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The Intergenerational Effects of Unemployment: How Parental Unemployment Affects Educational Transitions in Germany

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Abstract

This paper studies the intergenerational effects of parental unemployment on students' transitions after completing upper secondary education. Besides estimating the average treatment effect of parental unemployment on transition outcomes, we also aim to identify the economic, psychological or other intra-familial mechanisms that might be responsible for any adverse impact of parental unemployment on children's educational transitions. Using longitudinal data from the German Socio-Economic Panel and propensity score matching estimators, we indeed find that paternal unemployment has an adverse impact on the likelihood to enter tertiary education whereas maternal unemployment does not. We also find that the magnitude of the effect depends on the duration of unemployment. Even though we are unable to fully account for the underlying mechanisms, our mediation analysis suggests that the effect of paternal unemployment is not due to the loss of income, but relates to the negative consequences of unemployment for intra-familial well-being and students' declining optimism about their further academic opportunities.

Keywords

Educational inequality, school-to-work transitions, higher education, intergenerational effects, parental unemployment, propensity score matching

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1. Introduction

A growing number of studies have begun to address social inequalities related to the intergenerational effects of unemployment. These recent studies find that parental unemployment negatively affects a child's psychological well-being (Bubonya et al 2017, Schaller & Zerpa 2015), educational performance (Rege et al 2011), educational ambitions (Andersen 2013), attitudes towards work (Mooi-Reci & Bakker 2015) and outcomes in education and the labor market (e.g. Brand & Thomas 2014, Coelli 2011, Müller et al 2017, Oreopoulos et al 2008). These adverse effects could arise because of negative consequences of unemployment, such as reduced family income and increased stress levels (e.g Brand 2015). Moreover, any negative consequences of parental unemployment experienced in childhood can be quite long-term, affecting children also in their early adulthood or even beyond if parental unemployment occurs at critical stages in children's educational trajectory (Brand & Thomas 2014, Lehti et al 2017). All this suggests that parental unemployment may have a significant role in enhancing educational inequalities and, through this channel, economic and labor market inequalities in the next generation.

Educational attainment has long been conceptualized as the outcome of multistage decision and transition processes in the sociological literature (Breen & Goldthorpe 1997, Erikson & Jonsson 1996, Mare 1980), yet how parental unemployment affects these processes remains largely uncharted territory in recent scholarship. Hence, a key question that animates the present paper is not just if, but why adverse effects of parental unemployment arise in educational transition processes. Some studies explicitly find that income loss due to unemployment is one reason (Coelli 2011, Kalil & Wightman 2011). Surprisingly, there is only limited empirical research on mechanisms other than parents' financial resources. What adds to the complexity of the phenomenon is that the effects of maternal unemployment might differ from that of paternal unemployment. Some previous research suggests that paternal job loss has more severe effects on children's school performance than maternal job loss (Kalil &

Ziol-Guest 2008, Rege et al 2011). It is possible that different implications of gender roles or gender differences in parents' relative contribution to household income may explain any differences in the impact of paternal as opposed to maternal unemployment on educational transitions. As empirical research to illuminate the mechanisms behind the intergenerational effects of unemployment is still scarce, our paper aims to fill this gap in the literature.

To do so, we specifically focus on how parental unemployment that occurred at some point while children were attending secondary education affects the subsequent transition that young people make after they complete school. Given the realities of post-industrial labor markets with their high employment and wage premia on academic education, we center our analysis on this particular transition because the opportunity to pursue high-quality post-secondary education may well be considered the critical juncture in the life courses of young people that is key to upward social mobility and an economically secure future. We draw on the literature on educational transitions to describe the options available to school-leavers after secondary education and to identify different financial, educational or familial mechanisms that may operate in the transition process to generate a negative impact of parental unemployment on outcomes. We specifically explore the roles of family income, adolescents' school performance, educational aspirations and perceived likelihood of success in post-secondary education, and we also address the impact of the family's home environment as expressed in the degree of supportive parenting and parents' own life satisfaction. We also systematically compare the effects of maternal and paternal unemployment on transition outcomes.

By conducting our analysis with German data, we furthermore place the analysis in a very specific institutional context. For the purposes of the present paper, Germany may in many respects be considered a critical case study where potential intergenerational effects of unemployment are likely to be much muted: relative to Anglo-Saxon countries, Germany has a generous unemployment benefit system and a largely public higher education system

dominated by public universities without tuition fees[1] and supported by a federal needs-based study grant program to students from the most economically disadvantaged families. This speaks to a reduced role for financial constraints to prevent students' entry into higher education. Moreover, the German education and training system features an attractive non-academic alternative to university in the form of vocational training and dual-system apprenticeship contracts (VET) that combine practical training in the firm with learning more general skills at vocational schools (Protsch & Solga 2015). This latter pathway could be considered low-cost and low-risk for school leavers as apprentices already earn a small salary, gain professional experience and are regularly offered a job in their training company at the completion of their training (typically as an intermediate level specialist). Previous research has suggested that the security offered by the vocational training is diverting students from lower socioeconomic backgrounds away from tertiary education (Hillmert & Jacob 2003, Müller & Pollak 2007), due to both higher perceived costs of university studies and a lower expected likelihood of success in those studies (Becker & Hecken 2009). Similar considerations of risk aversion may generate a related diversion from higher education in response to parental unemployment, even when Germany's institutional environment may otherwise not appear conducive to such intergenerational effects of unemployment.

In our empirical analysis, we rely on propensity score matching to identify and estimate the causal effect of parental unemployment on transition outcomes after upper secondary education in Germany. We base our analysis on longitudinal data from the German Socio-Economic Panel (GSOEP), which enables us to follow children living in a representative sample of survey households from early adolescence into their early adulthood. The GSOEP survey also provides us with rich background data to control for the social selectivity of parental unemployment, and with additional data on potentially relevant

[1] Beginning in 2007, some German states introduced quite moderate tuition fees (about 1000€ per academic year) but all abolished them again within a few years.

mediators to account for any adverse effects of parental unemployment on transition outcomes. Besides, two features of our analysis imply that we focus on households that are economically relatively successful. First, because we wish to identify the impact of job loss rather than mere search unemployment, we restrict our sample to working families where either the mother or the father was employed prior to any unemployment spell. Thus, we implicitly exclude families in chronic poverty from our analyses. Second, as we deliberately restrict our sample to the pool of young people who are eligible to enter tertiary education after completing secondary education, we also focus on a group that is again positively selected in terms of academic ability and social background. But even in this scenario of a least-likely test case in many respects, we empirically obtain evidence for a negative effect of parental unemployment on students' transitions from upper secondary education. The negative effect is evident for father's unemployment only, not mother's, and relates specifically to a lower propensity to enter tertiary education and a higher probability to begin vocational training. We also find that loss of family income is not the relevant mechanism that generates the adverse intergenerational effects of unemployment in the German case.

2. Theoretical Framework

2.1. Parental Unemployment and Educational Transitions

Standard sociological models of educational attainment mostly focus on the effects of parental education and social class (Breen & Goldthorpe 1997, Erikson & Jonsson 1996). The theoretical logic they present can also help to understand the possible role of parental unemployment in educational transitions. More specifically, taking a status attainment approach as a point of departure suggests that social influences from an early age onwards support the formation of quite stable educational expectations that then shape later educational decisions (Andrew & Hauser 2011, Sewell et al 1969). For instance, Grodsky and Riegle-Crumb (2010) assert that some students develop expectation to attend a college in their

childhood and thus this transition is an eventual non-decision for them. We might expect that educational ambitions already formed by early adolescence should increase a student's (and her family's) resilience to later parental unemployment. However, Bozick et al (2010) suggest that educational aspirations among children from lower social backgrounds are less stable than among children whose parents hold well-paying professional jobs. If so, it is conceivable that parental unemployment may have adverse effects on educational trajectories precisely because job loss is a class-specific risk: it disproportionately affects lower-educated and lower-class parents, who might be the least resilient to the economic insecurity involved because their children's educational aspirations (and those that parents hold for their children) might be more sensitive to external disturbance.

In addition, parental unemployment may of course affect educational transitions through the economic, behavioral or attitudinal changes it brings, and their likely implications can well be explicated within the framework of a standard but broadly conceived rational choice model of educational decision making (e.g. Breen & Goldthorpe 1997, Erikson & Jonsson 1996). As the Breen-Goldthorpe model expects families to evaluate financial costs against the subjective benefits of pursuing alternative educational options weighted by the perceived likelihood of successfully completing them, families' economic circumstances deserve primary consideration. Research on the scarring effects of unemployment has unequivocally found that long-term household income tends to be reduced significantly after job loss (e.g. Brand 2015, DiPrete & McManus 2000, Gangl 2006), making it also more difficult to manage the costs of children's higher education. Some previous studies for the United States and Canada suggest that income is an important factor that mediates the effect of parental unemployment on the next generation's educational outcomes (Coelli 2011, Kalil & Wightman 2011). However, as discussed before, family income may be a less decisive factor in a higher education system like Germany's that limits both the direct economic costs of higher education as well as, mainly through its study grant programs, the opportunity costs

of pursuing higher education. Besides the capability to cover the financial costs of tertiary education, higher income also gives families an opportunity to provide a supportive learning environment already during secondary education, and this mechanism may be relevant to support entry to higher education even in a low-cost environment like Germany.

In general, and especially so in the German institutional environment, parental unemployment might have important effects on transition outcomes over and above any of its direct economic implications, however, if it affects students' subjective perceptions of either the benefits of or their perceived likelihood of succeeding in higher education. The most important source of information that children and families have on the latter is children's academic performance in school (Breen & Goldthorpe 1997). And as academic performance is known to be shaped by students' social background in the sense of the social, emotional, economic and cultural resources linked to a supportive home environment (Erikson & Jonsson 1996), unemployment may have evident detrimental effects: parental unemployment has been shown to affect stress levels and personal relations in the family (Burgard & Kalousova 2015, Kalil 2013), other studies report that children's mental health is affected by paternal and maternal job loss (Bubonya et al 2017, Schaller & Zerpa 2015). For instance, Peter (2016) who finds that maternal job loss decreases a child's belief in self-determination in Germany. Moreover, empirically, Levine (2011) finds very limited evidence for a relationship between parental unemployment and children's school performance for U.S. data while Rege et al (2011) show that parental job loss has a negative causal effect on children's grade point average in Norway.

In addition, it is possible that parental unemployment affects the value that families attach to higher education in general, following a pattern of adaptive preference change known as the 'sour grapes' phenomenon (Elster 1983): to reduce cognitive dissonance, preferences may adapt to the feasible set of educational opportunities, typically by mentally downgrading the less accessible options. In line with this idea, some recent research in the

United Kingdom finds that parental unemployment reduces a child's educational ambitions (Andersen 2013), a result that aptly resonates classical findings of the Marienthal study from Depression-era Austria (Jahoda et al 1971 [1933]).

Finally, unemployment might also affect attitudes and role models that parents transmit to their children more generally. More resourceful parents have better opportunities to provide positive encouraging role models for their children (Haveman et al 1991), which might be more difficult to do for unemployed parents. Moreover, based on Dutch data, Mooi-Reci and Bakker (2015) find that parental unemployment reduces educational achievement of children because unemployment changes the work orientation within the family, namely by lessening its subjective importance to parents. In addition, children's relations outside family might be affected by parental unemployment. For example, Brand and Thomas (2014) suggest that social stigma attached to parental unemployment may have a long-term effect on children by reducing their well-being and educational outcomes. In general, the available empirical research provides good evidence that parental unemployment indeed induces negative intergenerational implications for either children's subsequent educational opportunities or in terms of later-life labor market risk (e.g. Lehti et al 2017 for Finland, Lohmann & Groh-Samberg 2017 for Germany, Macmillan 2014 for the United Kingdom, Mooi-Reci & Bakker 2015 for the Netherlands, Oreopoulos et al 2008 for the United States, Rege et al 2011 for Norway), yet has not thoroughly examined the potentially relevant mechanisms so far.

2.2. Maternal and Paternal Unemployment

The strength of any intergenerational effects of unemployment might depend on whether it is the mother or the father who is unemployed. To begin with, the financial consequences of the husband's job loss might be more severe for the household. Although couples have increasingly moved to dual-earner arrangements also in Germany, men have remained the primary provider in many households as mothers often take up part-time employment (Trappe

et al 2015). Another reason for gender-differential effects could be that, maybe linked to the threat implied to traditional male breadwinner roles, unemployment tends to distress men more severely than women (Paul & Moser 2009), which then also generates further adverse spillover effects on the mental health of their spouse and other family members (Bubonya et al 2017, Marcus 2013). In similar line, Mooi-Reci and Ganzeboom (2015) find that stigma effects likely play more important role for men than for women in explaining scarring effects of unemployment to reemployment wages.

Also, there might be gender-specific patterns in how parents make use of their involuntary non-work time during unemployment, some of which might simply be used for intensified parenting. The changes in time spent on housework during unemployment provide some indirect support for the possibility that mothers' unemployment might differ from fathers' also in this respect. For instance, Gough and Killewald (2011) show that unemployed women in the United States increase their time spent on housework twice as much in relation to unemployed men. Similarly, Lippe et al (2017) conclude, based on data from 28 European countries, that unemployed women do more extra housework than unemployed men even though men also contribute more to housework during their unemployment than while employed.

Plausible as these considerations might be, previous empirical studies to compare the effects of maternal and paternal unemployment are rare and mostly point towards the importance of paternal unemployment. For instance, Kalil and Ziol-Guest (2008) show that, in the United States, a father's involuntary joblessness in two-parent families has adverse effect on children's academic progress but mother's joblessness has no such effect. Similarly, Rege et al (2011) find in a Norwegian study that paternal job loss has a negative effect on child's school performance while the effect of maternal job loss is not significant. Both studies conclude that the reasons for the adverse effect of paternal unemployment relate to mental distress rather than income loss. However, some studies that focused solely on maternal job

loss report significant adverse effects on the likelihood to enroll in college (Brand & Thomas 2014 for single mothers in the United States) and increased risk of grade repetition (Peter 2016 for Germany).

3. Data and Methods

3.1. Data and Sample

This paper uses longitudinal survey data from the German Socio-Economic Panel to test the above considerations and to empirically analyze the effect of parental unemployment on the transition outcomes of their children. The GSOEP is a large-scale longitudinal study that is representative of private households in Germany (Wagner et al 2007). For the present analysis, we use the GSOEP data from all survey waves conducted between 1984 (the start of the GSOEP study) until 2015. Our sample on transition outcomes after completing upper secondary education includes children born between 1973 and 1998.

Overall, we have information on the completion of secondary education for 5,711 children living in GSOEP families.[2] However, as the secondary education system in Germany is highly differentiated, students are assigned to different tracks of secondary schooling (typically at age 10-12) based on their previous academic performance, but also with strong effects of social background at this transition point (Neugebauer et al 2013). Only the graduates of upper secondary schools (*Gymnasium*) are eligible for entering the tertiary education later on, whereas students who do not complete *Gymnasium* may choose to obtain a restricted upper secondary degree (*Fachhochschulreife*) that gives access to universities of applied science (see also Weiss & Schindler 2017). As we focus on young people who have the required credentials to continue in tertiary education, we restrict our sample to the 2,295 school-leavers from GSOEP families with either a full or a restricted upper secondary degree.

[2] We excluded the few households where one of parents was less than 17 at child's birth as employment patterns might be very specific for such households.

Furthermore, we seek to observe family life courses while children are in secondary schooling in order to estimate the impact of parental unemployment that occurred at this stage of children's schooling trajectory, i.e. when children were aged 12 years or older. Since a fair share of GSOEP households joined the survey only when their children were already older (as a part of new or refresher samples), this age requirement further reduces our sample size to 1,526 children who are present in the GSOEP survey from age 12 onwards. Finally, when seeking to identify and estimate the impact of parental experiences of unemployment, information on parents' earlier employment status is of key importance, both as a relevant confounder to predict parental unemployment incidence and as a means to ensure that our measure of unemployment reflects genuine job loss rather than search unemployment of parents who re-enter the labor force after a family-related work interruption or any other type of long-term non-employment. To that end, we restricted our analysis to children whose parent was employed when the child was 12 years old. We defined parental employment as having worked for at least one month in the year when the child was 12. With this, our final sample for the analysis of mothers' unemployment includes 1,027 children and 1,321 children for our analysis of fathers' unemployment.

When analyzing possible mediators for the effect of parental unemployment on transition outcomes, we can draw on a smaller sample of 793 children for whom more detailed information on potential mediating variables is available. Our main source of these variables is the GSOEP's youth questionnaire that is filled in the year when children in GSOEP households turn 17. Since this questionnaire was introduced in 2000 only, our available sample is restricted to respondents born between 1982 and 1998. Interestingly, the treatment effect estimates in this reduced sample are almost identical to those obtained in the main analysis, so that the more restricted cohort range is not an apparent source of bias in the mediation analysis (see the results section for more details). Also, as we do not find any

treatment effect for maternal unemployment, we conduct and report on the mediation analysis only for the case of paternal unemployment (again, see the results section below).

3.2. Variables

The treatment variable of interest in our analysis is the unemployment experience of a parent (either the mother or the father) while the child attended secondary schooling. We use the GSOEP calendar data to identify parents' unemployment spells, i.e. the exact times when a parent was looking for a job and was not employed. We only consider those spells in our analysis where the parent was unemployed for at least for 4 months within an observation window of 2 years in order to remove singular short-term unemployment spells between job changes unless these are frequent.[3] In the main analyses, we focus on the effect of parental unemployment that occurred when their child was aged 12-19 years, e.g. we code school-leavers who enrolled to tertiary education but also had an employment spell as students in tertiary education. For the mediation analysis we restrict this age range to 12-17 years, i.e. before the measurement of the mediator variables in the GSOEP youth survey. Overall, about 11% of fathers and 13% of mothers experienced some unemployment in the full transition sample, and 9% of fathers in the mediation sample.

We assess the impact of maternal and paternal unemployment on a child's transition outcome within three years after leaving the upper secondary education. By choosing this timeframe, we seek to discount a possible gap year that some school-leavers take as well as military or social service that was compulsory for men in earlier cohorts. We study whether school-leavers (1) enter tertiary education, (2) enter a vocational training program (VET), (3) are in paid employment or (4) are out of education and work (NEET), i.e. either economically inactive or unemployed. In case of multiple outcomes, we prioritize the coding of outcomes as

[3] In sensitivity analyses we also included shorter unemployment spells and find, as expected, that very short spells do not have any visible negative effects on transitions (see Figure 3 below).

listed, i.e. see the entry into tertiary education as the most and NEET status as the least desirable outcome. In line with the tracked nature of the German schooling system, sample descriptives show that only a small fraction of school leavers from upper secondary education remain in NEET status for three years after finishing school (see Table 1). Moreover, young people whose fathers have experienced unemployment enter tertiary education less often than their peers. The same holds for children whose mother has been unemployed, albeit to lesser extent.

Moreover, the GSOEP dataset includes a rich set of control variables that may predict parental unemployment as well as children's transition outcomes. All parental and household variables refer to time when child was 12 years old. We expect the following paternal or maternal employment characteristics to predict unemployment incidence: industry and size of the company where the parent was employed, net labor income decile and years of working experience in full-time employment. We also control for parents' satisfaction with health, the level of education and whether the parent was born in Germany. As mothers tend to shift to part-time work after childbirth in Germany (Trappe et al 2015), our analysis of maternal unemployment also includes variables to indicate whether the mother worked part-time (<35 hours per week) and a measure of part-time work experience (in years). We also control for parents' age as parents in prime working age might have different unemployment risks than younger parents (below 35) or older parents (50+). In addition, we control for unspecified period effects and whether the respondent lived in a rural area or in East Germany.[4] Moreover, we include variables to measuring the number of children younger than 16 in the household and the other parent's migration status, level of educational and employment status. We also control for whether child lived with a single mother; in case of fathers, the number of single father households is too marginal to permit any meaningful distinction. We

[4] East Germany joined the SOEP after Germany's reunification. Since our unemployment definition requires observing family at the year when child was 12, our sample does not include parental employment before reunification.

also include child's gender and the type of upper secondary degree (restricted or full). Table 1 gives a detailed overview of all the covariates we use in the analysis.

TABLE 1 ABOUT HERE

In the subsequent mediation analysis, we are able to empirically test the role of six potential mechanisms to account for the treatment effect of parental unemployment on transition outcomes. First, we test whether academic performance, measured as students' *grade point average* (GPA) in the first foreign language, math and German on the last report card, mediates the effect of parental unemployment.[5] Second, parental unemployment could have an adverse impact on *educational aspirations*, which we measure with a variable that indicates whether students plan to attain a tertiary education (university or university of applied sciences) degree. Third, we test the role of students' subjective perceptions of their own *likelihood of academic success*. The GSOEP asked young people to estimate their probability of being accepted for an apprenticeship or at the university to study their desired profession, which respondents answered on a scale from 0% to 100%. In conceptual terms, it is important to note that this question refers to the student's perception of chances to accomplish personal occupational aspirations (and to acquire the required educational certificates) and not specifically to the expected success in an academic program at university. Fourth, the GSOEP measured perceived *paternal emotional support* based on adolescents' replies to nine questions (see Appendix B) about supportive parenting. We took the average of these replies and coded it into five categories: very low support (more than 1 standard deviation (SD) below the mean), rather low support (at most 1 SD below the mean), rather high support (at most 1 SD above the mean), very high support (more than 1 SD above the mean) and missing answer. Fifth, as a catch-all indicator of psychological stress, we test for

[5] In contrast to German practice, grades are rescaled so that higher grades denote higher performance.

the role of *parent's life satisfaction* when the child was 17 years old. Finally, we test the possible mediating role of families' financial resources measured with the family's relative economic position in terms of *household net disposable income*, expressed as its decile position. Because the GSOEP provides annual income data, we use family income when the child was 18 years old. In addition, we also include the difference between family income decile at child's age 12 and 18 as a measure of the *change in households' economic position* while children attended secondary education.

3.3. Methods

Our empirical analysis aims to identify the causal effect of parental unemployment on their children's transition outcomes. We base our analysis on an observational design that seeks to estimate the treatment effect of interest from the comparison of outcomes in the treatment and in the control group, while holding constant theoretically relevant and empirically observable confounders. For this purpose, we use non-parametric propensity score matching (PSM) estimators to account for potential selection into parental unemployment (Rosenbaum & Rubin 1983). To estimate the treatment effect of interest empirically, PSM constructs the counterfactually expected transition outcome for each child whose parent was unemployed using data on the outcomes of children whose parents were not unemployed but who are otherwise as similar as possible to the focal child in terms of observed characteristics X of parents and children. By expressing similarity between observations through a one-dimensional propensity score, PSM furthermore reduces the high dimensionality-comparison across a multitude of observed covariates X to an empirically manageable one-dimensional comparison.

In our analysis, we will specifically focus on estimating the average treatment effect on the treated (ATT) because this quantity expresses the transition outcomes that children of unemployed parents would have had without the experience of parental unemployment

(treatment D). Empirically, the ATT is calculated as the average of all differences between the factually observed outcomes (Y) of individuals *i* in the treatment group (D_i=1) and the counterfactual outcome estimated from the factually observed outcomes among observationally similar individuals *j* from the control group (D_i=0) for the sample of treatment group observations (e.g. Gangl 2015, Morgan & Winship 2015):

$$ATT_{match} = \frac{1}{N^{D=1}} \sum_{i|D=1} \left[Y_i \quad - \sum_{j|D=0} w_{ij} Y_j \right]$$

where $N^{D=1}$ is the number of observations in the treatment group and w_{ij} denotes the matching weight that, based on the propensity score, any control group observation *j* receives in the computation of the counterfactually expected outcome for a treatment group observation *i*.

For our PSM analysis, we first estimate the propensity scores from a logistic regression model to predict the incidence of parental unemployment from the observed covariates X. Based on the estimated propensity scores, we apply the kernel matching estimator (Heckman et al 1998),[6] which has the advantage of using all cases in the control group to construct the counterfactuals and thus reducing the variance of the resulting treatment effect estimates. [7] Empirically, post-estimation tests also showed that residual bias was marginal after balancing control and treatment groups in our analysis, so that our PSM estimator rests on acceptable covariate balance (Appendix A). Moreover, as is well known, PSM methods allow to estimate treatment effects only over the common covariate support in

[6] We used an Epanechnikov kernel function and bandwidth parameter 0.05 for transition analysis and 0.06 for mediation analysis.

[7] As a robustness check, we also conducted our analysis using entropy balancing matching (EBM). In contrast to PSM methods, EBM focuses on achieving covariate balance at the level of the raw data directly (in terms of mean, variance and skewness of covariates). Empirically, we found no relevant difference in results attained with these two methods.

the treatment and control group overlap, yet due to the large reservoir of control group cases, we were able to assign counterfactual observations to almost all children of unemployed parents in our analysis (see Appendix A again). As a further robustness check, we also compare the ATT estimates from PSM matching with the corresponding estimates from a linear probability regression. As is well known, both methods share the principal vulnerability of inferences to unobserved confounders, but the comparison will at least illuminate whether our conclusions were to change in linear probability models that trade-off parametric functional form assumptions for greater statistical efficiency (Imbens 2015).

Following up on the main analysis, the mediation analysis aims to explore the mechanisms through which the causal effects of parental unemployment on children's transition outcomes may operate. We again use PSM estimators and implement a PSM mediation model by conditioning on mediators (M) as well as pre-treatment confounders (X), i.e. by incorporating the covariate vector (M, X) in the assignment model and by subsequently balancing observations across the joint (M, X) distribution (see Huber et al (2017) for a related application). [8] Conceptually, the effect of parental unemployment on children's transition outcomes most likely arises through multiple mechanisms, and a causal interpretation of mediation in this case would require that each of the mediators M may be considered exogenous after conditioning on other mediators, the treatment and pre-treatment covariates (Imai & Yamamoto 2013). However, given our limited sample sizes, we refrain from simultaneously conditioning on all possible mediators in a single specification, but present the results from multiple PSM mediation models that include single mediators or a combination of a few selected mediators instead. As a result, we will not aim to give a strictly

[8] Empirically, we had to slightly adapt some covariates to achieve successful covariate balance with a smaller sample size. These changes are the following: 1) for father's age, we only distinguish whether the father is aged 50 or younger; 2) instead of the migration background of the parent we use a binary variable for the child's own migration background; 3) we combined services and trade sectors into one industry code; 4) the variable for maternal employment does not separate full-time and part-time employment; 5) we do not include period effects because the cohort range is more confined in the mediation sample.

causal interpretation to our mediation analysis, but rather see it as an attempt to explore and describe empirical evidence on what the mediating variables on the path between parental unemployment and the transition outcomes of their children might be.

4. Empirical results

4.1. The average treatment effect of parental unemployment

We begin our analysis with the estimation of the incidence of parental unemployment, i.e. the assignment model of the PSM estimator. The respective logistic regression models show that mothers and fathers who have lower levels of education are more likely to be unemployed, as are parents who were located at lower deciles of the income distribution, who lived in East Germany and who had a non-employed partner (see Table 2). Table 2 also suggests that mothers whose work experience is shorter, whose health is poorer and who live together with a less-educated partner face a higher risk of unemployment. In addition, fathers' likelihood of unemployment is affected by firm size, economic sector and older age, and unemployment risks were particularly pronounced in the period 1991-1995. Also, fathers whose children attained a restricted upper secondary degree were more likely to experience unemployment.[9] Note that the assignment models include control variables for children's characteristics not as predictors of parental unemployment in any causal sense, but because they might predict children's transition outcomes in their own right and hence respective covariate adjustment is required for proper estimation and causal inference.

TABLE 2 ABOUT HERE

[9] Although the type of degree attained at the end of upper secondary is measured after parental unemployment, sorting to the school track occurs before parental unemployment. Yet, as mobility between tracks is empirically limited (Hillmert & Jacob 2010), we see this as a defensible approximation in practice. Given that parental unemployment might induce some downward track mobility as a relatively strong response (in terms of children's declining school performance), the fact that we include the type of degree (rather than the track attended) implies that our estimates of the effects of parental unemployment on transitions are likely to be conservative.

Based on the assignment models of Table 2, we constructed the propensity scores as the predicted probability of maternal and paternal unemployment and then applied these in conjunction with kernel matching to tackle the selection into unemployment and to estimate the ATT. Figure 1 presents our ATT estimates for the effect of maternal unemployment on children's transition outcomes, and Figure 2 below has the corresponding ATT estimates for the effect of paternal unemployment. In either case, we present our ATT estimates from both the PSM and the LPM model; as these are mutually very consistent, and thus do not appear to critically depend on the specific assumptions of either estimator, we simplify the presentation of results by focusing exclusively on the PSM estimates in the following.

FIGURE 1 ABOUT HERE

As far as mother's unemployment is concerned, we find no evidence of any causal effect of unemployment on children's transition outcomes after upper secondary education in Germany. In Figure 1, we provide three different ATT estimates that seek to ascertain the impact of maternal unemployment across all possible pathways after completing secondary education. Yet neither for the probability of entering tertiary education, nor for the probability to choose pursuing a tertiary education vs. vocational training, nor for the probability of NEET status do we find any evidence of an adverse impact. Indeed, it is important to stress that these findings refer to the average treatment effect of unemployment in the sample of all working mothers. As recent research in the U.S. has reported evidence of negative intergenerational effects of unemployment among single mother families (see Brand & Thomas 2014), it would of course be of interest to focus on this group also in our case. However, the relatively small size of our sample and the low prevalence of single motherhood

in Germany (around 10% of mothers in our sample, see Table 1) does not allow for any more differentiated analysis along these lines.

FIGURE 2 ABOUT HERE

These findings in case of mother's unemployment stand in sharp contrast to the results that we obtain on the impact of father's unemployment on children's transition outcomes after upper secondary education. Here, our empirical findings in Figure 2 show that paternal unemployment indeed has a clear adverse effect on children's transition outcomes. Students whose father experienced unemployment while they were in secondary education turn out to have about 14 percentage points lower likelihood of continuing in tertiary education than that of students whose father was not unemployed during secondary education (Figure 2, panel A). Panel B in Figure 2 shows that the treatment effect of paternal unemployment is -13 percentage points if we compare only the choice between pursuing tertiary education or vocational training that leads up to qualifications at the level of intermediate specialists and technicians. The similarity between these ATT estimates indicates that the main effect of paternal unemployment in Germany is to channel students away from higher education and into the VET system. As the ATT estimates presented in Panel C of Figure 2 indicate, there is again no evidence that paternal unemployment would induce severe transition problems involving extended periods of NEET status.[10]

[10] Our results differ from the findings in Müller et al (2017). Using data from the GSOEP as well, they report that paternal unemployment even increases the likelihood of college attendance for daughters, while it has no effect on the college attendance of sons. In our view, the main reason for the discrepancy in results is the more theoretically informed research design adopted in the present paper. In contrast to Müller et al (2017) analysis: (1) we deliberately excluded short spells of parental unemployment that are unlikely to create transition problems; (2) we ensured that our treatment variable refers to unemployment experiences that occurred during secondary education; (3) our treatment variable (predominantly) captures job loss rather than mere search unemployment; (4) we also condition on the sorting of children into the academic and non-academic tracks of the German secondary educational system(see footnote 10).

In additional sensitivity analyses, we also tested whether accounting for paternal unemployment that occurred before a child was 12 years old would change our conclusions. For this, we added the overall duration of earlier unemployment spells to the covariate vector of the PSM (and LPM) model, but found no evidence of any meaningful difference in the ATT estimates (see Appendix C for details). In other words, we find that our results indeed speak to a genuine causal effect of paternal unemployment during secondary schooling, independently of whether this might have been the first or a repeated spell of unemployment for the father. However, as the model's balancing tests are not as good as for the simpler models from Figure 2, we prefer to use the latter specification in the remaining analysis.

FIGURE 3 ABOUT HERE

To further probe whether it is not simply the incidence, but rather the severity of paternal unemployment experiences that might be relevant for children's transition outcomes, we explore whether the ATT estimates vary with the duration of paternal unemployment. Figure 3 provides our treatment effect estimates for this more differentiated analysis, where we distinguish between students whose father was unemployed for either 1-3 months, between 4-12 months or long-term unemployed for more than a year. Doing so first of all provides an empirical corroboration for our theoretically informed decision to disregard very short spells of parental unemployment in our main analysis. When fathers were experiencing no more than three months of unemployment while their children attended secondary schooling, there is no subsequent discouragement of entry into tertiary education at all; if anything, the point estimate is even positive, although not reaching statistical significance. Fathers' longer unemployment spells, however, reduce the likelihood that children enter tertiary education, and this negative effect increases with the duration of father's unemployment. Among children whose father had a total of 4-12 months of unemployment,

our ATT estimate indicates that the probability to enter tertiary education falls by some 10 percentage points, yet this transition penalty increases to 17 percentage points for children whose father had been long-term unemployed.

4.2. Mediation analysis

We explore next why paternal unemployment has an adverse effect on children's transitions after secondary education. Due to the reduced sample size available to us for the detailed mediation analysis, we focus on the contrast between entering tertiary education vs. all other transition outcomes in the following. Figure 4 reports the corresponding ATT estimates that we obtained as the estimates of the (residual) direct effect from a series of PSM mediation model estimators. Although the sample size (and, indirectly, the range of birth cohorts that can be included in the analysis) is reduced relative to the main analysis, our baseline ATT estimate from a model without mediators is -13 percentage points (see model M1 in Figure 4), which closely replicates the findings from the main analysis of the preceding paragraph. In further specifications, we explore the role of several potential mediating factors discussed in our theoretical framework. Specifically, models M2-M4 evaluate the contribution of changes in children's school performance, educational aspirations and children's subjective expectations of educational success, models M5 and M6 explore the role of supportive parenting and family stress, models M7 and M8 the role of family income, and models M9-M11 present three further extensions of the basic mediation analyses that will be discussed in more detail below.

As regards educational factors, models M2 and M3 reveal that neither grades nor educational aspirations contribute to mediate the adverse effect of paternal unemployment on

students' chances to enter tertiary education.[11] To understand these findings, we estimated a series of supplementary linear regression models to quantify the nature of the relationships along the paths between paternal unemployment, the mediators and transition outcomes (for these two specific and all other mediators in the analysis, see appendices D and E). From these supplementary analyses, we indeed find that grades and educational aspirations strongly predict enrolment in tertiary education. But we also find that father's unemployment does not have any effect on children's aspirations and has even a slight positive effect on the grade point average in Germany.

Model M4, however, suggests that students' subjective expectations of academic success work as a partial mediator for the treatment effect of paternal unemployment. In M4, the (residual) direct effect estimate is reduced to 11.5 percentage points. Our supplementary analyses indeed show that father's unemployment somewhat reduces the likelihood that children believe they can be successful in attaining their desired career (the effect is no longer statistically significant if all covariates are included, however) and also that these subjective expectations of academic success are a clear predictor of enrollment in tertiary education (see appendices D and E again).

FIGURE 4 ABOUT HERE

On the side of intra-familial stress factors, however, neither father's life satisfaction nor the emotional support the child reported to receive from the father mediate the adverse effect of paternal unemployment on entering higher education (see M5 and M6 in Figure 4). Further analysis shows that paternal unemployment reduces the amount of perceived emotional support from father as well as father's own life satisfaction, confirming our

[11] We also tested whether the effects of potential mediators might differ depending on students' academic performance, but found no support at all from models with full interactions between grades and all other mediator variables at our disposal (results not presented).

theoretical expectations. However, supportive parenting and father's life satisfaction both have at best very minor effects on children's entry into higher education (see appendices D and E). Likewise, and in contrast to some results in the recent U.S. and Canadian literature but not wholly unexpected in the German institutional context, we also find that household income does not mediate the adverse effect of paternal unemployment (see model M7 in Figure 4). Again, parental unemployment leads to lower family income, but family income does not influence students' propensity to continue their education in the tertiary system in Germany (see appendices D and E). The same applies when we explicitly add the change in household income position during secondary education to the covariate vector (see model M8 in Figure 4).

Because of the very modest results from these different single-mediator specifications, we implement and report a few selected multiple-mediator PSM estimates in order to obtain a better sense of whether the joint impact of several mediators might provide a more satisfactory explanation for the treatment effect of interest. As a first extension, we tested a mediation model that included all mediator variables except those that were found to suppress the effect of paternal unemployment on transition outcomes (i.e. grades and aspirations). However, this is not much more effective empirically than considering adolescents' subjective expectations of academic success alone (compare models M4 and M8 in Figure 4). As a second extension, we considered the possibility that the importance of potential mediators depends on whether a child attends a school track leading to a restricted or a full upper secondary degree (i.e. a *Fachgymnasium* or a traditional Gymnasium); given the clear academic orientation in the traditional *Gymnasien* from ages 10 or 12, it might be presumed that educational trajectories are more firmly settled and more of a non-decision there. On the other hand students in the *Fachgymnasien* might be a more selective group in terms of high educational motivation because enrolling in these schools requires an explicit decision by the student after grade 10. We tested the interactions between school track and all potential

mediators, but only report the two instances where we obtained some findings of interest in Figure 4. Model M10 demonstrates that the mediating role of students' subjective success probability differs between tracks (and reduces the negative direct effect of paternal unemployment to 10 percentage points). The same is true for father's life satisfaction (see M11, where the residual ATT drops to less than 9 percentage points). Interestingly, additional analysis indicates in both cases that the mediators are affecting the educational decisions of students from traditional *Gymnasien* more strongly than their peers from more vocationally oriented *Gymnasien* (results not presented).

5. Conclusion

Recent scholarship has expressed a growing concern about durable intergenerational effects of unemployment that may affect socio-economic outcomes also in the next generation. This study has sought to extend the previous literature by shifting the focus to educational transition processes instead of final attainment, and by evaluating the impact of parental unemployment experiences preceding critical branching points in educational trajectories. We specifically investigated how parental unemployment affects the likelihood of different transitions after upper secondary schooling, which probably has become the decisive educational decision point in the post-industrial economies of the Western world. By using longitudinal data for Germany, our analysis moreover contributes new empirical evidence on the intergenerational effects of unemployment in an institutional environment that might be thought to render educational trajectories rather resilient to the adverse impact of economic shocks.

Nevertheless, our empirical analysis suggests that parental unemployment, especially father's unemployment, has a strong negative impact on the educational decisions of children even in a favorable institutional environment like Germany's. We find that paternal unemployment reduces the likelihood that students enter tertiary education, and increases the

likelihood that they pursue vocational training (VET) instead. In the German debate, this pathway is often considered as offering more security regarding future labor market prospects and thereby contributing to deflect working-class children from academic trajectories (Müller & Pollak 2007). Applying the same reasoning to the case of adverse intergenerational effects of unemployment would suggest that father's unemployment triggers transitions into Germany's high-quality VET system as the preferred training strategy among risk-averse families and students under economic uncertainty and stress.

Although lacking definitive proof, the findings from our mediation analysis would be consistent with this interpretation in principle. Our empirical findings certainly underscore that family income is not a mediating factor to explain the intergenerational effect of (father's) unemployment, nor is income even affecting the likelihood to enter tertiary education in Germany in general. This result may be somewhat surprising as men are still primary breadwinners in many households in Germany (Trappe et al 2015), yet the irrelevance of financial constraints is in perfect accordance with the institutional environment of both Germany's education and training system as well as its larger welfare state. Public universities and need-based federal study grants reduce direct financial barriers to access, and generous unemployment benefits and other transfers protect family income after job loss. Some of our findings from the mediation analysis point towards a role for more psychological consequences of unemployment, notably on children's subjective expectations of academic success and also family stress levels as indexed by father's life satisfaction that both partially explain the treatment effect of interest (especially when we allow mediation effects to vary between school tracks). But as the results from the mediation analysis are quite modest overall, it would be consistent to conclude that the event of parental unemployment may not so much *change* educationally relevant orientations as simply imply a heightened sense of economic insecurity to which students and their families respond by adopting educational trajectories that involve fewer risks and more predictability.

In fact, the specific educational response observed among families where the father experienced unemployment – pursuing VET instead of academic education – is also likely to be highly contingent on the German context where the VET system is long established, highly reputed and famous for providing youth with a smooth and predictable pathway into the labor market. Tellingly then, the adverse intergenerational effects of parental unemployment are indeed quite circumscribed relative to an Anglo-Saxon context, for example, because the adversity entails a curbing of academic aspirations, but not an outright exclusion from the opportunity to acquire qualifications that will be of relevance in the labor market. Empirically, we do not find that parental unemployment would induce severe transition problems, as those indexed by extended periods of NEET status in the present study. Thus, our results do not provide any indication of possible negative attitudes or lacking positive role models that would hinder working or studying among upper secondary school leavers whose parents are unemployed.

Further analysis also seems warranted in case of the gender differentials that we observe. In line with some previous evidence in the United States and Norway (Kalil & Ziol-Guest 2008, Rege et al 2011), we also find that paternal unemployment has a negative effect on children's educational transitions in Germany, but not maternal unemployment. This result might be consistent with the argument that the psychological consequences of unemployment are more severe for men as the breadwinner role continues to be more central to men's identity than for women (e.g. review in Paul & Moser 2009). However, the observed gender difference might also be highly context-specific, as work-family arrangements and gender role expectations vary across countries and also over time. As women's economic role has continuously increased over time, it would be of particular interest to examine in future research whether the importance of maternal unemployment for children's education is increasing in accordance, or, likewise, whether it already is larger in countries with a longer history of high female labor force participation than Germany.

Clearly, we also have to acknowledge methodological limitations of the present study. With utilizing PSM or LPM estimators, we cannot exclude the possibility that some relevant unobserved factor that predicts both the selection of fathers into unemployment and the transition outcomes of their children might still be biasing our causal inferences. Another possible limitation is that our data does not include information on fathers who did not live together with their 12-year-old child, although the resulting bias might be small as previous research has suggested that socioeconomic status of non-residential fathers has a limited impact on children (Erola & Jalovaara 2017). More importantly, however, our relatively small sample size has not allowed us to further explore how the intergenerational consequences of unemployment might vary for different social groups, including the impact of unemployment among female-headed families, among the lower educated or also among migrant parents. Yet while we have to leave these questions for future research, it seems important to emphasize the key finding from our study once again: in many respects, whether for the structure of its education and training system, for the strength of its welfare state, for the comparatively low prevalence of single parenthood, or even for the selectivity of students in terms of higher abilities and parental background attending upper secondary (Gymnasium) schooling, conducting the present analysis for Germany corresponds to a critical test case where different theoretical reasons suggest the intergenerational effects of unemployment in entry to tertiary education to be mitigated relative to the U.S. or British case, for example.

Nonetheless, we do find evidence of a clear adverse effect of father's unemployment on children's educational transitions from upper secondary education even in this otherwise favorable context. Consistent with the institutional environment, we find that financial constraints are not among the causes of the intergenerational effects in Germany, but it seems that other consequences of unemployment – for educational expectations, family stress levels, or also related to broader feelings of economic insecurity – are indeed difficult to avoid.

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Tables and Figures

Table 1. Distribution of Covariates in the Sample

	Mother				Father			
	Employed		Unemployed		Employed		Unemployed	
	Mean / %	SE	Mean / %	SE	Mean / %	SE	Mean / %	SE
Parent's characteristics (age 12)								
Subjective health	7.3	(.06)	6.7	(.17)	7.2	(.06)	6.7	(.18)
Full-time work experience (years)	9.3	(.21)	8.7	(.52)	19.3	(.18)	19.8	(.56)
Full-time employment	39		51		-		-	
Part-time work experience (years)	5.2	(.16)	3.8	(.40)	-		-	
Wage decile	3.9	(.09)	3.1	(.16)	8.2	(.06)	5.9	(.21)
Size of firm								
Self-employed, no employees	3		3		4		3	
1-99 employees	44		44		28		50	
100-1999 employees	37		41		39		35	
More than 2000 employees	16		11		28		12	
Economic sector								
Energy, construction, transport	10		14		30		50	
Manufacturing	10		20		24		21	
Trade	14		25		9		15	
Service	66		41		37		14	
Age group								
34 or younger	12		20		4		6	
35-49	85		79		86		81	
50 or older	3		1		10		13	
Born outside Germany	11		15		14		23	
Level of education								
Lower secondary	5		9		4		10	
Upper secondary	47		61		43		57	
Post-secondary non-tertiary	12		5		13		19	
Tertiary	36		25		40		15	
Period								
1984-1990	14		12		20		14	
1991-1995	21		38		21		27	
1996-2000	23		21		21		23	
2001-2006	36		25		33		34	
2007-2009	6		4		5		3	
Household situation (age 12)								
Other parent is employed	88		78					
Other parent employed part-time					42		18	
Other parent employed full-time					24		32	
Lives in East Germany	29		50		23		43	
Lives in rural area	32		39		29		45	
Single parent	7		12		-		-	
Number of kids (age<16)								
1 (= target child)	25		37		21		30	
2	56		45		52		48	
3 or more	19		18		26		21	
Child's characteristics								
Female	52		61		52		53	
Full upper secondary degree	90		88		90		80	

Other parent has higher education	37	20	29	26
Other parent born outside Germany	11	12	15	23
Child's transition outcomes				
Tertiary education	53	48	56	41
Vocational training	36	40	35	47
Employment	9	10	7	9
NEET status	2	2	2	3
N	890	137	1176	145

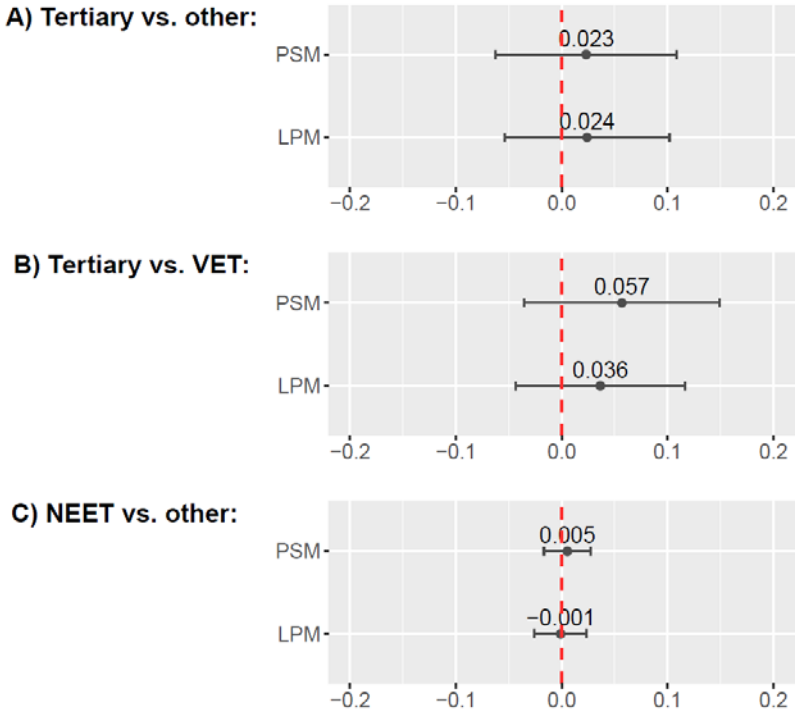
Note: Unweighted distributions

Table 2. Logistic Regression Predicting Parental Unemployment

	Mother		Father	
Parent's characteristics at age 12				
Level of education (ref. lower)				
Secondary	-.423	(.445)	-.929*	(.420)
Post-secondary	-1.159+	(.604)	-.602	(.485)
Tertiary	-.876+	(.519)	-1.568***	(.510)
Age group (ref. 34 or younger)				
35-49	.221	(.289)	.473	(.437)
50 or older	-1.504	(1.144)	1.328*	(.628)
Not born in Germany	.629	(.489)	.095	(.451)
Full-time work experience	-.083***	(.024)	-.024	(.021)
Part-time experience	-.075**	(.028)	-	
Full-time employment	.124+	(.071)	-	
Subjective health	-.177***	(.054)	-.036	(.050)
Wage decile	-.145*	(.063)	-.267***	(.050)
Economic sector (ref. energy, construction, transport)				
Manufacturing	.577	(.385)	-.506*	(.256)
Trade	.258	(.360)	.114	(.309)
Service	-.398	(.327)	-.934**	(.300)
Size of firm (ref. self-employed)				
1-99 employees	-.189	(.587)	1.425*	(.610)
100-1999 employees	-.207	(.592)	.916	(.625)
More than 2000 employees	-.185	(.649)	.821	(.663)
Period (ref. 1984-1990)				
1991-1995	.777*	(.356)	.626+	(.353)
1996-2000	-.022	(.382)	.490	(.360)
2001-2006	.017	(.381)	.637+	(.344)
2007-2009	.109	(.597)	.317	(.625)
Household situation at age 12				
Other parent is employed *(ref. not employed)*	-.811*	(.389)		
Other parent is employed full-time			-1.046***	(.269)
Other parent is employed part-time			-1.364***	(.271)
Lives in East Germany	1.454***	(.300)	.667*	(.309)
Lives in rural area	-.079	(.240)	.327	(.230)
Single parent	.058	(.526)	-	
Number of children in the household	-.315*	(.169)	-.146	(.153)
Child				
Female	.405+	(.209)	.109	(.203)
Full upper secondary degree	-.049	(.323)	-1.017***	(.273)
Education of other parent (ref. no higher)				
Higher education	-.515+	(.265)	-.059	(.269)
Missing	-.234	(.568)	-	
Other parent not born in Germany	-.354	(.521)	.379	(.441)
Log likelihood	-329.55		-348.74	
Pseudo R square	.183		.237	

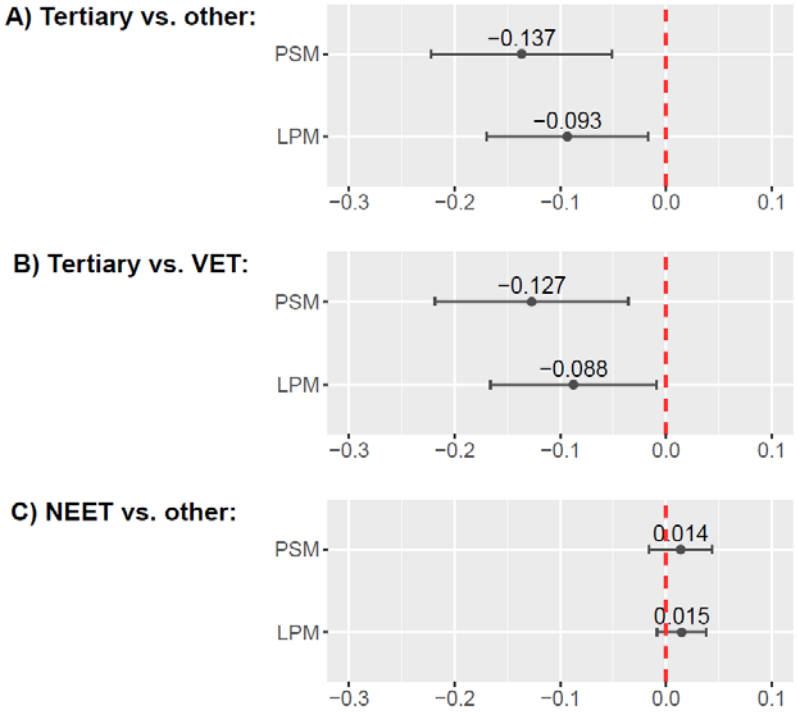
Note: Coefficients from logistic regression models; $N = 1027$ for mothers; $N = 1321$ for fathers; standard errors in parentheses; ***p<.001, ** p<.01, * p<.05, + p<.1 (two-tailed tests)

Figure 1. ATT Estimates for the Effects of Maternal Unemployment on Transition Outcomes



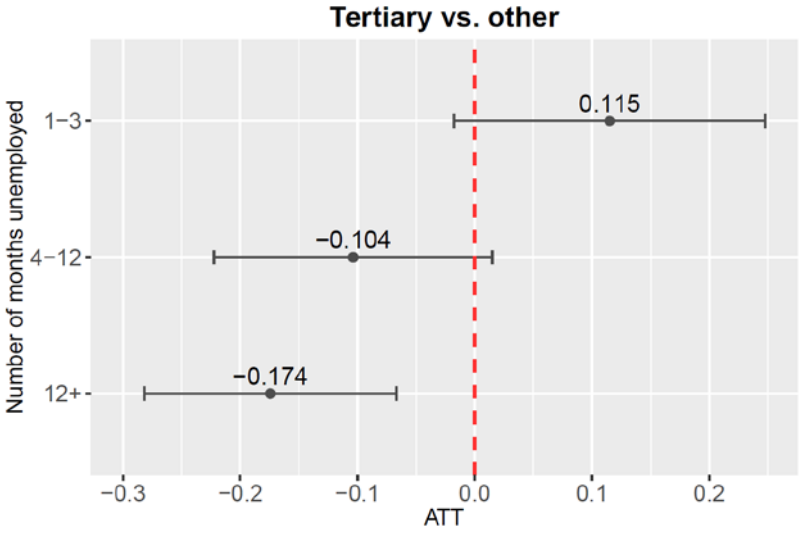
Note: *N* = 1027 for outcomes A and C; *N* = 872 for outcome B; 90 percent confidence intervals; Appendix A reports bootstrapped standard errors and significance levels of ATT estimates, common support and the results of balancing tests.

Figure 2. ATT Estimates for the Effects of Paternal Unemployment on Transition Outcomes



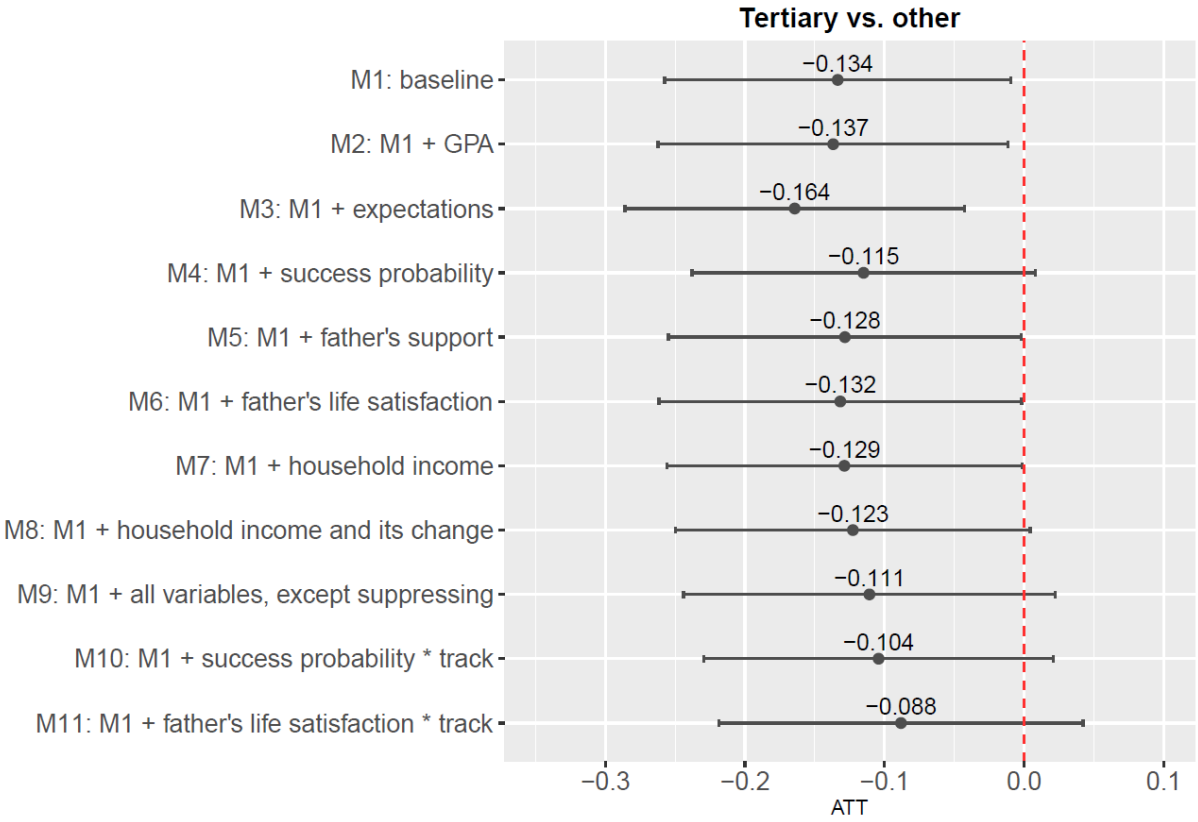
Note: *N* = 1321 for outcomes A and C; *N* = 1142 for outcome B; 90 percent confidence intervals; Appendix A reports bootstrapped standard errors and significance levels of ATT estimates, common support and the results of balancing tests.

Figure 3. Effects of the Duration of Paternal Unemployment on Transition Outcomes



Note: ATT estimates from propensity score matching analysis, duration is measured in months; control group is young people whose parents did not experience unemployment; *N* = 1080 for 1-3 months; *N* = 1193 for 4-12 months; *N* = 1208 for 12+ months; 90 percent confidence intervals; Appendix A reports bootstrapped standard errors and significance levels of ATT estimates, common support and the results of balancing tests.

Figure 4. Mediation of the Effect of Paternal Unemployment on Transition Outcomes



Note: ATT estimates from propensity score matching analysis; baseline model includes all control variables; each mediator is added separately to baseline model M1; *N* = 793; 90 percent confidence intervals; Appendix A reports bootstrapped standard errors and significance levels of ATT estimates, common support and the results of balancing tests.

Appendices

Appendix A. ATT estimates, balancing of the covariates between control and treatment group and the overlap of these two groups

	ATT	SE (boots-trapped)	Balancing test			Treated cases off support
			Pseudo R2	Mean bias	Median bias	
Transition outcomes						
Mother						
(models in Figure 1)						
A: Tertiary vs. other	.023	(.057)	.006	2.4	1.7	0
B: Tertiary vs. VET	.057	(.056)	.010	3.8	3.2	1
C: NEET vs. other	.005	(.014)	.006	2.4	1.7	0
Father						
(models in Figure 2)						
A: Tertiary vs. other	-.137**	(.053)	.008	3.6	3.2	2
B: Tertiary vs. VET	-.127*	(.056)	.008	3.6	3.2	0
C: NEET vs. other	.014	(.018)	.008	3.6	3.2	2
Duration analysis						
(models in Figure 3)						
A: 1-3 m	.115	(.090)	.016	5.1	4.9	0
A: 4-12 m	-.104	(.078)	.025	6.9	6.7	1
A: 12+ m	-.174*	(.071)	.009	3.4	2.5	5
Mediation sample						
(models in Figure 4)						
M1	-.134+	(.076)	.014	5.1	3.8	1
M2	-.137+	(.081)	.015	5.7	5.1	1
M3	-.164*	(.079)	.012	4.9	3.8	1
M4	-.115	(.080)	.014	4.4	2.9	1
M5	-.128	(.082)	.018	5.2	4.4	2
M6	-.132	(.089)	.019	5.6	4.7	4
M7	-.129	(.081)	.017	6.0	6.1	1
M8	-.123	(.082)	.015	5.9	5.5	1
M9	-.111	(.100)	.023	6.0	2.2	3
M10	-.104	(.080)	.018	5.0	3.5	1
M11	-.088	(.083)	.022	6.1	4.6	1

Note: ***p<.001, ** p<.01, * p<.05, + p<.1 (two-tailed tests). Significance levels are calculated based on bootstrapped standard errors (SE) with 200 replications.

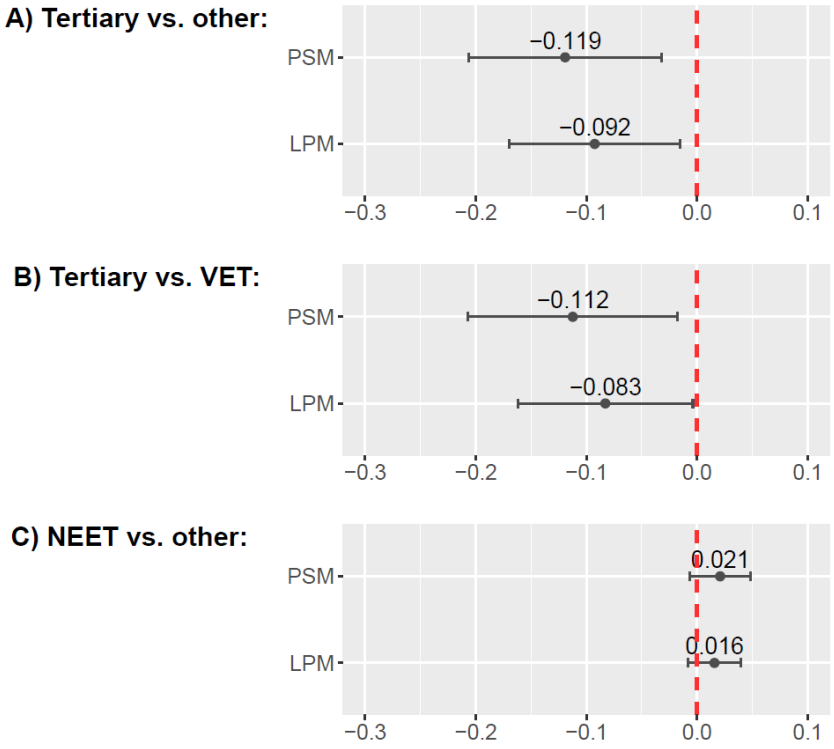
Appendix B. Items measuring supportive parenting in the SOEP study

Source: Richter, David, Maria Metzing, Michael Weinhardt, Jürgen Schupp. 2013. SOEP Scales Manual. *SOEP Survey Papers 138: Series C. Berlin: DIW/SOEP*

How often do the following situations occur with your mother and father? How often…

a) Do your parents talk to you about things you do or experience?
b) Do your parents bring up things that bother or worry you?
c) Do your parents ask you for your opinion before they decide something that affects you?
d) Do your parents express their opinion when you do something that they like or approve of?
e) Are you and your parents able to find a solution together to problems you have with each other?
f) Do your parents give you the impression that they really trust you?
g) Do your parents ask for your opinion before they make decisions on family matters or issues?
h) Do your parents give you an explanation for their decisions?
i) Do your parents show you that they really love you?

Appendix C. ATT Estimates for the Effects of Paternal Unemployment on Transition Outcomes: Controlling Additionally for Parental Unemployment Spells that Occurred before Age 12



Note: N = 1321, except for comparison of tertiary education and VET entry where N = 1142; 90 percent confidence intervals; the length of paternal unemployment experience before child was 12 years old is measured with variable that separates following categories: (a) no experience; (b) less than half a year, (c) less than one year, (d) one year and longer, (c) missing (about 9%).

Appendix D. Linear Regression Estimates of Paternal Unemployment on Mediators

	Dependent variable:						
	GPA	Plans tertiary	Perceived success	Father's supportive parenting	Father's life satisfaction	Household income decile at age 18	Change of household income
Baseline models							
Paternal unemployment	.162 (.116)	-.043 (.048)	-.208+ (.125)	-.206+ (.111)	-1.083*** (.197)	-2.260*** (.259)	-.459+ (.243)
Control variables	+	+	+	+	+	+	+
Previous employment	-	-	-	-	-	-	-
Observations	789	739	782	724	793	793	793
R-squared	.067	.081	.018	.028	.060	.165	.029
Full models							
Paternal unemployment	.214+ (.129)	.041 (.052)	-.091 (.136)	-.117 (.119)	-.667*** (.196)	-1.034*** (.257)	-.801** (.264)
Control variables	+	+	+	+	+	+	+
Previous employment	+	+	+	+	+	+	+
Observations	789	739	782	724	793	793	793
R-squared	.098	.142	.053	.075	.236	.367	.059

Note: father's supportive parenting is treated as a continuous dependent variable; missing values are excluded; control variables are migration background, female, gymnasium track, East Germany, rural area, number of kids, mother's education and employment status; father's previous employment variables are the age over 50, education, firm size, work experience, industry, wage decile; standard errors in parentheses; ***p<.001, ** p<.01, * p<.05, + p<.1 (two-tailed tests).

Appendix E. Linear Probability Regression Estimates of Mediators on Entry to Tertiary Education (compared to all other pathways)

	M1	M2	M3	M4	M5	M6	M7
GPA	.092***						
	(.018)						
Educational expectation (ref. not tertiary)							
Plans tertiary		.283***					
		(.047)					
Missing		.223**					
		(.077)					
Perceived success probability			.043*				
			(.017)				
Father's supportive parenting (ref. very high)							
Very low				-.008			
				(.078)			
Lower				-.051			
				(.060)			
Higher				-.039			
				(.057)			
Missing				.013			
				(.079)			
Father's life satisfaction					.016		
					(.012)		
HH income decile at age 18						.004	.018
						(.009)	(.012)
HH income change							-.023+
							(.011)
Control variables	+	+	+	+	+	+	+
Previous employment variables	+	+	+	+	+	+	+
Observations	793	793	793	793	793	793	793
R-squared	.131	.143	.109	.104	.104	.102	.107

Note: models are controlling for migration background, female, gymnasium track, East Germany, rural area, number of kids, mother's education and employment status + father: age over 50, education, firm size, work experience, industry, wage decile; standard errors in parentheses; ***p<.001, ** p<.01, * p<.05, + p<.1 (two-tailed tests).