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# Socioemotional Development during Adolescence: Evidence from a Large Macro Shock

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# Socioemotional Development during Adolescence: Evidence from a Large Macro Shock *

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**Abstract**

We exploit a large quasi-exogenous shock to study the development of socioemotional skills during early adolescence and their links to long-term behavior and labor market outlook. Using novel, longitudinal, microdata on cohorts of East German adolescents before and after a large macro shock (the German Reunification), we causally estimate the impact on socioemotional skills (self-confidence and impulse control), finding negative effects in the short run. These effects are substantially larger among those affected by the shock in early adolescence (13-14 years old), relative to later adolescence (16-17 years old). Changes in socioemotional skills have a lasting (negative) impact on them as adults, especially among those affected early in their adolescence, in terms of externalizing behavior (e.g., physical fighting), behavioral control problems (i.e., substance abuse), internalizing behavior (i.e., mental health) and in their (labor-market) optimism and expectations. This study highlights the permanent effects of uncertainty on socioemotional skills during formative years.

**JEL Classification:** D91, I12, I31, J13, J16, J24

**Keywords:** socioemotional skills, adolescence, behavior, health, labor market outlook.

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# 1 Introduction

Economists and scientists more generally have displayed an increasing interest in socioemotional skills, also known as noncognitive skills. Socioemotional skills have been shown to have critical implications for long-term economic and social success (for example, for school decisions and wages (Heckman et al., 2006, 2013), educational attainment (Deming, 2017)), geographic mobility (Bütikofer and Peri, 2021), and labor market adaption (Izadi and Tuhkuri, 2023)). The process of formation and development of socioemotional skills is, however, less well understood, but its literature is growing (see the seminal papers by (Cunha and Heckman, 2007; Cunha et al., 2010)). Understanding the development of socioemotional skills, and their responsiveness to environmental changes, as well as the malleability of socioemotional skills at different developmental stages (or ages), is paramount.

While cognitive skills are argued to be formed mainly in (early) childhood, adolescence and in particular early adolescence has been identified as a critical period for the formation and development of socioemotional skills based on evidence from neuroscience (Burnett et al., 2011), as well as economics (Cunha et al., 2010). During early adolescence (between ages 11 and 14), individuals face numerous changes, including hormonal shifts due to puberty (Rapee et al., 2019). It is a critical developmental stage in which experiences of negative emotions are heightened and the sensitivity toward social signals in the environment is enhanced (Rapee et al., 2019; Blakemore and Mills, 2014). Shedding light on the formation and development of socioemotional skills is often complicated, however, for two important reasons. First, due to the endogeneity of the environment in which development is taking place. Second, due to demanding data requirements, since longitudinal data on socioemotional skills over a longer period of time are often not readily available.

In this paper, we use novel longitudinal microdata to causally identify the impact of an important shock, exogenous to individuals' characteristics and skills, on the development of socioemotional skills during early and late adolescence. Over a ten-year period, we focus on the development of Impulse Control and Self-Confidence, which are direct measures of socioe-

motional skills. Specifically, we use a difference-in-differences framework to examine the impact of the German Reunification in October 1990 on the socioemotional development of a cohort of East German individuals at an early stage in adolescence (aged 13-14 years old), using as a control group a cohort of the same age but in a period pre-dating the Reunification. This allows us to causally identify the impact of the shock on the socioemotional skills in early adolescence. As an alternative control group, we compare individuals in the same time period (i.e., at the time of Reunification) but who are at a later stage of adolescence (aged 16-17 years old). This enables us to explore the heterogeneity in response to the shock, based on age, highlighting which stages in adolescence are particularly critical for the development of socioemotional skills. Finally, we analyze how changes in socioemotional skills are linked to behavior and outcomes in early adulthood. Our findings offer valuable insights into the impact of major macro events on the development of socioemotional skills, and the potential long-term consequences of these changes.

Our study of socioemotional skills aligns with the widely used "Big Five" taxonomy of personality traits (McCrae and Costa, 1987), which encompasses factors such as impulse control and confidence (Waddell, 2006; Duckworth et al., 2007; Almlund et al., 2011; Farrington et al., 2012; Kautz et al., 2014). Recent studies have investigated how changes in policy or shocks to the household can impact socioemotional development (for instance, education policies (Alan et al., 2019; Jackson et al., 2020), social intervention (Kosse et al., 2020; Sevim et al., 2023), shocks to household income or health shocks (Brenøe and Lundberg, 2018; Autor et al., 2019; García-Miralles and Gensowski, 2023). Notably, our analysis uses measures predating the validation of these constructs, providing a unique real-world "historic" perspective on changes in socioemotional skills and their long-term economic consequences. Our context also allows for another important historic insight by looking behind the "Iron Curtain" and employing unique microdata following East German individual before and after Reunification, from childhood into early adulthood.

Reunification represented a historic shift from a socialist to a capitalistic and democratic system, leading to rapid and substantial economic, cultural, and political changes, which initially created a highly uncertain environ-

ment for East Germans (see Hunt (2002); Krueger and Pischke (1992), for a detailed overview). Previous descriptive research in psychology suggests that the period around Reunification led to significantly higher stress and anxiety levels among East German adults, with implications for their mental well-being, including an increase in suicides (see, for instance, Kirkcaldy et al. (1999); Krauss and Faas (1994); Schmitt and Maes (1998)). Our focus is on the impact of Reunification on the socioemotional development of East Germans during adolescence, a critical time for socioemotional development, and its link to long-term behavioral outcomes. Additionally, we investigate whether the determinants of socioemotional development differ by gender and whether changes in socioemotional skills manifest differently for male and female adolescents in terms of behavior and longer-term outcomes.

Our study takes advantage of the quasi-experimental setting of the German Reunification in October 1990 and our empirical research design overcomes significant empirical challenges. Typically, the environment in which shocks occur is endogenous to the individual (and family), making it difficult to account for unobservable factors leading to selection bias and reverse causality concerns. However, the macro nature of the shock and the panel dimension of our data in combination with information about different cohorts allow us to control for within-individual fixed effects.

The empirical strategy focuses on one treatment group and uses two control groups to identify different effects of the shock on socioemotional skills. First, we identify the causal effect of a shock to the environment of young adolescents on their socioemotional skills by partialling out the natural age evolution of socioemotional skills in the absence of the shock, where the key identifying assumption (which is supported by placebo tests) is that, in the absence of Reunification, the skill profiles would look similar across groups. Second, we measure the impact of exposure to Reunification on young adolescents (more sensitive point in adolescence) relative to the effect on those in later adolescence (less sensitive point in adolescence).

We employ a difference-in-differences framework that uses variation in the timing of Reunification for two cohorts of surveyed students who have a three-year age gap. We start by partialing out the natural age evolution of socioemotional skills under "no-Reunification". We focus specifically on

the change in socioemotional skills of the younger "treated" cohort in the short period before and after Reunification – aged 13-14 years old at the time of Reunification – and use the evolution of socioemotional skills of the older "control" cohort between the same *ages* (before Reunification) as the counterfactual trend. This approach allows us to control for the counterfactual trend in a concise way, ensuring that the control group is not affected by Reunification and thus not contaminated by the treatment. We extend the analysis, using an alternative control group, to show how the effect of a shock differs depending on the stage in adolescence. Specifically, to understand the *malleability* of socioemotional skills during different periods of adolescence, we employ a difference-in-differences approach that compares the development of the treatment group, who is 13-14 years old at the time of Reunification, with a control group, who is 16-17 years old, at the time of Reunification. This approach enables us to compare the impact of a macro shock on socioemotional development in late adolescence with that in early adolescence.

In the last part of the paper, we investigate the relationship between socioemotional skill development and later adolescent behavioral issues, including externalizing behaviors (such as anger management), problems with behavioral control (such as substance abuse), internalizing behaviors (such as mental health), and their (labor-market) optimism and expectations. To do this, we examine the relationship between socioemotional skills in adolescence with their behavior and outlook as young adults (18 to 21 years old). We then examine the extent to which the change in socioemotional skills of the treatment group, around the time of Reunification, is associated with longer-term outcomes, relative to the change in socioemotional skills of the control group. By controlling for the general link between changes in socioemotional skills and long-term behaviors, we isolate the impact of the Reunification-induced change in socioemotional skills of the treatment cohort (in early adolescence) on long-term outcomes. Understanding the link between socioemotional skills and later behavior is crucial, given the growing concerns surrounding the worsening mental health of adolescents and young adults, which is often expressed through behavioral control problems and internalizing behaviors. These concerns reflect alarming trends such as the persistent opioid crisis in the United States and the fact that suicide

is now the second leading cause of death among teenagers aged 15 to 19.[1] Moreover, mental health problems have replaced physical conditions as the leading causes of disabilities among U.S. children for the first time in over thirty years (Slomski, 2012).[2]

Our study yields several notable findings. First, we causally identify a significant decrease in socioemotional skills (impulse control and self-confidence) among the treatment group (i.e., young adolescents, 13-14 years old) as a result of Reunification, indicating the impact of increased economic and social uncertainty on socioemotional development. The decline in impulse control is substantial, with a decrease of 34 percent of a standard deviation, as is the decrease in self-confidence (by 45 percent of a standard deviation). We conduct placebo tests to ensure that pre-trends are similar, providing support for the underlying parallel trend assumption. Interactions with individuals' characteristics reveal that adolescents from low socioeconomic backgrounds (in terms of parental education and occupations) are more strongly affected by the Reunification shock, consistent with the resulting economic uncertainty affecting especially (but not only) the socioemotional skills of youths from less privileged backgrounds. Interestingly, the socioemotional skills of students with stronger political ties to the Socialist regime prior to Reunification are also impacted more (especially in terms of self-confidence).

Second, consistent with the idea that early adolescence is a critical period for development, we find that uncertainty in the environment has a more severe impact on the socioemotional development of those affected in early versus later adolescence. To understand the malleability and adjustment process at different ages, we compare how the treatment cohort's socioemotional skills change (when aged 13-14) from before to after Reunification compared to how the control cohort's socioemotional skills change (when aged 16-17) over the same period. Our results suggest that early adolescence is a critical age in terms of the development of impulse control and self-confidence, while there is substantially less adjustment in late adolescence. While both cohorts incur negative effects, the effects are more

[1]Suicide rates have nearly doubled between 2007 and 2017, according to the Centers for Disease Control and Prevention (CDC).

[2]See also "It's Life or Death": The Mental Health Crisis Among U.S. Teens - NYT: https://www.nytimes.com/2022/04/23/health/mentalhealth-crisis-teens.html

than twice as large for the younger cohort. Despite the fact that younger cohorts are the ones that stand to (economically) benefit the most from the changes in opportunities (Azmat and Kaufmann, 2023), we find that they are the ones who experience a more severe impact on their socioemotional skills.

Third, we document that socioemotional skills are linked to longer-term behaviors such as externalizing behaviors, behavioral control problems, and internalizing behaviors. Moreover, importantly, we show that the changes in socioemotional development, resulting from the shock (Reunification) have important implications. We find that the link between changes in socioemotional development is significantly stronger for the young (treated) cohort, indicating that the change in socioemotional skills in early adolescence has a significant impact on longer-run outcomes. We see that the decrease in impulse control (occurring at the time of Reunification) among the treated group is linked to a significant increase in externalizing behaviors, consistent with findings in the literature according to which negative experiences or environmental shocks lead to increases in negative (school-related) externalizing behaviors. We also find that the decrease in impulse control is linked to an increase in behavioral control problems (substance abuse) and internalizing behaviors related to mental health problems. The substantial decrease in self-confidence due to Reunification is also linked to longer-term behaviors, particularly internalizing behaviors and mental health.

Finally, we investigate whether, and to what extent, our results differ by gender. In the biological/ medical literature, the "fragile male" hypothesis (e.g., Trivers and Willard (1973); Kraemer (2000)) has been well-established and has been linked to behavioral differences. Findings from the literature suggest that males are more likely to engage in "risky" behavior (Juutilainen et al., 2004) and experience a stronger impact of negative environmental influences on their disruptive behavior at schools (Bertrand and Pan, 2013; Autor et al., 2019; Brenøe and Lundberg, 2018). We find that Reunification has a negative effect on the socioemotional development of both, adolescent boys and girls and, if anything, a somewhat stronger effect on girls (in terms of a fall in self-confidence). Importantly, however, the way in which the effect on socioemotional development is transmitted

to long-term behaviors differs by gender. The decrease in impulse control due to Reunification increases externalizing behaviors and behavioral control problems, but only for boys. This is consistent with literature findings that show particularly negative effects of environmental shocks for externalizing (mostly school-related) behaviors for boys. Our findings show, however, that this is not due to gender differences in how socioemotional skills are affected (the effect on impulse control is gender-neutral), but in how changes in these skills are transmitted to longer-term behaviors. Furthermore, we find that the negative effect on self-confidence, which was particularly strong for girls, is only transmitted to longer-term behaviors for girls, specifically in terms of internalizing behaviors (i.e., related to suicidal tendencies), which so far has received relatively less attention in the literature despite its importance for adolescent mental health.

Our study highlights the importance of studying and promoting socioemotional development during early adolescence. Insights into socioemetional skills and their malleability have important (short and long term) implications that are relevant from an academic, as well as a policy perspective. We provide (rare) evidence for a causal link between increased uncertainty due to a substantial shock to the economic and social environment and youths' socioemotional development. Our findings underline the significance of the timing of such changes during adolescence, whereby a (negative) shock in early adolescence is substantially more consequential than at a later stage. Our study highlights that changes in adolescent socioemotional skills are tightly linked to later behaviors, which –in turn– are known to have important implications for their outcomes as adults – both, in pecuniary and non-pecuniary terms. Our study similarly highlights important insights into gender differences in adolescent development, wherein adverse shocks affect the socioemotional skills of both males and females, but are transmitted to later behaviors and outcomes in distinct ways that would suggest different targeting.

# 2 Background

Until 1945, East and West Germany were united as a single country. When separation occurred after Germany's defeat in the Second World War, it

was exogenously imposed by the winning Allies. In the fall of 1989, change swept through Eastern Europe and led to the fall of the Berlin Wall in November 1989. On October 3, 1990, East Germany joined the Federal Republic of Germany (FRG), creating a sovereign unified German state ("Reunification"). Significantly, the former German Democratic Republic (GDR), instead of experiencing a change of government within its borders or independence like other countries in this area, ceased to exist as a separate state. In this process, East Germany switched from state socialism to liberal democratic capitalism in a short period of time and without a gradual transition.[3]

This large and unexpected upheaval of the entire economic and political system created a substantial amount of uncertainty in this period. Upon Reunification, the economic system in East Germany was replaced and led to a substantial rise in unemployment Hunt (2008); Krueger and Pischke (1992).[4] Bhaumik and Nugent (2011), for example, show that economic uncertainties (especially employment-related uncertainty) driven by Reunification led to an important decrease in childbirths. In general, Reunification had important effects on individuals' stress levels and well-being. Psychologists have described how Reunification led to substantially higher stress levels related to the adaptive pressures associated with the changes as well as the increased threat of unemployment (Kirkcaldy et al., 1999). Krauss and Faas (1994), among others, note that beyond the changes in economic pressure, the political revolution in East Germany threatened individuals' psychological identity and the previously held notion that individuals have only one reality, which could lead to increased anxiety. They conducted extensive interviews during which they saw "very intense and powerful feelings", which ranged from "visible euphoria about the anticipation of more closeness and new possibilities for the relationships to anxiety over being accepted or outright panic". Dragone and Ziebarth (2017) show that Re-

[3]In our analysis, we use this sudden change in regime in East Germany to compare different cohorts of East German youths affected by Reunification at different times. This allows us to evade the concern that East and West Germany were already characterized by important social, cultural, and political differences at the time of separation, as discussed by Becker et al. (2020).

[4]During state socialism under the GDR, there was no official unemployment (i.e., people were employed even when their productivity was low, which changed upon Reunification).

unification also had negative effects on physical health due to changes in eating habits.[5]

Our research is centered around investigating how Reunification impacted the socioemotional development of youths during the critical developmental phase of adolescence. Importantly, we provide causal evidence of the effect of a macro shock on the socioemotional skills of these youths, exploring variations in impact during different stages of adolescence, and examining the long-term implications for their behavior and their outlook on prospects in the labor market.

# 3 Data and Descriptive Statistics

## 3.1 Longitudinal Study of Students in East Germany

The microdata used in the following analysis come from the Longitudinal Study of Students (1985-1995).[6] The study followed two cohorts of students in East Germany from 1985 to 1995 when students were between 9 and 21 years of age. This study is unique in that it followed students for several years prior to and several years after the Reunification of Germany. Students in the younger cohort were surveyed between ages 9 and 18 (i.e., from academic grade 3 to grade 12), while students in the older cohort were surveyed in the same calendar years between ages 12 and 21 (i.e., from academic grade 6 up to the first years of university/vocational training).

The survey focused on the development of cognitive abilities, socioemotional skills, and mental health as well as on values, goals, and attitudes during childhood and adolescence until (young) adulthood. The data are, therefore, ideal for our purpose in that the survey followed the same indi-

[5]With the transition to a capitalist economy, the former GDR regions obtained access to formerly unavailable Western food products, which lead to weight gain and worse diet-related health, such as high blood pressure.

[6]The study, in Germany called *Schülerintervallstudie Fähigkeiten/Risiko 1986-1995*, was initiated by the Central Institute for Youth Research, Leipzig (*Zentralinstitut für Jugendforschung (ZIJ)*) and continued by the German Youth Institute Munich, Regional Office Leipzig (*Deutsches Jugendinstitut München, Regionale Arbeitsstelle Leipzig*) The data are available at the GESIS Data Archive, Cologne, at the Leibniz Institute for the Social Sciences. A description of the study can be found at https://search.gesis.org/research_data/ZA6117

viduals from before to after German Reunification, covering a wide range of topics, including socioemotional development, (psychological) well-being measures, and health-related behaviors and outlook. Importantly, the survey asked students about their socioemotional skills and their psychological well-being at several points in time before and after Reunification, allowing us to study whether and to what extent these measures are impacted by Reunification and relate to long-run outcomes. Given the longitudinal nature of the study, we can link changes in socioemotional skills (specifically, impulse control and self-confidence) to longer-run, post-Reunification behavioral, educational, and health outcomes when students are young adults.

The surveyed sample was selected using multistage sampling, wherein first regions within East Germany and then schools were randomly selected, and then all students in the relevant academic cohorts were surveyed. All surveys were self-administered, ensuring students' anonymity (i.e., personally identifiable information was separated from the survey responses).

## 3.2 Variable description

In our short-run analysis of how Reunification affects adolescent socioemotional skills and how they develop, our main outcomes of interest are the socioemotional skills of the treated cohort (the young adolescents, aged 13-14 years at the time of Reunification), as measured by their levels of Impulse Control and Self-Confidence.[7] Our measure of self-confidence is based on the extent of agreement with the statement *"I struggle with low self-confidence"*. To measure impulse control, individuals are asked about their agreement with the following statements: *"When provoked, I express my anger verbally"* and *"When provoked, I express my anger physically"*, which are combined using factor analysis. The survey elicits students' level of agreement with the above statements, where possible answers range from 1 ("very strongly agree") to 4 ("do not agree at all"). We reverse the scale

[7] According to the APA (2015b), self-confidence is defined as the trust in one's own abilities and judgment, while impulse control is defined as the ability to resist an impulse or temptation and the ability to control its translation into an action (APA, 2015a). Problems with impulse control are considered a disorder. For instance, individuals with intermittent explosive disorder (IED), which is an impulse control disorder, experience sudden episodes of anger and have aggressive outbursts (see, Grant and Potenza (2011)). This type of anger management is directly measured in our Impulse Control variable.

of both variables so higher-value answers imply higher self-confidence and higher impulse control (for an overview of the different measures, see Panel A of Table 1).

In the second part of our analysis, we link socioemotional skills to later outcomes, focusing especially on changes in these skills around the time of Reunification to later outcomes, measured when individuals are aged 18 to 21. We classify these outcomes into the following four categories: *externalizing* behavior, *internalizing* behavior, *behavioral control* issues, and *economic outlook* (for an overview, see Panel B of Table 1).

In terms of externalizing behavior, we measure self-reported deviant behavior during the past 12 months. We use principal component analysis to create one index of externalizing behavior. There are three main measures: (1) *Physical fighting*, which captures whether the individual has deliberately beaten or hurt someone, (2) *Destroy property*, which captures whether the individual has deliberately destroyed or damaged private or public property, and (3) *Trouble with police*, indicating whether the individual has had problems with the police due to his or her actions.

For internalizing behavior, we create an index measuring individuals' suicidal tendencies based on the following two variables. (1) The *Suicidal thoughts* variable captures whether the individual has thought of committing suicide at least once, and (2) the *Repeated suicidal thoughts* variable indicates whether the individual has had thoughts of committing suicide more than once.

With respect to behavioral control problems, we combine, via principal component analysis, the incidence of substance abuse and cigarette consumption. *Substance abuse* captures whether the individual consumes alcohol on a weekly basis (within the last three months of the interview) and/or has consumed at least two different types of drugs (within the last 12 months of the interview), and *Cigarette smoking* indicates whether the individual is a regular smoker.

We measure individuals' future outlooks and expectations using three variables. First, *Optimism*, which is an indicator taking the value one in case individuals generally have an optimistic view on their own future and zero otherwise. Second, *Occupational Optimism*, which ranges from 1 ("not at all") to 4 ("completely") and measures how optimistic individuals are

about their own occupational future. Third, *Employment Expectations* capturing individuals' optimism with future employment chances, with values ranging from 1 ("not at all") to 4 ("completely").

## 3.3 Summary statistics

In Table 1, we present the summary statistics of the socioemotional skill measures in early adolescence and of behaviors and long-run outlook in early adulthood.

In Panel A, we present descriptive statistics for adolescents' socioemotional skills. All measures capture individuals' agreement with the statements, as discussed in the previous section. We reverse the scale, such that higher values indicate better impulse control and higher self-confidence.

In Panel B, we present the different measures of behavior and outlook in early adulthood. The index for externalizing behavior is based on three variables: physical fighting, property damage, and trouble with the police. We see that around 5% of young adults report having deliberately beaten or hurt someone in the past 12 months; 7.5% are involved with property damage and 2.6% report having been in trouble with the police. Internalizing behavior is based on a measure of suicidal tendencies, wherein almost 30% of young adults in our sample report ever having thought of suicide and 6.6% even thought about it multiple times.[8] With respect to behavioral control problems, smoking cigarettes on a regular basis is relatively common among young adults (37%), while substance abuse is reported by 20% of the sample. Finally, with respect to outlook, we see that, on average, 59.9% of the sample has an optimistic view of their future in general. Looking more closely at prospects in the labor market, values range from 1 to 4 in terms of optimism about their professional (or occupational) future and employment expectations.

[8]In Appendix Table A.1, we compare our measures of externalizing and internalizing behaviors and behavioral control problems with similar measures from a US survey targeted at the surveillance of risky behaviors among youths, the "Youth Risk Behavior Surveillance" survey of 12th graders from 1995. Although there are some differences in the survey questions and reference periods (and the US sample is slightly younger), the average incidence and patterns are similar.

# 4 Empirical Methodology

This section introduces the empirical strategy, which we employ to causally estimate the effect of a macro shock on socioemotional skills of young adolescents. In particular, we use the quasi-experiment of German Reunification in October 1990, whereby students' birth cohort and the timing of Reunification jointly determine their exposure to the change in regime. The analysis is presented in two parts. First, we describe how we identify the causal effect of a shock to the environment of young adolescents on their socioemotional skills by partialling out the natural age evolution of socioemotional skills in the absence of a shock. The key identifying assumption (which is supported by the data) is that, in the absence of Reunification, the skill profiles would look similar across groups. Second, we measure the impact of exposure to Reunification on young adolescents (more sensitive point in adolescence) by partialling out the effect on those in later adolescence (less sensitive point in adolescence).

## 4.1 Effect of Reunification on Socioemotional Skills

We apply a difference-in-differences (DID) framework that uses variation in the timing of Reunification for the two cohorts of students, who have a three-year age gap, to identify its effect on socioemotional skills. We analyze the change in socioemotional skills of the treated (younger) cohort before and after Reunification (i.e., when in grade 7 (aged 12-13) before, and grade 8 (13-14) after), using as a control for the counterfactual trend, the evolution of the older (control) cohort's socioemotional skills between the same grades/ages, taking place before Reunification.[9] This allows us to isolate a change in socioemotional skills that is not driven by age effects. The DID approach relies on the parallel trend assumption, which is that, without German Reunification, the younger cohort's socioemotional development between ages 12 and 14 would have been the same as that of the older cohort between ages 12 and 14. We provide evidence in support of the parallel trend assumption by conducting a placebo test in which we

[9]For instance, the younger cohort is aged 14 in 1991, which was in the post-Reunification period, while the older cohort is aged 14 in 1988, which was in the pre-Reunification period.

compare the evolution of the socioemotional skills between the two cohorts in the pre-period.

The empirical design is such that we focus on the grades directly pre- and post-Reunification for the younger cohort, which allows us to identify the short-run effects of Reunification and helps compute the correct standard errors (Bertrand et al., 2004). More generally, we estimate the following equations:

$$S_{icg} = \beta_0 + \beta_1 T_{ic} + \beta_2 P_{ig} + \beta_3 (T_{ic} P_{ig}) + X_{ic}\delta + \epsilon_{icg} \quad (1)$$

$$S_{icg} = \beta_0 + \beta_2 P_{ig} + \beta_3 (T_{ic} P_{ig}) + D_i + \epsilon_{icg} \quad (2)$$

where $S_{icg}$ is the measure of the socioemotional skill of student $i$ in cohort $c$ in grade $g$. $T_i$ is a dummy variable indicating "treated cohort" (i.e., taking the value of one if the individual belongs to the younger cohort and zero otherwise), $P_{ig}$ indicates the "post" period, more generally reflecting the student's academic grade. Since we restrict the main analysis to the grade the treated cohort is in shortly before and the one shortly after Reunification (i.e., grades 7 and 8, when individuals are between ages 12 and 14), $P_{ic}$ is a dummy variable that has the value of 1 if the individual is in grade 8 (where grade 7 is the excluded category). The variable of interest is $(T_{ic}P_{ig})$, which interacts the "treated cohort" with the "post"-period indicator and takes the value of one if a student is from the younger cohort and is 14 (grade 8), which is in the post-Reunification period for the younger cohort. $X_{ic}$ is a vector of predetermined individual-specific characteristics. Alternatively, we include individual fixed effects $D_i$ (see Equation 2). We estimate Equation 1 and Equation 2 using ordinary least squares. Standard errors are adjusted for clustering at the school level.

## 4.2 Heterogeneous Exposure to Reunification by Age

A relevant question is whether the age (or educational stage) at which individuals are affected by a shock to their environment is relevant for the development of their socioemotional skills. To understand this, we employ an alternative control group to study the evolution in terms of their socioemotional skills. Specifically, the treatment group (i.e., the younger

cohort, aged 13-14 years at the time of Reunification) is compared with the older cohort in the same years (i.e., aged 16-17 years at the time of Reunification). Both cohorts are thus in the same environment but hit by Reunification at different stages of adolescence. Applying a difference-in-differences (DID) framework allows us to measure the effect of heterogenous exposure to environmental change on socioemotional development.

While both cohorts are potentially affected by Reunification, this framework allows us to understand the extent to which older adolescents adjust relative to the younger ones. For example, if the estimate resulting from the approach in the previous subsection is non-zero (using the control group at the same age) but zero here, it would suggest that the socioemotional skills of older adolescents respond to Reunification to the same extent as did the younger ones. A non-zero estimate instead tells us how much more the younger adolescents adjusted relative to the older ones.

More generally, we estimate the following equations:

$$S_{ict} = \beta_0 + \beta_1 T_{ic} + \beta_2 P_{it} + \beta_3 (T_{ic} P_{it}) + X_{ic}\delta + \epsilon_{ict} \tag{3}$$

$$S_{ict} = \beta_0 + \beta_2 P_{it} + \beta_3 (T_{ic} P_{it}) + D_i + \epsilon_{ict} \tag{4}$$

where the specifications expressed in Equation 3 and Equation 4 measure the change in socioemotional skills of student $i$ in cohort $c$ at time $t$ without and with fixed effects, respectively. $T_{ic}$ is a dummy variable indicating being in the "treated" younger cohort (i.e., taking the value of one if the individual belongs to the younger cohort and zero otherwise), $P_{it}$ indicates the "post" Reunification period (i.e., post-1990). The variable of interest is $(T_{ic}P_{it})$, which interacts the "treated cohort" with the "post"-Reunification indicator and takes the value of one if a student is from the younger cohort in 1991, i.e. post-Reunification.

# 5 Results

## 5.1 Effect of Reunification on Socioemotional Skills

Table 2 (Panel A) shows that the macro shock to adolescents' environment had drastic effects on the development of their socioemotional skills in

young adolescence (aged 13-14 at the time of the shock). Panel A presents the impact of Reunification on impulse control and self-confidence employing a difference-in-differences approach, as discussed in Subsection 4.1. Columns (1) and (2) show that Reunification led to a substantial decrease in terms of impulse control (by 34 percent of a standard deviation). The results are very similar without and with controls for individual fixed effects (compare Columns (1) and (2)). Similarly, Reunification led to a substantial decrease in the level of self-confidence of 45 percent of a standard deviation (Columns (3) and (4), without and with individual fixed effects, respectively).

In Panel B of Table 2, we conduct a placebo experiment to test whether the pre-trends in socioemotional skills are similar for the two cohorts. We estimate a differences-in-differences specification (without and with fixed effects) by comparing the evolution of both groups' socioemotional skills before the age of 12. The results are consistent with the parallel trend assumption, in that the pre-trends for both cohorts are very similar (the estimated coefficient is close to zero and insignificant). This lends support to our causal interpretation of the effect of Reunification on youths' socioemotional skills.

**Interactions with individuals' background** In Table 3, we explore potential heterogeneity in these estimates. In particular, we investigate whether some families were affected more strongly by the uncertainty shock induced by Reunification. In Columns (1) and (4), we analyze the effects by parents' socioeconomic (academic) background (i.e., whether at least one parent has obtained the 'Abitur' degree and thus the college entrance certificate). In Columns (2) and (5), we look at whether parents have a high-profile position (i.e., whether at least one parent has an executive position – being employed as a leader/ deputy of a work collective or overarching area). In Columns (3) and (6), we investigate the effects by youths' political affiliation (i.e., whether the adolescent is an "FDJ member with a function", that is a member of the communist youth organization with a leading role) when under the socialist regime before Reunification.

The findings suggest that the socioemotional development of adolescents from a high socioeconomic background, in terms of parental educa-

tion and employment position, are less affected (although differences are not statistically significant at conventional levels). Adolescents with (highly) educated parents decrease their impulse control by 29 percent and their self-confidence by 35 percent of a standard deviation after Reunification, while those with lower educated parents faced a decrease of 47 (51) percent of a standard deviation, respectively. Similarly, having at least one parent with an executive position decreased adolescents' impulse control (self-confidence) by 36 (35) percent of a standard deviation compared to 60 (55) percent of a standard deviation for adolescents with parents without executive positions. These findings are in line with unemployment after Reunification being lower among the more educated (Krueger and Pischke, 1992) and thus economic uncertainty affecting the socioemotional skills of youths from less privileged backgrounds more strongly.

Interestingly, the socioemotional skills of students with stronger political ties to the Socialist regime prior to Reunification have been particularly strongly affected compared to those less well connected. In particular, in terms of self-confidence, students more attached to the communist regime faced a decrease of 55 percent of a standard deviation compared to 37 percent for less attached students.[10]

## 5.2 Heterogeneous Exposure to Reunification by Age

Table 4 shows the extent to which the socioemotional skills of the younger adolescents adjust to the shock relative to the older adolescents, over the same period (i.e., before and after Reunification). We present coefficients based on a regression without fixed effects in Columns (1) and (3) and with fixed effects in Columns (2) and (4)) for socioemotional skills, as measured by impulse control and self-confidence, respectively. Column (2) of Table 4 shows a 0.26 standard deviation fall in impulse control among the younger cohort from shortly before to shortly after Reunification (relative to the older one over the same time period), while self-confidence falls by a similar magnitude (Column 4).

A comparison of the estimated coefficients in Table 4 to the (causal)

[10]In Table A.7 we show that these findings are robust to restricting our sample to the same adolescents across the three subgroups.

effects based on a difference-in-differences design at the same age (Table 2), shows that while the socioemotional development of the older adolescents is indeed affected by Reunification, it is to a much lesser extent than for those affected during their early adolescence. In particular, we find that the impact on impulse control is more than three times as large for the younger cohort (0.34 standard deviations compared to $0.08 = 0.34 - 0.26$) and on self-confidence more than twice as large (0.45 standard deviations compared to $0.18 = 0.45 - 0.27$).[11]

Overall, our findings show that the economic environment is an important determinant of socioemotional skills and that the age at which individuals experience a shock to their environment matters. In particular, impulse control and self-confidence are still malleable in adolescence, but substantially more malleable in early than in late adolescence.

# 6 Long-Run Behavior and Outlook

## 6.1 Empirical Methodology

In this section, we study how the changes in socioemotional skills among adolescents resulting from the macro shock transmit to their later behavior and labor market outlook. To do so, we link the change in socioemotional skills from before to after Reunification to outcomes approximately five years later when the youths have become young adults (ages 18 to 21). For both cohorts, this is in the post-Reunification period. In particular, we link the changes in socioemotional skills for each cohort during Reunification to their behavior (externalizing behaviors, internalizing behaviors, and behavioral control problems), as well as their outlook about the future (general optimism about the future, occupational optimism, and employment expectations).

Our interest is not in the effect of the macro shock on long-run outcomes per se, but in how the changes in socioemotional skills are linked to behaviors, *and* whether and how the age matters for the adjustment of

[11] As discussed in Subsection 4.2, the DID that analyses the heterogeneity in exposure of a shock by age reflects how much young adolescents responds to the shock *relative* to older adolescents. This implies that the difference between the two DID coefficients can be interpreted as the extent to which older adolescents responds.

socioemotional skills to shocks. In our analysis so far, we have estimated a causal effect of the shock on socioemotional skills and shown that individuals' response to the shock depends on when it happens during adolescence. As an important next step, the goal is to investigate whether there is a lasting impact of the change in socioemotional skills and whether it depends on the age at which the shock took place.

In terms of the empirical strategy, we analyze how a change in socioemotional skills in early adolescence (i.e., for the younger cohort who experience the shock at age 13-14) affects long-run behavior and other outcomes as compared with when it takes place in later adolescence (i.e., for the older cohort who were aged 16-17). We, therefore, estimate the following equation:

$$\begin{aligned} B_{ic} = \gamma_0 + \gamma_1 \Delta S_{ic} + \gamma_1^T (\Delta S_{ic} T_{ic}) + \gamma_2 S_{ic,pre} \\ + \gamma_2^T (S_{ic,pre} T_{ic}) + \gamma_3 T_{ic} + \gamma_4 X_{ic} + \epsilon_{ic} \end{aligned} \tag{5}$$

where $B_{ic}$ is an indicator for a certain behavior or outlook measure of individual $i$ in cohort $c$, $T_{ic}$ is an indicator for belonging to the young (treated) cohort, $S_{ic,pre}$ captures the level of a certain socioemotional skill at baseline (i.e., the individuals' socioemotional skill levels at age 12 before Reunification for both cohorts), and $\Delta S_{ic}$ captures how a certain socioemotional skill indicator changed from before to after Reunification (i.e. when the young cohort is aged 12 to 14, while the older cohort is aged 15 to 17).

The coefficient of interest is $\gamma_1^T$, which measures how the change in socioemotional skills between ages 12 and 14 differentially affects individuals' later behavior and outcomes, compared with it taking place between 15 to 17. Given the specification above, we (indirectly) control for potential time-constant factors that contribute to a correlation between socioemotional skills and long-run outcome (such as family background characteristics) by holding the level of socioemotional skills at age 12 (prior to Reunification for both cohorts) constant to focus on the link between changes in socioemotional skills and long-run behavior.

## 6.2 Results

Table 5 and Table 6 summarize the main coefficients of interest illustrating how the changes in socioemotional skills are linked to the different long-run outcomes for the young cohort, treated by Reunification between ages 12 and 14, relative to the older cohort. The full set of regression coefficients is presented in Appendix Table A.2 and Table A.3. Table 5 presents the results for externalizing behavior (Columns (1) and (2)), internalizing behavior (Columns (3) and (4)), and behavioral control problems (Columns (5) and (6)). Table 6 shows the results for optimism (Columns (1) and (2)), occupational optimism (Columns (3) and (4)), and employment expectation (Columns (5) and (6)). In all specifications, we include controls for treatment, pre-Reunification levels of socioemotional skills, and their interaction with treatment.

In Table 5, Columns (1) and (2) show that externalizing behavior (measured as an index of the propensity of physical fights, destruction of property, and trouble with the police) in young adulthood is strongly linked to the changes in impulse control in adolescence. A one-standard-deviation decrease in impulse control, post- versus pre-Reunification, is related to an increase of externalizing behavior by 15 percent of a standard deviation (significant at the one percent level). The interaction with treatment suggests that the effect is borne entirely on the young "treated" cohort, in that the change in impulse control is linked to longer-run externalizing behavior only for them. For the young cohort, a one-standard-deviation decrease in the level of impulse control increases externalizing behavior by 26 percent of a standard deviation (the difference to the effect for the older cohort is significant at the ten percent level). Changes in self-confidence do not influence externalizing behavior, with coefficients close to zero (see Online Appendix Table A.2 for the full set of coefficients).

In Columns (3) and (4), we show that there is a sizeable impact of a change in socioemotional skills on internalizing behavior (linked to adolescents' mental health), which is again driven by the young "treated" cohort. Both socioemotional indicators are negatively related to the longer-run propensity toward suicidal thinking (see Online Appendix Table A.2 for the full set of coefficients). We find that a one-standard-deviation decrease

in self-confidence is associated with an increase in internalizing behavior by 12 percent of a standard deviation (significant at five percent). This effect is significantly stronger for the younger cohort, where the point estimate is 22 percent of a standard deviation. A fall in impulse control is also linked to an increase in internalizing behavior, but again only for the young "treated" cohort, where a one-standard-deviation decrease leads to an increase in internalizing behavior of 13 percent of a standard deviation (the difference to the effect for the old cohort is significant at the 5 percent level).

We next analyze how changes in socioemotional skills are associated with later engagement in "risky" behavior – often referred to in the psychology literature as behavioral control issues – which combines information on regular cigarette consumption and substance abuse (alcohol consumption and/or drugs). Columns (5) and (6) of Table 5 display the links to behavioral control problems.[12] We find that a change in impulse control is negatively related to problems of behavioral control. A one-standard-deviation decrease in impulse control is associated with an 11 percent of a standard deviation increase in behavioral control problems (significant at one percent). This effect is again driven entirely by the young "treated" cohort, for whom a decrease in impulse control increases behavioral control problems by 18 percent (the difference to the older cohort is significant at five percent). Changes in self-confidence are not linked to engagement in risky behavior.

In Table 6, we present the main coefficients on how changes in socioemotional skills in (early) adolescence are linked to the economic outlook of young adults.[13] Columns (1) and (2) show that changes in self-confidence in adolescence are strongly related to optimism about the future. A one-standard-deviation decrease in self-confidence is related to a decrease in optimism about the future by 6 percent of a standard deviation. Once again, the link is much stronger for the young "treated" cohort, who experience the shock to socioemotional skills in younger adolescence (reduction in optimism by 12 percent of a standard deviation relative to the effect for

[12]The full set of coefficients for behavioral control problems can be found in Online Appendix Table A.2.

[13]The full set of coefficients for behavioral control problems can be found in Online Appendix Table A.3.

the older cohort and the difference is significant at the one percent level). From Columns (3) and (4), we see that changes in self-confidence are also linked to optimism with respect to the occupational landscape. This is only the case for the younger cohort, for whom a one-standard-deviation decrease in the level of self-confidence increases occupational optimism by 27 percent of a standard deviation relative to the effect on the older cohort. The last two columns, Columns (5) and (6), show that, similarly, changes in socioemotional skills are also linked to expectations about the labor market and, in particular, employment expectations. As with occupational optimism, we find that the impact is entirely borne by those from the younger cohort (the effect is 22 percent of a standard deviation larger for the young "treated" cohort relative to the older cohort and the difference is significant at the five percent level).

In summary, the results suggest that the overall negative effect of Reunification on young adolescents' socioemotional development in the short-run is linked and transmitted into worse behavioral outcomes in young adulthood. Moreover, the impact is worse for individuals affected in their early, rather than late, adolescence. Impulse control decreased among both cohorts (albeit less for the old), but the change is linked to externalizing behavior and behavioral control problems only for the younger cohort. In terms of the impact of changes in socioemotional skills on internalizing behavior, we find that changes in both impulse control and self-confidence are relevant. Importantly, the age of the shock appears to matter again, since we find that the persistent effects on long-term behaviors are substantially more relevant for the younger cohort. The negative effect of Reunification on adolescents' self-confidence is also associated with a worse economic outlook and lower optimism of these individuals when they are young adults (while the change in impulse control is not linked to these outcomes). Again this effect is only found for the young "treated" cohort, whose socioemotional skills are impacted by Reunification during early adolescence.[14]

[14]We complement our analysis of socioemotional (noncognitive) skills by examining the impact on individuals' cognitive skills (see, e.g., Heckman et al. (2006); Cunha and Heckman (2007). To do this, we compute an index of cognitive ability derived from a principal component analysis based on outcomes in two standardized tests (verbal and math) and school-based German and math grades. In Table A.6 we show that Reunification did not change individuals' cognitive skills.

# 7 Gender Differences

## 7.1 Short-Run Effect on Socioemotional Development

**Impact of Reunification (Shock) on Socioemotional Skills** In Table 7, we analyze whether the shock to adolescents' environment affects socioemotional skills of boys and girls differently. To do this, we estimate versions of Equation 1 and Equation 2, which are fully interacted with a female dummy. Columns (1) and (2) show that (with and without fixed effects) impulse control decreases similarly for both genders. This finding is important in that, as we will show later, if one were to focus only on changes in *externalizing behavior* (such as disruptive and aggressive behavior) following a major life disruption, one would observe those changes predominantly in boys, while girls would appear unaffected (or less affected). This would suggest that socioemotional skills of boys are more severely affected by adverse events (see e.g., Fortin et al. (2015); Autor et al. (2020)). However, by directly measuring socioemotional skills, we show that the effects are similar for both girls and boys.

Columns (3) and (4) show that compared to adolescent boys, the self-confidence of girls is more negatively impacted by the macro shock. We find that girls' self-confidence levels decrease by 64 percent of a standard deviation, but only by 22 percent of a standard deviation for boys. This finding again highlights that, if anything, girls are more strongly affected by the macro shock in terms of their socioemotional skill development than boys.[15] The stronger change in self-confidence among girls is in line with findings in the neuroscience literature reporting greater social anxiety among females in response to a negative social environment (Burnett et al., 2011) and findings in the psychology/ psychopathology literature of females' greater vulnerability to anxiety and depression in response to stress, especially during adolescence (Rudolph, 2002). In Panel B of Table 7, we repeat the placebo experiment to show that pre-trends in socioemotional skills of the two cohorts are similar, both for boys and girls in the two cohorts.

[15] We find no significant effects of Reunification on cognitive skills for either gender (as discussed in the previous section).

**Heterogeneous Exposure to Reunification by Age** Next, we analyze whether there are gender differences in terms of what are the more sensitive periods during which socioemotional skills adjust to environmental shocks, again comparing the response of the treatment group, affected during early adolescence (age 13-14 years old) with those affected during late adolescence (16-17 years old).

The results presented in Table 8 show interesting gender differences in the adjustment of socioemotional skills. For adolescent boys, the coefficient on the interaction between treatment and post-Reunification is 0.22 standard deviation for impulse control and 0.23 for self-confidence (see Columns (2) and (4)). These coefficients are almost as large in magnitude as in the previous analysis, which uses the older cohorts' evolution of socioemotional skills between the same *ages* to account for the counterfactual trend (compare Table 7; also see the discussion in Subsection 5.2). This suggests that the impact is almost entirely borne on the younger adolescents (i.e., there is no impact of the shock on the self-confidence of boys of the older cohort and only a small impact in terms of impulse control). For adolescent girls, we find that the effect of Reunification on impulse control is borne almost entirely on the younger adolescents (compare Column (2) of Table 8 and Table 7). However, for self-confidence, we do see some impact in later adolescence, albeit smaller, about half of the effect it has on the younger cohort (compare Column (4) of Table 8 and Table 7, i.e. 0.64 versus $0.64 - 0.30$).

In summary, the impact of the shock on both male and female adolescents is stronger in early adolescence relative to later adolescence. Moreover, the (smaller) impact in later adolescence differs by gender. For male adolescents, there is some adjustment in terms of impulse control, while for female adolescents the adjustment occurs in terms of self-confidence.

## 7.2 Links to Long-Run Behavior and Outcomes

To understand whether there are gender differences in how changes in socioemotional skills manifest themselves in terms of long-term behavior and outlook, we estimate versions of Equation 3 and Equation 4, which –instead with a treatment dummy– are fully interacted with a female dummy. In doing so, we measure how the socioemotional skill change induced by Reunifi-

cation (i.e., ages 13-14 for the young and ages 16-17 for the oler adolescents) differentially affects young males' and females' behavior and outlook.

The results presented in Table 9 show some important patterns and differences. First, regarding the impact of changes in socioemotional skills on *externalizing behavior* and *behavioral control problems*, we find that the key relevant psychological measure is impulse control, but only for young men. In particular, a decrease in impulse control by one standard deviation increases externalizing behavior of young men by 33 percent of a standard deviation and behavioral control problems by 29 percent of a standard deviation. This suggests, in line with the literature, that following a (negative) shock, the expression of externalizing behavior among men will increase. Second, in terms of the impact of changes in socioemotional skills on *internalizing behavior*, we find that mainly changes in self-confidence are relevant, which is entirely driven by young women. A decrease in self-confidence by one standard deviation increases internalizing behavior of young women by 18 percent of a standard deviation. Third, the impact of changes in socioemotional skills on *economic outlook* does not differ between young men and women (see Table 10).

Altogether, focusing on gender differences, we document that the short-term effects of Reunification on socioemotional development are similarly negative for boys and girls, and this is transmitted to longer-term economic expectations and optimism in a similarly negative manner. This is despite the common perception that males are more strongly impacted by (negative) circumstances or changes in their environment. We find, however, that adverse shocks, via decreases in socioemotional skills, led to worse externalizing behaviors and behavioral control problems only among young men. For women, the transmission operates through internalizing behavior, which is harder to observe, but directly related to critical mental health outcomes.

# 8 Conclusion

We identify the enduring impact of macroeconomic shocks on the development of socioemotional skills during the critical formative years of early adolescence. In this paper, we exploit the large quasi-experiment of Ger-

man Reunification to causally estimate the effect of a shock to young adolescents' environment and the resulting increase in uncertainty on their socioemotional skills, and how it propagates to later behavior and (labor market) outlook as young adults.

We document that the shock, which created a highly uncertain environment for East Germans, had a sizeable negative effect on the socioemotional skills of young adolescents. Exploring whether the age (or educational stage) at which individuals are affected by a macro shock is relevant for changes in socioemotional skills, we find that for younger adolescents (aged 13-14), change in environment has an immense impact, while those at a later stage in adolescence (aged 16-17), this is much less the case. By investigating whether changes in socioemotional skills of adolescents have a lasting (negative) impact on them as young adults, we establish important links between socioemotional development and expressions of behavior and (labor-market) optimism and expectations, which vary depending on the socioemotional skill measure and gender.

Our analysis offers several important results that are relevant from an academic, as well as a policy perspective. First, we provide (rare) evidence for a causal link between increased uncertainty due to a substantial shock to the economic and social environment and youths' socioemotional development. Using direct measures of socioemotional skills, we show that among early-adolescent East Germans, impulse control and self-confidence decreased considerably within a relatively short time span from before to after Reunification (using as a counterfactual trend the development of a slightly older cohort between the same ages prior to Reunification). Second, our study highlights that changes in adolescent socioemotional skills are tightly linked to later behaviors, which –in turn– are known to have important implications for their outcomes as adults – both, in pecuniary and non-pecuniary terms. Third, our findings underline the significance of the timing of such changes during adolescence, whereby a (negative) shock in early adolescence is substantially more consequential than at a later stage. Finally, we also offer important insights into gender differences in adolescent development, wherein adverse shocks affect the socioemotional skills of both males and females, but are transmitted to later behaviors and outcomes in distinct ways that would suggest different targeting.

To conclude, our study highlights the importance of studying and promoting socioemotional development during adolescence. The malleability of socioemotional skills during this developmental stage has critical implications for long term behavior and well-being, including mental health. It is crucial to gain insight into these skills, the extent to which they can change and develop under uncertainty, and their consequences for relevant outcomes.

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# Tables

Table 1: Variable Description

| | Description | Answers | Mean | Std.Dev. | N.Ind. |
|---|---|---|---|---|---|
| **Panel A:** | | | | | |
| **Impulse Control** | Combined index. | | | | |
| Anger expression 1 | Physical expression of anger. | 1 4 | 3.227 | 0.848 | 877 |
| Anger expression 2 | Verbal expression of anger. | 1 4 | 2.917 | 0.841 | 877 |
| **Self-Confidence** | Level of self-confidence. | 1 4 | 3.383 | 0.746 | 877 |
| **Panel B:** | | | | | |
| **Externalizing Behavior** | Combined index. | | | | |
| Physical fighting | Have you deliberately beaten or hurt someone in the last 12 months? | 0 1 | 0.053 | 0.225 | 656 |
| Property Damage | Have you deliberately destroyed or damaged private/others' property in the last 12 months? | 0 1 | 0.075 | 0.263 | 656 |
| Trouble with police | Have you been in trouble with the police due to rampage or rioting? | 0 1 | 0.026 | 0.159 | 656 |
| **Internalizing Behavior** | Combined index. | | | | |
| Suicidal thoughts | Have you ever had suicidal thoughts? | 0 1 | 0.296 | 0.457 | 656 |
| Repeated suicidal thoughts | Have you had suicidal thoughts more than once? | 0 1 | 0.066 | 0.248 | 656 |
| **Behavioral Control Problems** | Combined index. | | | | |
| Cigarette smoking | Individual is a regular smoker. | 0 1 | 0.369 | 0.483 | 656 |
| Substance abuse | Consume alcohol on weekly basis and/or consumed at least two types of drugs. | 0 1 | 0.221 | 0.415 | 656 |
| **Economic Outlook** | | | | | |
| Optimism | Indicator measuring an optimistic view on the individual future. | 0 1 | 0.599 | 0.491 | 673 |
| Occupational Optimism | How optimistic are you about your occupational/professional future? | 1 4 | 2.897 | 0.709 | 673 |
| Employment Expectations | How optimistic are you about the chances of getting a job? | 1 4 | 2.691 | 0.818 | 673 |

*Notes: Impulse Control* combines the students' strength of agreement with expressing their anger in a physical and verbal way using factor analysis, we reverse the scale so a higher value indicates better impulse control. *Self-Confidence* captures students' agreement with having problems with low self-confidence, again we reverse the scale so higher values indicate higher self-confidence. *Externalizing Behavior* is measured by an index combining the incidence of physical fighting, having damaged property, and having had trouble with the police; hereby higher values imply stronger expressions of externalizing behavior. *Internalizing behavior* is captured by an index based on the student's (repeated) suicidal thoughts with higher values indicating more internalizing behavior. *Behavioral Control Problems* is an index based on cigarette consumption (indicator for regular/ occasional consumption) and substance abuse indicating that the student consumes alcohol on a weekly basis and/ or has consumed at least 2 different types of drugs; again higher values imply stronger behavioral control problems. *Optimism* is an indicator capturing whether the youth has an optimistic view of the own general future. *Occupational Optimism* measures optimism about the youth's occupational future and ranges from 1 ("do not agree at all") to 4 ("very strongly agree"). *Employment Expectations* measures the optimism about future employment chances and ranges from 1 ("do not agree at all") to 4 ("very strongly agree").

Table 2: Effect of Reunification (Shock) on Socioemotional Skills

| **Panel A** | **Main Results** | | | |
|---|---|---|---|---|
| | Impulse Control | | Self-Confidence | |
| | [1] | [2] | [3] | [4] |
| Treated Cohort x Post Reunification | -0.339*** | -0.339*** | -0.449*** | -0.449*** |
| | [0.067] | [0.067] | [0.082] | [0.081] |
| Treated Cohort (Young) | 0.055 | | 0.045 | |
| | [0.074] | | [0.062] | |
| Post Reunification (Age 14) | 0.071 | 0.071 | 0.013 | 0.013 |
| | [0.044] | [0.044] | [0.041] | [0.041] |
| Constant | 0.044 | 0.067*** | 0.088** | 0.107*** |
| | [0.048] | [0.017] | [0.042] | [0.019] |
| N Observations | 1754 | 1754 | 1754 | 1754 |
| N Individuals | 877 | 877 | 877 | 877 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.012 | 0.029 | 0.030 | 0.064 |
| **Panel B** | **Placebo-Tests** | | | |
| Treated Cohort x Post Reunification | -0.035 | -0.033 | 0.055 | 0.055 |
| | [0.066] | [0.064] | [0.069] | [0.066] |
| Treated Cohort (Young) | 0.020 | | -0.023 | |
| | [0.072] | | [0.056] | |
| Post Reunification | 0.067 | 0.067 | 0.013 | 0.013 |
| | [0.042] | [0.042] | [0.042] | [0.042] |
| Constant | 0.007 | 0.015 | 0.000 | -0.009 |
| | [0.047] | [0.016] | [0.043] | [0.016] |
| N Observations | 1730 | 1730 | 1727 | 1727 |
| N Individuals | 877 | 877 | 877 | 877 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.001 | 0.003 | 0.001 | 0.002 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. The outcome variables are measures of socioemotional skills, namely Impulse control (in Columns (1) and (2)) and Self-Confidence (Columns (3) and (4)).“Treated Cohort” takes value one (zero) if the individual is in the young (old) cohort. “Post” represents the individual’s age. In Panel A, “Post” is a dummy variable that takes the value of one, if the age of the individual is 14 (this is pre-Reunification for the older cohort and post-Reunification for the younger cohort) and zero when aged 12 (i.e., pre-Reunification for both cohorts). “Treated Cohort x Post” takes the value one, if the individual is in the young cohort and aged 14 (i.e. post-Reunification). Panel B displays results from a placebo test that compares the change in outcomes of both cohorts in the pre-Reunification period to lend support to the parallel trend assumption.

Table 3: Effect of Reunification on Socioemotional Skills: Interactions with Background

| | Impulse Control | | | Self-Confidence | | |
|---|---|---|---|---|---|---|
| | Parents Abitur [1] | Parents Executive [2] | FDJ mem. w. function [3] | Parents Abitur [4] | Parents Executive [5] | FDJ mem. w. function [6] |
| **Triple Interactions:** | | | | | | |
| Treated Cohort x Post x YES | -0.289** | -0.360** | -0.323*** | -0.345** | -0.353** | -0.555*** |
| | [0.131] | [0.149] | [0.116] | [0.162] | [0.149] | [0.116] |
| Treated Cohort x Post x NO | -0.469*** | -0.604*** | -0.277*** | -0.509*** | -0.546*** | -0.371*** |
| | [0.108] | [0.124] | [0.093] | [0.111] | [0.163] | [0.119] |
| p-value diff. | 0.289 | 0.257 | 0.754 | 0.292 | 0.354 | 0.259 |
| N Observations | 1204 | 1012 | 1604 | 1204 | 1012 | 1604 |
| N Individuals | 602 | 506 | 802 | 602 | 506 | 802 |
| N Schools | 61 | 61 | 62 | 61 | 61 | 62 |
| Individual FE | YES | YES | YES | YES | YES | YES |
| R-squared | 0.043 | 0.056 | 0.025 | 0.056 | 0.066 | 0.075 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are in brackets. "Treated Cohort" takes value one (zero) if the individual is in the young (old) cohort. "Post" represents the individual's age and takes the value of one, if the age of the individual is 14 (this is pre-Reunification for the older cohort and post-Reunification for the younger cohort) and zero when aged 12 (i.e., pre-Reunification for both cohorts). "Treated Cohort x Post" takes the value one, if the individual is in the young cohort and aged 14 (i.e. post-Reunification). The triple interactions with "x YES" indicate in columns [1] and [4] that students have at least one parent with an Abitur degree, in columns [2] and [5] that at least one parent has a leading/ deputy position in their employment, and in columns [3] and [6] that the adolescent was a member with function in the communist youth party "FDJ" prior to Reunification.

Table 4: Heterogeneous Exposure to Reunification (by Age)

| | **DID by year** | | | |
|---|---|---|---|---|
| | Impulse Control | | Self-Confidence | |
| | [1] | [2] | [3] | [4] |
| Treated Cohort x Post Reunification | -0.236*** | -0.263*** | -0.242** | -0.266*** |
| | [0.086] | [0.078] | [0.096] | [0.100] |
| Treated Cohort (Young) | 0.091 | | 0.153** | |
| | [0.076] | | [0.066] | |
| Post Reunification (Year 1991) | -0.022 | 0.006 | -0.182*** | -0.157** |
| | [0.070] | [0.060] | [0.067] | [0.073] |
| Constant | 0.068 | 0.110*** | 0.059 | 0.133*** |
| | [0.053] | [0.018] | [0.048] | [0.023] |
| N Observations | 1473 | 1473 | 1471 | 1471 |
| N Individuals | 825 | 825 | 825 | 825 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.010 | 0.036 | 0.028 | 0.085 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. The outcome variables are measures of socioemotional skills, namely Impulse control (in Columns [1] and [2]) and Self-Confidence (Columns [3] and [4]). "Treated Cohort" takes value one (zero) if the individual is in the young (old) cohort. "Post Reunification" is a dummy variable that takes the value of one, if the individual is surveyed in year 1991 (this is age 17 for the older cohort and age 14 for the younger cohort) and zero if the individual is surveyed in 1989 (i.e., age 15 for the older cohort and age 12 for the younger cohort). "Treated Cohort x Post Reunification" takes the value one, if the individual is in the young cohort in 1991 (i.e. post-Reunification).

Table 5: Links to Long-run Behaviors (aged 18-21)

| | Externalizing Behavior | | Internalizing Behavior | | Behav. Control Problems | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| Impulse Control | -0.148*** | -0.046 | -0.012 | 0.072 | -0.112*** | -0.018 |
| | [0.053] | [0.056] | [0.040] | [0.051] | [0.037] | [0.050] |
| Impulse Control x Treated | | -0.212* | | -0.199** | | -0.165** |
| | | [0.110] | | [0.082] | | [0.079] |
| Self-Confidence | 0.030 | 0.014 | -0.116** | -0.010 | 0.039 | 0.010 |
| | [0.052] | [0.048] | [0.046] | [0.054] | [0.037] | [0.061] |
| Self-Confidence x Treated | | 0.001 | | -0.213** | | 0.063 |
| | | [0.117] | | [0.090] | | [0.076] |
| N Observations | 656 | 656 | 656 | 656 | 656 | 656 |
| N Individuals | 656 | 656 | 656 | 656 | 656 | 656 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills is displayed, i.e., the change prior versus post-Reunification (which is between ages 12 to 14 for the young cohort and between ages 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the changes in socioemotional skills are on average negative. Columns [1] and [2] report the effects of the socioemotional skill changes on externalizing behavior, which is an index based on the propensity to fight, destroy property, and to have trouble with the police. Columns [3] and [4] report the effects on an index for internalizing behavior based on (repeated) suicidal thoughts. Columns [5] and [6] report effects on behavioral control problems measured by an index capturing cigarette consumption and substance abuse (alcohol and drugs). All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and for treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when individuals are aged 18 to 21. The full set of coefficients, including all included controls, are displayed in Online Appendix Table A.2.

Table 6: Links to Long-run Economic Outlook (aged 18-21)

| | Optimism | | Occupational Optimism | | Employment Expectations | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| Impulse Control | 0.012 | -0.014 | -0.030 | -0.056 | -0.026 | 0.010 |
| | [0.022] | [0.037] | [0.039] | [0.071] | [0.047] | [0.093] |
| Impulse Control x Treated | | 0.042 | | 0.054 | | -0.073 |
| | | [0.048] | | [0.089] | | [0.107] |
| Self-Confidence | 0.059*** | 0.005 | 0.051 | -0.093 | 0.066 | -0.043 |
| | [0.021] | [0.026] | [0.053] | [0.067] | [0.049] | [0.079] |
| Self-Confidence x Treated | | 0.118*** | | 0.280*** | | 0.215** |
| | | [0.040] | | [0.098] | | [0.098] |
| N Observations | 673 | 673 | 673 | 673 | 673 | 673 |
| N Individuals | 673 | 673 | 673 | 673 | 673 | 673 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills is displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report effects on Optimism which indicates an optimistic view on one's future. Columns [3] and [4] reports effects on the satisfaction with one's expected occupational future. Columns [5] and [6] reports effects on expected employment chances. All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and for treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students are aged 18 to 21. The full set of coefficients, including all included controls, are displayed in Online Appendix Table A.3.

Table 7: By Gender: Effect of Reunification (shock) on Socioemotional Skills

| **Panel A** | **Main Results** | | | |
|---|---|---|---|---|
| | Impulse Control | | Self-Confidence | |
| | [1] | [2] | [3] | [4] |
| Treated Coh. x Post Reuni. x Female | -0.092 | -0.092 | -0.427*** | -0.427*** |
| | [0.165] | [0.165] | [0.144] | [0.144] |
| Treated Cohort x Post Reunification | -0.288*** | -0.288*** | -0.217* | -0.217* |
| | [0.108] | [0.108] | [0.109] | [0.109] |
| Treated Cohort (Young) | 0.154 | | 0.056 | |
| | [0.114] | | [0.091] | |
| Treated Cohort x Female | -0.191 | | -0.016 | |
| | [0.157] | | [0.133] | |
| Post Reunification (Age 14) | 0.086 | 0.086 | -0.056 | -0.056 |
| | [0.060] | [0.060] | [0.063] | [0.063] |
| Post Reunification x Female | -0.028 | -0.028 | 0.130 | 0.130 |
| | [0.102] | [0.102] | [0.100] | [0.100] |
| Female | 0.336*** | | -0.160* | |
| | [0.112] | | [0.092] | |
| N Observations | 1754 | 1754 | 1754 | 1754 |
| N Individuals | 877 | 877 | 877 | 877 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.029 | 0.030 | 0.046 | 0.074 |
| **Panel B** | **Placebo-Tests** | | | |
| Treated Coh. x Post Reuni. x Female | 0.196 | 0.163 | -0.205 | -0.178 |
| | [0.152] | [0.155] | [0.170] | [0.168] |
| Treated Cohort x Post Reunification | -0.142 | -0.121 | 0.165 | 0.150 |
| | [0.093] | [0.096] | [0.102] | [0.100] |
| Treated Cohort (Young) | 0.209** | | -0.050 | |
| | [0.099] | | [0.093] | |
| Treated Cohort x Female | -0.355** | | 0.055 | |
| | [0.139] | | [0.145] | |
| Post Reunification (Age 14) | 0.081 | 0.081 | -0.057 | -0.057 |
| | [0.058] | [0.058] | [0.064] | [0.064] |
| Post Reunification x Female | -0.026 | -0.026 | 0.133 | 0.133 |
| | [0.098] | [0.098] | [0.102] | [0.102] |
| Female | 0.327*** | | -0.164* | |
| | [0.109] | | [0.095] | |
| N Observations | 1730 | 1730 | 1727 | 1727 |
| N Individuals | 877 | 877 | 877 | 877 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.018 | 0.005 | 0.005 | 0.004 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. The outcome variables are measures of socioemotional skills, namely Impulse control (in Columns [1] and [2]) and Self-Confidence (Columns [3] and [4]).“Treated Cohort” takes value one (zero) if the individual is in the young (old) cohort. “Post” represents the individual’s age. In Panel A, “Post” is a dummy variable that takes the value of one, if the age of the individual is 14 (this is pre-Reunification for the older cohort and post-Reunification for the younger cohort) and zero when aged 12 (i.e., pre-Reunification for both cohorts). “Treated Cohort x Post” takes the value one, if the individual is in the young cohort and aged 14 (i.e. post-Reunification). All included terms are interacted with the dummy “Female”. Panel B displays results from a placebo test that compares the change in outcomes of both cohorts in the pre-Reunification period to lend support to the parallel trend assumption.

Table 8: By Gender: Adjustment Process of Socioemotional Skills

| | **DID by year** | | | |
|---|---|---|---|---|
| | Impulse Control | | Self-Confidence | |
| | [1] | [2] | [3] | [4] |
| Treated Coh. x Post Reuni. x Female | 0.081 | -0.078 | -0.119 | -0.069 |
| | [0.162] | [0.161] | [0.150] | [0.160] |
| Treated Cohort x Post Reunification | -0.278** | -0.221* | -0.193 | -0.233* |
| | [0.127] | [0.117] | [0.121] | [0.120] |
| Treated Cohort (Young) | 0.081 | | 0.157* | |
| | [0.112] | | [0.090] | |
| Treated Cohort x Female | 0.012 | | 0.004 | |
| | [0.152] | | [0.132] | |
| Post Reunification (Year 1991) | 0.085 | 0.028 | -0.073 | -0.033 |
| | [0.092] | [0.078] | [0.084] | [0.083] |
| Post Reunification x Female | -0.199* | -0.040 | -0.170 | -0.221* |
| | [0.102] | [0.100] | [0.111] | [0.123] |
| Female | 0.126 | | -0.175* | |
| | [0.108] | | [0.093] | |
| Constant | 0.004 | 0.110*** | 0.149** | 0.134*** |
| | [0.072] | [0.018] | [0.063] | [0.023] |
| N Observations | 1473 | 1473 | 1471 | 1471 |
| N Individuals | 825 | 825 | 825 | 825 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.013 | 0.038 | 0.053 | 0.097 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. The outcome variables are measures of socioemotional skills, namely Impulse control (in Columns [1] and [2]) and Self-Confidence (Columns [3] and [4]). "Treated Cohort" takes value one (zero) if the individual is in the young (old) cohort. "Post" is a dummy variable that takes the value of one, if the individual is surveyed in year 1991 (this is age 17 the older cohort and age 14 for the younger cohort) and zero if the individual is surveyed in 1989 (i.e., age 15 for the older cohort and age 12 for the younger cohort). "Treated Cohort x Post" takes the value one, if the individual is in the young cohort in 1991 (i.e. post-Reunification). All included terms are interacted with the dummy "Female".

Table 9: By Gender: Links to Long-run Behaviors

| | **Externalizing Behavior** | | **Internalizing Behavior** | | **Behav. Control Problems** | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| Impulse Control | -0.145*** | -0.333*** | -0.015 | -0.092* | -0.110*** | -0.292*** |
| | [0.051] | [0.108] | [0.039] | [0.054] | [0.037] | [0.064] |
| Impulse Control x Female | | 0.316*** | | 0.136 | | 0.307*** |
| | | [0.119] | | [0.084] | | [0.094] |
| Self-Confidence | -0.001 | 0.047 | -0.085* | 0.058 | 0.031 | 0.098 |
| | [0.051] | [0.093] | [0.046] | [0.040] | [0.037] | [0.067] |
| Self-Confidence x Female | | -0.083 | | -0.246*** | | -0.118 |
| | | [0.097] | | [0.089] | | [0.088] |
| Significance of total effect on female | | | | | | |
| p-value for Impulse Control | | 0.720 | | 0.458 | | 0.776 |
| p-value for Self-Confidence | | 0.411 | | 0.016 | | 0.699 |
| N Observations | 656 | 656 | 656 | 656 | 656 | 656 |
| N Individuals | 656 | 656 | 656 | 656 | 656 | 656 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report the effects of the socioemotional skills changes on externalizing behavior, which is an index based on the propensity to fight, destroy property, and to have trouble with the police. Columns [3] and [4] report the effects on an index for internalizing behavior based on (repeated) suicidal thoughts. Columns [5] and [6] report effects on behavioral control problems measured by an index capturing cigarette consumption and substance abuse (alcohol and drugs). All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students age aged 18 to 21. The full set of coefficients, including all included controls are displayed in Online Appendix Table A.4.

Table 10: By Gender: Links to Long-run Economic Outlook

| | **Optimism** | | **Occupational Optimism** | | **Employment Expectations** | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| Impulse Control | 0.012 | 0.013 | -0.030 | -0.030 | -0.025 | -0.018 |
| | [0.022] | [0.035] | [0.039] | [0.059] | [0.047] | [0.064] |
| Impulse Control x Female | | -0.004 | | -0.009 | | -0.022 |
| | | [0.048] | | [0.086] | | [0.078] |
| Self-Confidence | 0.047** | 0.043 | 0.034 | 0.062 | 0.041 | 0.064 |
| | [0.021] | [0.030] | [0.052] | [0.074] | [0.048] | [0.063] |
| Self-Confidence x Female | | 0.010 | | -0.041 | | -0.031 |
| | | [0.038] | | [0.100] | | [0.080] |
| Significance of total effect on female | | | | | | |
| p-value for Impulse Control | | 0.765 | | 0.510 | | 0.493 |
| p-value for Self-Confidence | | 0.056 | | 0.767 | | 0.588 |
| N Observations | 673 | 673 | 673 | 673 | 673 | 673 |
| N Individuals | 673 | 673 | 673 | 673 | 673 | 673 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report effects on Optimism which indicates an optimistic view on one's future. Columns [3] and [4] reports effects on the satisfaction with one's expected occupational future. Columns [5] and [6] reports effects on expected employment chances. All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after the reunification, when students age aged 18 to 21. The full set of coefficients, including all included controls are displayed in Online Appendix Table A.5.

# ONLINE APPENDIX – For Online Publication

## A. Tables

Table A.1: Comparison of Measures

| survey country | **Longitudinal Study of Students** Germany | | | **Youth Risk Behavior Surveillance** USA | | |
|---|---|---|---|---|---|---|
| sample age | 18-21 year olds | | | 18 year olds (12th grade) | | |
| survey year | 1995 | | | 1995 | | |
| | definition | female | male | definition | female | male |
| physical fight | have been or started a physical fight at least once in past 12 months | 2.38% | 9.32% | at least once in past 30 in physical fight on school property | 5.6% | 15.5% |
| suicidal thoughts | thought about committing suicide at least once | 34.88% | 19.95% | thought seriously about attempting suicide during past 12 months | 23.9% | 16.3% |
| smoking behavior | currently smoking (regularly/ occasionally) | 38.55% | 36.15% | smoked at least on one of the past 30 days | 34.4% | 42.0% |
| drinking behavior | drank alcohol at least 1-2 times per month during past year | 63.04% | 74.35% | drank alcohol on at least one day out of the past 30 days | 53.6% | 59.5% |
| | drank alcohol at least once per week during the past 3 months | 37.77% | 57.72% | episodic heavy drinking (drank at least 5 drinks in one occasion during the past 30 days) | 31.6% | 46.5% |

Table A.2: Long-run Behaviors - full set of coefficients

| | **Externalizing Behavior** | | **Internalizing Behavior** | | **Behav. Control Problems** | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| **Impulse control** | **-0.148*** ** | **-0.046** | **-0.012** | **0.072** | **-0.112*** ** | **-0.018** |
| | **[0.053]** | **[0.056]** | **[0.040]** | **[0.051]** | **[0.037]** | **[0.050]** |
| **Impulse control x Treated** | | **-0.212*** | | **-0.199** ** | | **-0.165** ** |
| | | **[0.110]** | | **[0.082]** | | **[0.079]** |
| **Self-Confidence** | **0.030** | **0.014** | **-0.116** ** | **-0.010** | **0.039** | **0.010** |
| | **[0.052]** | **[0.048]** | **[0.046]** | **[0.054]** | **[0.037]** | **[0.061]** |
| **Self-Confidence x Treated** | | **0.001** | | **-0.213** ** | | **0.063** |
| | | **[0.117]** | | **[0.090]** | | **[0.076]** |
| Treated Cohort (Young) | 0.208*** | 0.210*** | 0.154* | 0.151* | -0.104 | -0.091 |
| | [0.078] | [0.078] | [0.084] | [0.079] | [0.086] | [0.087] |
| Impulse control (age 12) | -0.117** | -0.056 | -0.095** | -0.000 | -0.174*** | -0.185*** |
| | [0.045] | [0.052] | [0.045] | [0.053] | [0.045] | [0.055] |
| Impulse control (age 12) x Treated | | -0.172* | | -0.237** | | -0.011 |
| | | [0.098] | | [0.091] | | [0.097] |
| Self-Confidence (age 12) | 0.001 | 0.057 | -0.112** | -0.115 | 0.008 | 0.009 |
| | [0.037] | [0.035] | [0.048] | [0.072] | [0.040] | [0.056] |
| Self-Confidence (age 12) x Treated | | -0.092 | | -0.034 | | 0.026 |
| | | [0.093] | | [0.102] | | [0.084] |
| Constant | -0.112*** | -0.120*** | -0.095 | -0.111** | 0.063 | 0.048 |
| | [0.040] | [0.039] | [0.060] | [0.054] | [0.059] | [0.058] |
| N Observations | 656 | 656 | 656 | 656 | 656 | 656 |
| N Individuals | 656 | 656 | 656 | 656 | 656 | 656 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |
| R-squared | 0.033 | 0.045 | 0.033 | 0.057 | 0.030 | 0.035 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report the effects of the socioemotional skills changes on externalizing behavior, which is an index based on the propensity to fight, destroy property, and to have trouble with the police. Columns [3] and [4] report the effects on an index for internalizing behavior based on (repeated) suicidal thoughts. Columns [5] and [6] report effects on behavioral control problems measured by an index capturing cigarette consumption and substance abuse (alcohol and drugs). All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and for treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students are aged 18 to 21.

Table A.3: Long-run Economic Outlook -full set of coefficients

| | Optimism | | Occupational Optimism | | Employment Expectations | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| **Impulse control** | **0.012** | **-0.014** | **-0.030** | **-0.056** | **-0.026** | **0.010** |
| | **[0.022]** | **[0.037]** | **[0.039]** | **[0.071]** | **[0.047]** | **[0.094]** |
| **Impulse control x Treated** | | **0.042** | | **0.054** | | **-0.073** |
| | | **[0.048]** | | **[0.090]** | | **[0.108]** |
| **Self-Confidence** | **0.059*** ** | **0.005** | **0.052** | **-0.094** | **0.066** | **-0.043** |
| | **[0.021]** | **[0.026]** | **[0.054]** | **[0.068]** | **[0.049]** | **[0.080]** |
| **Self-Confidence x Treated** | | **0.118*** ** | | **0.281*** ** | | **0.217** ** |
| | | **[0.040]** | | **[0.098]** | | **[0.099]** |
| Treated Cohort (Young) | -0.123*** | -0.121*** | -0.199** | -0.195** | -0.257*** | -0.250*** |
| | [0.041] | [0.041] | [0.076] | [0.079] | [0.075] | [0.076] |
| Impulse control (age 12) | 0.030 | 0.026 | -0.004 | -0.032 | -0.039 | -0.035 |
| | [0.020] | [0.030] | [0.037] | [0.060] | [0.041] | [0.056] |
| Impulse control (age 12) x Treated | | 0.013 | | 0.064 | | -0.028 |
| | | [0.041] | | [0.078] | | [0.082] |
| Self-Confidence (age 12) | 0.053** | 0.035 | 0.095** | 0.110* | 0.071 | 0.078 |
| | [0.023] | [0.034] | [0.038] | [0.060] | [0.046] | [0.065] |
| Self-Confidence (age 12) x Treated | | 0.064 | | 0.039 | | 0.049 |
| | | [0.049] | | [0.083] | | [0.099] |
| Constant | 0.672*** | 0.678*** | 0.167*** | 0.181*** | 0.170*** | 0.173*** |
| | [0.023] | [0.022] | [0.045] | [0.049] | [0.051] | [0.053] |
| N Observations | 673 | 673 | 673 | 673 | 673 | 673 |
| N Individuals | 673 | 673 | 673 | 673 | 673 | 673 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |
| R-squared | 0.039 | 0.053 | 0.019 | 0.036 | 0.023 | 0.033 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report effects on Optimism which indicates an optimistic view on one's future. Columns [3] and [4] reports effects on the satisfaction with one's expected occupational future. Columns [5] and [6] reports effects on expected employment chances. All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and for treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students age aged 18 to 21.

Table A.4: By Gender: Links to Long-run Behaviors - full set of coefficients

| | **Externalizing Behavior** | | **Internalizing Behavior** | | **Behav. Control Problems** | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| **Impulse control** | **-0.145*** ** | **-0.333*** ** | **-0.015** | **-0.092*** | **-0.110*** ** | **-0.292*** ** |
| | **[0.051]** | **[0.108]** | **[0.039]** | **[0.054]** | **[0.037]** | **[0.064]** |
| **Impulse control x Female** | | **0.316*** ** | | **0.136** | | **0.307*** ** |
| | | **[0.119]** | | **[0.084]** | | **[0.094]** |
| **Self-Confidence** | **-0.001** | **0.047** | **-0.085*** | **0.058** | **0.031** | **0.098** |
| | **[0.051]** | **[0.093]** | **[0.046]** | **[0.040]** | **[0.037]** | **[0.067]** |
| **Self-Confidence x Female** | | **-0.083** | | **-0.246*** ** | | **-0.118** |
| | | **[0.097]** | | **[0.089]** | | **[0.088]** |
| Treated Cohort (Young) | 0.305** | 0.287* | -0.066 | -0.068 | -0.135 | -0.151 |
| | [0.145] | [0.147] | [0.101] | [0.101] | [0.136] | [0.136] |
| Female | -0.248** | -0.275** | 0.129 | 0.125 | -0.122 | -0.145 |
| | [0.109] | [0.114] | [0.094] | [0.096] | [0.149] | [0.147] |
| Treated x Female | -0.197 | -0.156 | 0.413*** | 0.413*** | 0.048 | 0.081 |
| | [0.148] | [0.151] | [0.134] | [0.137] | [0.186] | [0.184] |
| Impulse control (age 12) | -0.096** | -0.246** | -0.114** | -0.128** | -0.168*** | -0.308*** |
| | [0.044] | [0.104] | [0.044] | [0.059] | [0.045] | [0.068] |
| Impulse control (age 12) x Female | | 0.249** | | 0.011 | | 0.231** |
| | | [0.107] | | [0.098] | | [0.088] |
| Self-Confidence (age 12) | -0.032 | 0.002 | -0.079* | 0.037 | -0.001 | 0.035 |
| | [0.037] | [0.082] | [0.045] | [0.044] | [0.042] | [0.068] |
| Self-Confidence (age 12) x Female | | -0.047 | | -0.178** | | -0.051 |
| | | [0.090] | | [0.084] | | [0.096] |
| Constant | 0.033 | 0.034 | -0.170** | -0.186** | 0.134 | 0.132 |
| | [0.096] | [0.101] | [0.084] | [0.082] | [0.096] | [0.096] |
| N Observations | 656 | 656 | 656 | 656 | 656 | 656 |
| N Individuals | 656 | 656 | 656 | 656 | 656 | 656 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |
| R-squared | 0.064 | 0.086 | 0.074 | 0.090 | 0.032 | 0.053 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report the effects of the socioemotional skills changes on externalizing behavior, which is an index based on the propensity to fight, destroy property, and to have trouble with the police. Columns [3] and [4] report the effects on an index for internalizing behavior based on (repeated) suicidal thoughts. Columns [5] and [6] report effects on behavioral control problems measured by an index capturing cigarette consumption and substance abuse (alcohol and drugs). All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students are aged 18 to 21. All included terms are interacted with a dummy for being Female.

Table A.5: By Gender: Links to Long-run Economic Outlook - full set of coefficients

| | Optimism | | Occupational Optimism | | Employment Expectations | |
|---|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Change in Socioemotional Skills** | | | | | | |
| **Impulse control** | **0.012** | **0.013** | **-0.030** | **-0.030** | **-0.025** | **-0.018** |
| | **[0.022]** | **[0.035]** | **[0.040]** | **[0.060]** | **[0.048]** | **[0.064]** |
| **Impulse control x Female** | | **-0.004** | | **-0.009** | | **-0.023** |
| | | **[0.048]** | | **[0.087]** | | **[0.079]** |
| **Self-Confidence** | **0.047**** | **0.043** | **0.034** | **0.063** | **0.041** | **0.065** |
| | **[0.021]** | **[0.030]** | **[0.052]** | **[0.074]** | **[0.048]** | **[0.064]** |
| **Self-Confidence x Female** | | **0.010** | | **-0.041** | | **-0.031** |
| | | **[0.038]** | | **[0.101]** | | **[0.081]** |
| Treated Cohort (Young) | -0.123** | -0.123** | -0.155 | -0.150 | -0.195* | -0.192* |
| | [0.050] | [0.049] | [0.105] | [0.104] | [0.103] | [0.100] |
| Female | -0.143*** | -0.142*** | -0.155 | -0.144 | -0.226 | -0.216 |
| | [0.041] | [0.040] | [0.117] | [0.119] | [0.149] | [0.145] |
| Treated x Female | -0.009 | -0.008 | -0.092 | -0.102 | -0.131 | -0.137 |
| | [0.073] | [0.074] | [0.153] | [0.151] | [0.173] | [0.169] |
| Impulse control (age 12) | 0.037* | 0.021 | 0.006 | -0.077 | -0.024 | -0.100** |
| | [0.020] | [0.032] | [0.037] | [0.054] | [0.040] | [0.048] |
| Impulse control (age 12) x Female | | 0.029 | | 0.148** | | 0.135* |
| | | [0.035] | | [0.071] | | [0.072] |
| Self-Confidence (age 12) | 0.041* | 0.054* | 0.077* | 0.144*** | 0.045 | 0.130** |
| | [0.022] | [0.031] | [0.039] | [0.053] | [0.044] | [0.054] |
| Self-Confidence (age 12) x Female | | -0.022 | | -0.107 | | -0.138* |
| | | [0.039] | | [0.076] | | [0.083] |
| Constant | 0.754*** | 0.751*** | 0.256*** | 0.238*** | 0.300*** | 0.281*** |
| | [0.031] | [0.030] | [0.079] | [0.080] | [0.077] | [0.076] |
| N Observations | 673 | 673 | 673 | 673 | 673 | 673 |
| N Individuals | 673 | 673 | 673 | 673 | 673 | 673 |
| N Schools | 62 | 62 | 62 | 62 | 62 | 62 |
| R-squared | 0.060 | 0.061 | 0.030 | 0.036 | 0.046 | 0.053 |

**Notes:** * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. Each column represents a separate regression for which the coefficient on the change in socioemotional skills are displayed, i.e., the change prior versus post-Reunification (which is between age 12 to 14 for the young cohort and between age 15 to 17 for the older cohort). As shown in Table 2 and Table 4, both socioemotional skill measures decrease in response to Reunification, so that the change in socioemotional skills is on average negative. Columns [1] and [2] report effects on Optimism which indicates an optimistic view on one's future. Columns [3] and [4] reports effects on the satisfaction with one's expected occupational future. Columns [5] and [6] reports effects on expected employment chances. All regressions control for the level of both socioemotional skill measures at age 12 (i.e., prior to Reunification for both cohorts) and treatment assignment indicating whether the student belongs to the young cohort. All outcome variables are measured after Reunification, when students are aged 18 to 21. All included terms are interacted with a dummy for being Female.

Table A.6: Effect of Reunification on Cognitive Skills - full set of coefficients

| | **Cognitives** | | | |
|---|---|---|---|---|
| | **Panel A:** Main results | | **Panel B:** Placebo-Tests | |
| | [1] | [2] | [3] | [4] |
| Treated Cohort x Post Reunification | -0.053 | -0.053 | 0.016 | 0.011 |
| | [0.060] | [0.060] | [0.046] | [0.040] |
| Treated Cohort (Young) | 0.042 | | 0.043 | |
| | [0.084] | | [0.083] | |
| Post Reunification (Age 14) | 0.115*** | 0.115*** | 0.171*** | 0.193*** |
| | [0.030] | [0.030] | [0.028] | [0.022] |
| Constant | -0.063 | -0.047*** | -0.108** | -0.102*** |
| | [0.045] | [0.014] | [0.047] | [0.010] |
| N Observations | 1504 | 1504 | 1456 | 1456 |
| N Individuals | 752 | 752 | 752 | 752 |
| N Schools | 62 | 62 | 62 | 62 |
| Individual FE | NO | YES | NO | YES |
| R-squared | 0.002 | 0.032 | 0.008 | 0.145 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are displayed in brackets. The outcome variable is an indicator of cognitive skills. "Treatment" takes value one (zero) if the individual is in the young (old) cohort. "Post" represents the individual's age. In Panel A, "Post" is a dummy variable that takes the value of one, if the age of the individual is 14 (this is pre-Reunification for the older cohort and post-Reunification for the younger cohort) and zero when aged 12 (i.e., pre-Reunification for both cohorts). "Treatment x Post" takes the value one, if the individual is in the young cohort and aged 14 (i.e. post-Reunification). Panel B displays results from a placebo test that compares the change in outcomes of both cohorts in the pre-Reunification period to lend support to the parallel trend assumption.

Table A.7: Heterogenous Effects of Reunification on Psychological Measures

| | SED: Impulse Control | | | SED: Self-Confidence | | |
|---|---|---|---|---|---|---|
| | Parents Abitur | Parents Executive | FDJ mem. w. function | Parents Abitur | Parents Executive | FDJ mem. w. function |
| | [1] | [2] | [3] | [4] | [5] | [6] |
| **Triple Interactions:** | | | | | | |
| Treatment x Post x YES | -0.242* | -0.332** | -0.533*** | -0.355* | -0.334** | -0.540*** |
| | [0.132] | [0.161] | [0.147] | [0.178] | [0.151] | [0.144] |
| Treatment x Post x NO | -0.503*** | -0.539*** | -0.248** | -0.514*** | -0.582*** | -0.338* |
| | [0.126] | [0.128] | [0.118] | [0.125] | [0.176] | [0.184] |
| p-value diff. | 0.145 | 0.361 | 0.141 | 0.396 | 0.264 | 0.379 |
| N Observations | 938 | 938 | 938 | 938 | 938 | 938 |
| N Individuals | 469 | 469 | 469 | 469 | 469 | 469 |
| N Schools | 61 | 61 | 61 | 61 | 61 | 61 |
| Individual FE | YES | YES | YES | YES | YES | YES |
| R-squared | 0.045 | 0.050 | 0.051 | 0.067 | 0.071 | 0.068 |

*Notes:* * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level. Standard errors clustered at school level are in brackets. "Treatment" takes value one (zero) if in the younger (older) cohort. "Post" is a dummy variable that takes the value of one if the age of the individual is 14 (this is prereunification for the older cohort and post-Reunification for the younger cohort) and zero when aged 12 (i.e., prereeunification for both cohorts). "Treatment x Post" indicates changes in the outcome for the younger cohort, after versus before Reunification.