1
Moved out of parents' nest	1590	0.025	0.156	0	1
# Siblings	1589	1.957	1.317	0	11
Dominating class origin of mother and father, register (ref = unskilled manual)					
Skilled manual	1590	0.136	0.343	0	1
Routine non-manual	1590	0.051	0.221	0	1
Lower service	1590	0.188	0.391	0	1
Upper service	1590	0.22	0.414	0	1
Entrepreneurs	1590	0.056	0.231	0	1
Farmers	1590	0.005	0.075	0	1
Dominating class origin of Sweden and abroad, survey (ref = unskilled manual)					
Skilled manual	1590	0.238	0.426	0	1
Routine non-manual	1590	0.071	0.258	0	1
Lower service	1590	0.279	0.449	0	1
Upper service	1590	0.173	0.378	0	1
Entrepreneurs	1590	0.074	0.263	0	1
Farmers	1590	0.016	0.129	0	1
Personality					
Personality factor: wellbeing and control	1542	0.036	0.942	−4.002	1.929
Personality factor: risk and frustration	1542	−0.016	0.873	−3.692	4.144
Personality factor: risk aversion and conformity	1542	−0.036	0.841	−2.809	2.646
Ethnic heterogeneity					
Orientation to Swedish culture	1589	3.247	0.871	1	5
Language used with parents: Swedish/Other	1590	0.131	0.337	0	1
Language used with parents: Other/Swedish	1590	0.175	0.38	0	1
Language used with parents: Other only	1590	0.069	0.253	0	1
Parents religiosity	1575	1.959	0.883	1	4
Migration experience:					
Mixed origin (one native, one immigrant parent)	1590	0.108	0.311	0	1
Young immigrant (<age 7)	1590	0.117	0.322	0	1
Old immigrant (7 < age < 14)	1590	0.04	0.196	0	1
Recent immigrant (>age 14)	1590	0.005	0.075	0	1
Born in Sweden, parents' long term residents	1590	0.051	0.221	0	1
Born in Sweden, parents' recent immigrants	1590	0.145	0.352	0	1
Health					
Self-rated health	1588	1.792	0.765	1	5
Exercise days/week	1588	2.615	2.14	0	7
BMI	1539	22.442	3.238	15.794	57.469

(*continued*)

Variable	N	Mean	SD	Min	Max
Own labor market experience					
Have had extra or summer job	1590	0.867	0.338	0	1
Prestige in summer/extra job	1590	28.89	8.774	13	78
Friends' average characteristics					
Network density (% alters that knows each other)	1590	0.473	0.119	0.05	1
Average religiosity among friends	1574	1.477	0.594	1	4
# friends that smoke	1590	1.273	1.328	0	5
Average of ego's distrust	1578	0.197	0.397	0	1
# friends that are male	1590	2.078	1.784	0	5
# friends of Swedish origin	1590	3.458	1.448	0	5
Average risk attitude among friends	1542	5.429	1.485	1	10
Average age among friends	1579	19.376	1.249	15.5	30.5
# friends that have entered university	1590	0.719	0.986	0	5
# over-weight friends	1590	0.356	0.633	0	4
# friends eating healthy food	1590	1.991	1.462	0	5
# friends exercising	1590	2.541	1.388	0	5
# friends in school	1590	3.024	1.402	0	5
# friends in neighborhood	1590	1.284	1.321	0	5
Friends' homogeneity					
IQV friends' religiosity	1534	0.317	0.325	0	1
IQV friends' smoking habits	1548	0.462	0.425	0	1
IQV ego's distrust	1550	0.461	0.429	0	1
IQV friends' sex composition	1550	0.311	0.413	0	1
IQV friends' country of origin	1549	0.214	0.363	0	1
MAD friends' risk attitude	1419	1.312	0.733	0	4.5
Ln MAD friends' age distribution	1551	−0.635	1.08	−2.302	2.794
IQV friends' education	1547	0.287	0.289	0	0.888
IQV over-weight friends	1429	0.252	0.382	0	1
IQV friends eating healthy food	1387	0.517	0.434	0	1
IQV friends exercising	1554	0.589	0.407	0	1
IQV friends' religiosity	1534	0.317	0.325	0	1

Note: IQV = Index of Qualitative Variation, MAD = Mean Absolute Deviation.

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