Inevitable? Doping Attitudes among Berliners in 2011—
The Role of Socialist State Socialization and Personal Factors

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Abstract

Background: In order to design effective and commonly accepted policies against Performance-Enhancing Drugs (PED), it is crucial to understand general attitudes towards doping in the population. Little is known about both attitudes toward doping, and the factors that shape such attitudes. Individual-level predictors of this study include age, gender, and whether respondents were former amateur athletes. A particular focus is on whether socialist or capitalist state socialization matters.

Methods: IPSOS MOPRI carried out a web-based survey in the city of Berlin in fall 2011. Specifically designed, the survey elicited doping attitudes, socio-demographics and state socialization histories among 5,877 Berlin residents. Multivariate regression methods identified doping attitude predictors.

Results: Former amateur athletes are a statistically significant 5ppt more often (i) in favour of heavy state sanctions for doping offenders and (ii) think that athletes can be successful without doping. Former athletes socialized in the GDR are a statistically significant 8ppt more likely to believe that (iii) doping is inevitable in sports. Younger people and females are significantly less likely to support (iv) heavy sanctions for doping offenders as compared to older people and males.

Conclusions: Socio-demographics such as age, gender and athlete experience are significant determinants of doping attitudes. They operate in interaction with state socialization in shaping attitudes.

Keywords: performance-enhancing drugs, population doping attitudes, state socialization, socialism, Berlin

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1. Introduction

The use of performance-enhancing drugs (PED, “doping”) in sport contests is not a new phenomenon. Athletes in Ancient Rome and Greece were known to experiment with substances such as mushrooms or bull’s blood to increase their level of performance (Houlihan, 2002). In modern times, the use of steroids among elite athletes was common in the 1950s and 1960s. During this era, adverse side effects were unclear and testing methods were undeveloped, making it virtually impossible to sanction athletes using such substances. For an overview about the history of doping, see Thompson (2012).

After the 1998 Tour de France doping scandal, the World Anti-Doping Agency (WADA) was founded. The WADA coexists with national anti-doping organizations and aims to create global collaboration in the fight against doping. The WADA Anti-Doping-Code defines doping as “the occurrence of one or more of the anti-doping rule violations set forth in Article 2.1 through 2.8 of the Code” (WADA, 2009, page 18). The articles essentially include a list of prohibited substances and specific behaviour, such as the possession of prohibited substances or the refusal to submit to sample collection. The WADA’s main tool in its fight against doping is laboratory doping control analysis. Athletes have expressed substantial dissatisfaction with these current WADA anti-doping measures (Valkenburg et al. 2014). Given the criticism with the current WADA anti-doping policies, alternative approaches have been proposed (Aubel and Ohl, 2014).

In fact, an increasing literature in social sciences is very critical with the current anti-doping practices. For example, the economics literature models doping as a game theoretical approach. Accordingly, athletes with the strongest tastes for victory would find doping always optimal and hence dope (Bird and Wagner, 1997; Szymanski, 2003; Dilger et al., 2007). Moreover, Bird and Wagner (1997) point out that the current anti-doping approach would be based on centralized bureaucratic methods and be ineffective. Similarly, research in biomedical ethics stresses a questionable ethical basis of the current approach. Kayser et al. (2007) provide a critical review of anti-doping policies. Besides other criticism, they point out that the protection of athletes’ health would be a questionable argument given the focus of anti-doping policies on professional sports,
whereas the use of PED in amateur sports and in the general population would be largely uncontrolled and unsupervised.

According to official WADA doping tests, less than 1% of all professional athletes dope (Tsvou et al., 2006; Striegel et al., 2010). However, anonymous surveys of professional and amateur athletes find that the actual (lifecycle) prevalence is substantially higher (Rachón et al., 2006; Simon et al, 2006; Pitsch et al., 2007; Striegel et al., 2010; Sagoe et al. 2014). Lentillon-Kaestner and Ohl (2011) estimate that, depending on the sample and the framing of the doping question, doping prevalence estimates vary between 1 and 40%.

There exists a relatively large multidisciplinary quantitative and qualitative literature on doping attitudes and their determinants (Moran et al., 2008; Bloodworth and McNamee, 2010; Humphreys and Ruseski, 2011; Fürhapter et al., 2013; Overbye et al., 2013; Hodge et al., 2013). Morente-Sánchez and Zabala (2013) provide a comprehensive overview and a meta-analysis of “Elite Athletes’ Attitudes, Beliefs and Knowledge.” However, all these studies almost exclusively focus on attitudes and beliefs of amateur or professional athletes. Other than that, multidisciplinary research on the topic mostly reflects expert opinions, viewpoints, and diverse analytical approaches of different scientific disciplines.

To our knowledge, this paper is one of the first to elicit doping attitudes in the general population and to test for differences by state socialisation and athlete status. In order to design effective anti-doping policies, such should be accepted and supported by the general population, as well as athletes. Without integrating and considering doping perceptions in the population, it is unlikely that anti-doping policies will effectively work in

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1 When asked, athletes do believe that PEDs are effective in enhancing performance (Alaranta et al., 2006). However, they view the use of banned performance-enhancing substances as “unnatural” and “cheating,” but legal performance-enhancing substances as “essential” for success (Outram and Stewart, 2015). Outside of elite sports, the use of banned substances is positively associated with being young and male, as well as exhibiting other risky behaviour such as smoking, drinking, or marijuana use (Humphreys and Ruseski, 2011). Data from US high school seniors suggests that steroid availability and peer effects are important predictors of use (Denham, 2009). There exists also a methodological literature on how to elicit doping attitudes (Moran et al. 2008; Petrócz et al. 2011).

2 Exceptions are Backhouse and McKenna (2011) as well as Laure et al. (2013) who focus on physicians, Blank et al. (2015) who focus on parents of junior athletes, and Breivik et al. (2009) who compare the acceptance of specific PEDs among 234 Norwegian elite athletes and 428 respondents from the general population.
practice. In addition, population perceptions on PED use may influence professional athletes as well as amateurs in their decision to dope. Therefore, it is crucial to understand how the general population thinks about doping in professional sports. This paper explicitly assesses whether athletes have different perceptions than the general population. To test for whether cultural socialisation plays a role in the shaping of population attitudes throughout the lifetime, we compare former East to West Berlin residents (see Appendix C). In that respect, this paper also contributes to the diverse social science literature on cultural socialization and its relationship to risky health behaviours (Kaufman et al., 2007; Simons-Morton et al., 2009; Room et al., 2012; Christopoulou, R. and Lillard, 2013; Schori et al., 2014). PED use among professional or amateur athletes is a public health concern and, hence, this paper contributes to the literature in public health and epidemiology (Laure, 1997; Kanayama et al. 2008).

2. Method

2.1 Data: A Survey to Elicit Population Doping Attitudes

As part of a bigger international research project, one of the leading European survey companies, IPSOS MORI was hired to conduct a survey among Berlin residents between August 9 and September 30, 2011. IPSOS MORI independently carried out a mixed telephone and online survey of Berlin residents. A quarter of all interviews were conducted by telephone and three quarters online. The 75-25 split between the online and telephone interviews was determined by IPSOS MORI, given the number of respondents requested. IPSOS Mori randomly recruited respondents from their respondent database via email and online links to the survey. Because it included an online component, the survey was not strictly representative of the Berlin population.

Comparing the raw demographics of our survey with household panel data from the nationally representative German Socio-Economic Panel Study (SOEP) illustrates some differences and similarities. According to the SOEP, in 2010, the average resident of Berlin was 51 years old, whereas our survey yields only an average age of 41.5 (see Appendix A). Comparing gender (54% vs. 58% female), marital status (24% vs. 35% single), and employment status (37% vs. 44% full-time employed) shows that the differences are not extreme,
but that our sample is younger, includes more singles and full-time employees. However, first, all elicited beliefs were adjusted with respect to these socio-demographics. Second, in 2014, almost 80% of all Germans were “online”—50% of all respondents above 65 (ARD-ZDF, 2014). Due to greater flexibility in answering, today’s online surveys may be less selective than telephone surveys. Finally, all respondents participated in a lottery with a prize of €500 in order to maximize response rates. Disregarding respondents with missings on relevant variables of interest, the main sample consists of 5,877 Berliners.

Attitudes toward Doping in Elite-Level Sports. In total, we elicited opinions in response to four statements related to doping. Accordingly, we generated four binary variables on doping attitudes. The large majority of respondents answered the survey in German. We translated the survey questions into English.

As Appendix A shows, about 40% of all respondents agreed with statement (a) “Doping has always existed, will always exist, and is an inevitable part of professional sports.” and (c) “The system of professional sports itself is to blame for doping. The athletes are only the victims.”

About 30% of all respondents agreed with statement (b) “The state should do everything to ban doping. Doping offenders should be heavily punished.” and (d) “Those who really want to, can be successful in professional sports without doping.”

East or West Socialization: We asked respondents about their residency before German reunification. GDR is a variable that is one for respondents who lived in East Berlin before 1989 and zero for those who lived in West Berlin before 1989. In our survey, pre-1989, 57% of all respondents were socialized in West Berlin and 43% were socialized in East Berlin. As such, we obtain large enough sample size and statistical power to detect state socialization differences between East and West Berliners.

Ex-Athlete: The survey also elicited whether respondents were former athletes in an “extramural sports club.” In Germany, many children begin to participate in regular sport sometime between age 5 and 15; however, the sports groups they participate in are not associated with primary or secondary school. Instead,
these extramural sports clubs typically operate as non-profit amateur organizations. Almost every village has one such club. The clubs charge very low membership fees and generally admit anyone who applies to be a member. Clubs typically participate in contests and amateur or semi-professional sports leagues.

A significant number of youths join extramural sports clubs in Germany. If a youth is serious about the particular sport, that is if she decides she wants to develop and hone their skills, she will often practice two to five times a week, join a team in their age group, and participate in amateur competitions. Youth compete in matches that occur in their home village and they travel to compete in matches hosted by clubs of neighbouring villages. The competitions and the associated travel are an integral part of the extramural sport club experience for German youth.

We drop those 156 respondents who are still active in extramural competitive sports and focus on those with past and serious involvement through one variable of interest. ExAthlete is one for those with past amateur elite sports experience and zero for all else.

**Other Socio-demographics:** Appendix A provides a summary statistic of all variables used. In addition to the variables Female, Age, Single, and Full-time employed, we ask whether people own property (Home owner) and have a university degree (University degree). Moreover, we found the number of household members under 16 (Household members under 16) as well as the total number of household members (Household members). Individuals indicated their gross annual household income according to 10 income categories (Annual household income). The lowest category is “€0 to 5,000” and the highest “more than €100,000”.

### 2.2 Empirical Approach

We estimate the following multivariate regression model:

\[ y_i = \beta_0 + \beta_1 \text{ExAthlete}_{i,t-T} + \beta_2 \text{GDR}_{i,t-22} + \beta_3 \text{GDR}_{i,t-22} \times \text{ExAthlete}_{i,t-T} + X_i'\gamma + \varepsilon_i \]  \hspace{1cm} (1)
where $y_i$ is one of the dependent variables that measure the individual’s attitude toward doping. $ExAthlete_{i,t-7}$ indicates whether the individual is a former amateur athlete and $GDR_{i,t-22}$ is one if the respondent had her residency in East Berlin prior to 1989. $X_i$ represents other socio-demographic control variables and $\epsilon_i$ is the error term.

$\beta_1$ indicates—for those who were socialised in West Berlin—whether former elite level athletes have a different attitude toward doping than people who were never athletes. $\beta_2$ yields whether—among non-athletes—socialization in the socialist GDR vs. the capitalist FRG has any systematic impact on attitudes. $\beta_3$ is the interaction term between $GDR$ and $ExAthlete$. $\beta_1 + \beta_2 + \beta_3$ yields attitude differentials for former athletes who grew up in East Berlin, relative to the baseline category, which are non-athletes who grew up in West Berlin ($\beta_0$).

We estimate Linear Probability Models (LPM) for the sake of clarity and transparency. Marginal effects of probit models do not alter the findings. The sizes of the coefficients are very similar, as are the levels of statistical significance. The results are available upon request.

3. Results

**Model 1: Own Experience as Former Athlete vs. GDR Socialization**

Our first model focuses on state socialization vs. being a former athlete and estimates equation (1). To capture effects that stem from personal GDR socialization experience, we restrict the sample in this first model to individuals who were at least 18 years old when the Wall fell in 1989. We also condition on respondents who were either socialised in East or West Berlin—i.e. exclude post 1989 migrants—in order to cleanly identify the impact of socialization under capitalism and socialism. When ignoring both younger people and people who moved to Berlin, the sample size is reduced to 2,182 but is still left with enough statistical power. Appendix B provides more details on the German division and reunification, and its use as a natural experiment to test for socialisation effects.
Table 1 shows the results for the determinants *EastBerlin* as well as *ExAthlete*, and suppresses other socio-demographic determinants that will be analyzed in more detail below. Each column represents one regression model. We run four different models with our four different dependent variables indicating individuals’ attitudes toward PED use. Sample adjusters are included in even number columns and excluded from odd number columns. The results for *EastBerlin* and *ExAthlete* are largely robust to the inclusion of socio-demographics, showing that sample adjusters are largely uncorrelated with *EastBerlin* and *ExAthlete*.

Looking at the overall pattern of results in Table 1, among West Berliners, being a former athlete has a large impact on attitudes toward doping. Among the group of former athletes, we observe a significant 5 to 6ppt larger fraction of respondents—as compared to non-athletes—who agree with the following statements.

- *The state should do everything to ban doping. Doping offenders should be heavily sanctioned.*

- *Those who really want to can be successful in professional sports without doping.*

- *The system of professional sports itself is to blame for doping.*

The estimates for being socialized in the GDR are close to zero and insignificant in most cases. However, the coefficient estimate that indicates agreement with the statement “*The system of professional sports itself is to blame for doping. The athletes are only the victims*” is relatively large (4ppt) and significant at the 10% level. This means that former GDR residents (who were not a former athletes) are more likely to blame system effects and structural circumstances for doping in sports and to see athletes as victims. This fits with the history of doping in the GDR and the systematic abuse of underage elite-level athletes, who were doped without their knowledge and suffered significant negative long-term health consequences. Obviously, attitudes are shaped by state policies and state socialization.
The interaction term between GDR socialization and Ex-Athlete yields relatively large coefficients between 4 and 8ppt. But they are imprecisely estimated in most cases. However, former athletes who were socialized in the GDR are 8ppt more likely to agree with the statement: “Doping has always existed, will always exist, and is an unavoidable part of professional sports.” This can be interpreted as a retrospective justification of the development system practices in the GDR. Note that it is highly unlikely that a significant share of these respondents were personally and physically affected by the GDR doping practices. However, since they were former active athletes, they were part of the GDR development system. An alternative interpretation would be of helplessness or resignation.

**Model 2: Other Socio-Demographic Determinants of Doping Attitudes**

Next, we leave the sample unrestricted—hence make use of all 5,877 respondents—and show all socio-demographic determinants in Table 2. Again, each column represents one multivariate regression model.

[Insert Table 2 about here]

**Age and Gender.** Older respondents are significantly more likely to believe that the state should heavily sanction doping offenders, and less willing to believe that doping is inevitable in professional sports. Females are also a significant 9ppt less willing to believe that doping is an integral part of professional sports. In addition, females are a significant 7ppt less in favour of strict state sanctions for offenders.

**Martial status, household size, and home ownership.** All these factors are relatively weak predictors of doping attitudes. Most coefficient estimates are very small in size and not statistically significant.

**Education, Employment Status, and Income.** Better educated respondents are about 4ppt more likely to believe that doping is a structural issue of professional sports. At the same time, the better educated, and also the full-time employed, are less likely to agree that athletes can be successful without doping. In a nutshell, better educated individuals are significantly more pessimistic about a doping-free professional sports world, as are those in higher-income households. Higher-income households are more likely to believe that (1) doping is
inevitable in professional sports, (2) that the state should heavily sanction offenders, but also that (3) doping is a structural problem of professional sports.

Note that the size and significance of being a former athlete is totally in line with our restricted Model 1 above: Former Athletes are significantly more likely to believe that athletes can be successful without doping (+7ppt) and that the state should heavily sanction offenders (+4ppt).

**Summary.** Personal experience with the amateur elite level sports system is an important predictor of doping attitudes. Former athletes are more optimistic that athletes can be successful without doping, yet also prefer heavier sanctions. Older people, males and wealthier households also demand heavier state sanctions against offenders but are significantly more pessimistic concerning doping free sports. Females are less willing to believe that doping should be the norm in professional sports. In line with the history of doping under socialism, former athletes who were socialised in the GDR over proportionally agree with the statement that doping is an inevitable part of professional sports. This holds 22 years after the peaceful German reunification and shows that state socialisation has a long-lasting impact on attitudes.

**4. Discussion**

This paper shows that state socialization can shape attitudes toward PED use in the long-run. Under State Plan 14.25, the socialist regime of the German Democratic Republic (GDR) systematically administered performance-enhancing drugs to their top-level athletes, in most cases without the athletes’ knowledge or consent. These systematic doping activities were revealed and comprehensively discussed in the German media during the 1990s. Even more than 20 years after the peaceful reunification, we still find significant differences in attitudes toward doping behaviour among East vs. West Berliners. Former GDR amateur athletes are significantly more likely to believe that doping is an integral part of professional sports. This long-lasting effect could either manifest itself through direct personal experience—among those who were active former amateur athletes, or indirectly—through a form of emotional solidarity and justification with the state in which people were raised and socialised.
We compare and contrast the top-down state socialisation effect with the impact of a bottom-up effect—the latter stemming from individual characteristics such as age or individual sports experience. Both state socialisation and individual experience matter. For example, former youth amateur athletes are significantly more likely to believe that professional athletes can be successful without doping and should be heavily punished if they dope. Females and older people are less willing to accept that doping is an inevitable part of sports. At the same time, females and young people are critical of heavy punishments for doping offenders.

Our findings have important policy-relevant implications for a number of topics. Western democracies have experienced on many occasions that social norms and values are extremely difficult to influence in the short-run. Obviously, decade-long exposure to specific state policies, especially in interaction with personal life experience, has a long-term impact on substance abuse attitudes and beliefs. When designing public health policies in general—and anti-doping policies in particular—the cultural background and specific attitudes of the population should be considered in order to design effective, population-supported, policies.

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Conflicts of Interest

None.
Key points

- The paper measures population attitudes toward doping and how they are shaped.
- A survey to elicit population doping attitudes was carried out in Berlin.
- The focus on Berlin allows us to contrast individual with state-level predictors.
- Individual factors, alone and interacted with state socialization, are relevant.
- For example, former GDR athletes are more likely to view doping as inevitable.

Literature


### Table 1: The Role of State Socialization vs. Being a Former Amateur Athlete in Shaping Population Attitudes toward Doping

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Doping is inevitable in professional sports</th>
<th>State should heavily sanction doping offenders</th>
<th>Doping is a structural issue; athletes are victims</th>
<th>Athletes can be successful w/o doping</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) EastBerlin* ExAthlete</td>
<td>0.0736**</td>
<td>0.0836*</td>
<td>-0.0705</td>
<td>0.0426</td>
</tr>
<tr>
<td>(B) Socialised in East Berlin</td>
<td>-0.0214</td>
<td>0.0000</td>
<td>0.0349*</td>
<td>0.0418*</td>
</tr>
<tr>
<td>(C) ExAthlete</td>
<td>0.0409*</td>
<td>0.0153</td>
<td>0.0569*</td>
<td>0.0640*</td>
</tr>
<tr>
<td>(D) Baseline (West, no-athlete)</td>
<td>0.3644***</td>
<td>0.5206***</td>
<td>0.4181***</td>
<td>0.2618***</td>
</tr>
</tbody>
</table>

### Other Covariates

<table>
<thead>
<tr>
<th></th>
<th>Demographics</th>
<th>Education &amp; labour market</th>
<th>HH-Characteristics</th>
<th>R²</th>
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<td>no</td>
<td>no</td>
<td>0.0273</td>
<td>2,182</td>
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<td>no</td>
<td>0.0107</td>
<td>2,182</td>
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<td>yes</td>
<td>0.0018</td>
<td>2,182</td>
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<td>0.0209</td>
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<td>yes</td>
<td>no</td>
<td>0.0066</td>
<td>2,182</td>
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<tr>
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<td>yes</td>
<td>yes</td>
<td>0.0077</td>
<td>2,182</td>
</tr>
</tbody>
</table>

Source: Data collection by IPSOS MORI in form of a combined telephone and online survey among Berlin residents between August 9 and September 30, 2011. *p<0.1, **p<0.05, ***p<0.01; standard errors are in parentheses. Each column stands for one multivariate linear probability regression model as in equation (1). Results are robust to estimating probit models and calculating marginal effects. Socialised in East Berlin is based on the pre-1989 East vs. West Berlin residency status and excludes post 1989 migrants to Berlin. The sample excludes people under the age of 40 and guarantees that respondents were at least 18 years when the Wall fell. In columns (1) and (2), the dependent variable is a dummy that is one if respondents agreed with the following statement: “Doping always existed, will always exist, and is an inevitable component of professional sports.” In columns (3) and (4), the dependent variable is a dummy that is one if respondents agreed with the following statement: “The state should do everything to prevent doping and sanction doping offenders heavily.” In columns (5) and (6), the dependent variable is a dummy that is one if respondents agreed with the following statement: “It is the system of professional sports that has to be blamed for the reoccurring doping cases. The athletes themselves are the victims.” In columns (7) and (8), the dependent variable is a dummy that is one if respondents agreed with the following statement: “Who really wants to, can be successful in professional sports without doping.”
Table 2: Socio-Demographic Determinants of Doping Attitudes

<table>
<thead>
<tr>
<th></th>
<th>Doping is inevitable in professional sports (1)</th>
<th>State should heavily sanction doping offenders (2)</th>
<th>Doping is a structural issue; athletes are victims (3)</th>
<th>Athletes can be successful w/o doping (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExAthlete</td>
<td>0.0191 (0.0156)</td>
<td>0.0466*** (0.0147)</td>
<td>0.0173 (0.0155)</td>
<td>0.0733*** (0.0149)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.0025*** (0.0006)</td>
<td>0.0011*** (0.0005)</td>
<td>0.0026*** (0.0006)</td>
<td>-0.0004 (0.0005)</td>
</tr>
<tr>
<td>Age^2/10</td>
<td>-0.0001 (0.0003)</td>
<td>0.0002 (0.0003)</td>
<td>0.0003 (0.0003)</td>
<td>0.0011*** (0.0003)</td>
</tr>
<tr>
<td>Female</td>
<td>-0.0910*** (0.0135)</td>
<td>-0.0696*** (0.0126)</td>
<td>0.0220 (0.0135)</td>
<td>0.0217* (0.0124)</td>
</tr>
<tr>
<td>Single</td>
<td>-0.0046 (0.0163)</td>
<td>0.0184 (0.0150)</td>
<td>0.0398*** (0.0164)</td>
<td>-0.0041 (0.0153)</td>
</tr>
<tr>
<td>Full-time employed</td>
<td>0.0168 (0.0137)</td>
<td>-0.0185 (0.0125)</td>
<td>-0.0365*** (0.0137)</td>
<td>-0.0292*** (0.0127)</td>
</tr>
<tr>
<td>Home owner</td>
<td>0.0206 (0.0173)</td>
<td>-0.0247 (0.0159)</td>
<td>0.0226 (0.0176)</td>
<td>-0.0183 (0.0158)</td>
</tr>
<tr>
<td>University degree</td>
<td>0.0206 (0.0133)</td>
<td>0.0093 (0.0123)</td>
<td>0.0446*** (0.0134)</td>
<td>-0.0315*** (0.0122)</td>
</tr>
<tr>
<td># HH members</td>
<td>-0.0050 (0.0074)</td>
<td>0.0055 (0.0070)</td>
<td>0.0098 (0.0075)</td>
<td>0.0068 (0.0071)</td>
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<tr>
<td># HH members under 16</td>
<td>-0.0036 (0.0102)</td>
<td>-0.0025 (0.0093)</td>
<td>-0.0284*** (0.0101)</td>
<td>0.0074 (0.0109)</td>
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<td>HH Income</td>
<td>0.0086*** (0.0024)</td>
<td>0.0081*** (0.0022)</td>
<td>0.0095*** (0.0024)</td>
<td>-0.0018 (0.0022)</td>
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<tr>
<td>Constant</td>
<td>0.5051*** (0.0394)</td>
<td>0.2263*** (0.0364)</td>
<td>0.2062*** (0.0395)</td>
<td>0.2998*** (0.0369)</td>
</tr>
<tr>
<td>Observations</td>
<td>5,877</td>
<td>5,877</td>
<td>5,877</td>
<td>5,877</td>
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<tr>
<td>R-squared</td>
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<td>0.0137</td>
<td>0.0149</td>
<td>0.0094</td>
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</tbody>
</table>

Source: Data collection by IPSOS MORI in form of a combined telephone and online survey among Berlin residents between August 9 and September 30, 2011. * p<0.1, ** p<0.05, *** p<0.01; standard errors are in parentheses. Each column stands for one multivariate linear probability regression model as in equation (1). Results are robust to estimating probit models and calculating marginal effects. The full sample is used. See Table 1 for the exact wording of the dependent variables.
### Appendix A: Descriptive Statistics

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doping is inevitable in professional sports</td>
<td>0.3961</td>
<td>0.4891</td>
<td>0</td>
<td>1</td>
<td>5,877</td>
</tr>
<tr>
<td>State should heavily sanction doping offenders</td>
<td>0.2887</td>
<td>0.4532</td>
<td>0</td>
<td>1</td>
<td>5,877</td>
</tr>
<tr>
<td>Doping is a structural issue; athletes are victims</td>
<td>0.4062</td>
<td>0.4912</td>
<td>0</td>
<td>1</td>
<td>5,877</td>
</tr>
<tr>
<td>Athletes can be successful w/o doping</td>
<td>0.2913</td>
<td>0.4544</td>
<td>0</td>
<td>1</td>
<td>5,877</td>
</tr>
</tbody>
</table>

#### Model 1: Covariates of main interest

| Socialised in East Berlin pre-1989 (0=West Berlin)  | 0.4562| 0.4981    | 0    | 1    | 3,913|
| ExAthlete                                          | 0.2217| 0.4154    | 0    | 1    | 5,877|

#### Model 1: Other socio-demographics

| Age                                                 | 41.55 | 14.35     | 16   | 90   | 5,877|
| Female                                              | 0.582 | 0.493     | 0    | 1    | 5,877|
| Single                                               | 0.346 | 0.476     | 0    | 1    | 5,877|
| Full-time employed                                   | 0.436 | 0.496     | 0    | 1    | 5,877|
| Home owner                                          | 0.189 | 0.391     | 0    | 1    | 5,877|
| University degree                                    | 0.420 | 0.494     | 0    | 1    | 5,877|
| # household members                                  | 2.231 | 1.175     | 1    | 20   | 5,877|
| # household member under 16                         | 0.368 | 0.771     | 0    | 19   | 5,877|
| Annual household income (10 categories)              | 4.655 | 2.897     | 0    | 10   | 5,877|
Appendix B: Division and Reunification of Germany and Its Use as “Natural” Experiment

At the Potsdam Conference in summer 1945, the allies divided Germany into four military occupation zones: American, British, French, and Soviet zones. The division was based on the idea of allocating territory proportional to the size of the nations’ army and according to military considerations (Mee, 1977).

Figure B2 illustrates that Eastern territories such as East Prussia and large parts of Pomerania became parts of Poland and Russia. These territories accounted for almost 25% of the total pre-war German territory and included 15% of Germany’s total population (Statistisches Bundesamt, 1953). About 12 million German citizens and ethnically German people living east of the Oder River were expelled or fled from these (former) eastern German territories toward the end of the war and in the years following the Potsdam Conference (“Heimatvertriebene”). By 1950, West Germany had taken in 8 million of these Heimatvertriebene from former eastern German—now Polish and Russian—territory. This boosted West Germany’s (which became the “Federal Republic of Germany (FRG)” in 1949), population by 17%. The remaining 4 million expellees resettled in East Germany (which became the “German Democratic Republic (GDR)” in 1949) (Beer, 2011; Bauer et al., 2013).

In 1949, the capitalist and democratic Federal Republic of Germany (FRG) was founded, comprising of the French, British, and American military occupation zones. As can be inferred from Figure B3a and B2b, in the Soviet zone the German Democratic Republic (GDR)—a totalitarian Stalin-oriented communist state—was forged in 1949. Between 1950 and 1961, about 3.6 million refugees migrated from the GDR to the FRG (Bethlehem, 1999). To stop the mass exodus, on August 13, 1961, the communist GDR regime started erecting a 155 kilometres (96 miles) long cement and 3.6 meter (12 feet) high “Berlin Wall” around West Berlin (see Figure B1). As Figure B3b shows, West Berlin was then an island surrounded by GDR territory, but belonged to the FRG.
Outside of Berlin and around the rest of the GDR territory, a physically different, but technically very similar 1,393 kilometre (866 miles) long “Inner German Border” was erected (see Figure B3b). This border ran from the Baltic Sea to Czechoslovakia and represented the boundary of the “Iron Curtain.” This Wall consisted only partly of cement, but mostly of high metal fences, wires, alarms, watchtowers, and spring guns. Around the Wall, the 500 meter wide “Protective Strip” (“Schutzstreifen”) was under tight control. The “Restricted Zone” (“Sperrzone”) even entailed an up to 5 kilometre (3.2 miles) wide strip. About 30,000 GDR soldiers projected the whole East-West German border, also referred to as the “Anti-Fascist Protection Rampart” (“Antifaschistischer Schutzwall”) by GDR officials. Henceforth, we specifically refer to the border around West Berlin as “Berlin Wall”, but also loosely refer to the whole Inner German border as “Wall.” For 28 years, from 1961 to 1989, the Wall served as border between the FRG and the GDR. It largely prevented East-West migration, although around 5,000 GDR citizens attempted to escape over the Berlin Wall alone; between 100 and 400 lost their lives at this attempt (Hertle and Nooke, 2009).

After mass demonstrations by the GDR residents, the communist regime decided to allow East-West migration on November 9, 1989. The fall of the Wall was completely unanticipated and unexpected. Some 11 months later, on October 3, 1990, the peaceful German reunification was formalized with the implementation of the “Unification Treaty” (“Einheitsvertrag”).

In the first year after the fall of the Berlin Wall, about 400,000 people migrated from East to West Germany (Hunt, 2006). From 1989 to 2005, a total of 3.4 million people migrated from East to West Germany—mainly due to better labour market prospects. At the same time 1.8 million migrated from West to East Germany. Approximately 50% of the West-East migration was return migration by former GDR residents. Since the reunification, East Germany lost about 10% of its population; after Albania, this
represents the second largest net population loss among the countries formerly behind the “Iron Curtain” (Wolf, 2007).

**Berlin’s Division as a Natural Experiment**

The fall of the Soviet Union and the fall of the “Iron Curtain” in Europe have been established as a natural experimental to derive the impact of communism on a battery of outcomes (cf. Blanchflower and Freeman, 1997). A substrand of the literature focuses on the division of Germany into East and West Germany in 1949 and its subsequent 1990 reunification (cf. Bursztyn and Cantoni, 2012; Hyll and Schneider, 2013). It is argued that the geographic division of Germany after World War II (WWII) by the Soviet and Western Allies was a random event. Indeed, as shown above, historical facts support this assumption. The main underlying identification assumption of using the German reunification as a natural experiment aims at a random division of Germany with otherwise two identical populations. The treatment group was exposed to communism, while the control group experienced a Western capitalist democracy for almost 40 years. Given the lack of data, the common and accepted methodological approach is to use post-reunification data and to compare East with West Germany (Frijters et al., 2004; Alesina and Fuchs-Schündeln, 2007; Easterlin and Plagnol (2008); Rainer and Siedler, 2009; van Hoorn and Maseland, 2010; Brosig-Koch et al. 2011; Burchardi and Hassan, 2013; Heineck and Süssmuth, 2013).

One main advantage of our “Berlin approach” is that East and West Berliners are more similar than East and West Germans: First of all, each of the 6 East German and the 12 West German states has a diverse and century-long history. The geography, infrastructure, and culture have been different for centuries (cf. Wolf, 2009).
Second, Berlin was much less affected by the various forced and voluntary migration flows as outlined above. As Figure B4 shows, between 1900 and 1930, Berlin almost doubled its population. During the last 2 years of WWII, Berlin lost a third, or 1.5 million, of its residents. However, between 1950 and 2010, the population of Berlin remained remarkably stable, only varying between 3 and 3.5 million residents.

Finally in the two decades following reunification, Berliners were exposed to the same state government, regulation, institutions, and local labour market. Today, without knowing what to look for, it is impossible to tell where the Berlin Wall divided the city prior to 1990. For example, 15% of our survey participants did not know whether they live on former GDR or FRG territory. In the empirical assessment, we focus on Berlin residents and exploit their current and their pre-reunification inner-Berlin place of residency.
Appendix C: Doping in the GDR

Appendix B discusses the division and reunification of Germany as a whole and of Berlin in particular, and explains how this historical accident can be used as a “natural experiment” to test for the impact of state socialization on doping attitudes. Figure B1 shows the Berlin Wall that divided Berlin from 1961 to 1989 into a socialist Soviet sector belonging to the German Democratic Republic (GDR) and capitalist French, British and American sectors belonging to the Federal Republic of Germany (FRG). This division resembled the division of Germany as a whole (see Appendix B). Eliciting respondents’ residencies prior to 1989 in the questionnaire, we can determine exactly whether someone was socialized in East or West Berlin before 1989.

Given the size of the GDR with its 17 million residents, their success at the Olympic Games was conspicuous. In 1968, at the Olympic Games in Mexico City, GDR athletes won 9 gold medals and ranked fifth in the medal table. Fours year later, in Munich’s 1972 games, GDR athletes won 20 gold medals and ranked third among all countries worldwide. During Montreal’s 1976 Olympics, GDR athletes won 40 gold medals, and ranked second in the medal table after the Soviet Union. Given these figures, rumors about systematic doping in the GDR spread widely and its athletes “had the reputation for never getting caught” (Wiese, 2007; Shackleton, 2009). Ultimately, only one East German athlete was ever convicted of doping and suspended: shot-putter Ilona Slupianek in 1977. That being said, Germany’s ability to cultivate and recruit athletic talent was well developed, identifying potential athletes as early as elementary school. Proof of this successful athlete development system was the extremely high share of successful former GDR residents in reunified German Olympic teams during the 1990s.

Once records became publicly available following the reunification, it became clear that the GDR implemented and maintained a systematic state doping program. Systematic state controlled doping started in the 1970s, when the “GDR Ministry for State Security” (“Staatssicherheit”, the so-called
“Stasi”) started supervising systematic doping practices. This became a state policy under the name “State Plan 14.25.” A doping testing laboratory in Kreischa (Saxony) performed 12,000 annual tests on East German athletes. The objective was not to penalize athletes but to develop scientific methods to avoid positive tests at official contests. The state-directed “Research Institute for Physical Culture and Sport” (“Forschungsinstitut für Körperkultur und Sport, FKS”) employed 600 and performed 21 doping research projects between 1984 and 1988 alone (Spitzer, 2003; Müller and Hartmann, 2009).

The state doping program kept athletes intentionally unaware. Even 10 year old athletes were forced to take “vitamin pills” by their coaches. Those who did not obey were suspended (Bachner, 2010). After the German reunification, it became clear that dozens of athletes were experiencing negative long-term health effects caused by their forced early age drug abuse. Several lawsuits against former coaches and state officials were filed. In 2002, a Doping-Victim-Assistance Law was implemented at the federal level. According to the ruling, about 200 victims were granted a one-time compensation of about €10,000 (Hettfleisch, 2010). Following the reunification, both East and West Berliners have been exposed to media commentary and coverage of this doping scandal through common media platforms.

In total, estimates suggest that around 12,000 GDR elite athletes were given performance-enhancing drugs without their knowledge or consent (Müller and Hartmann, 2009). Given an average population size of about 17 million people, this means that 1 out of every 1,400 GDR residents were personally affected. This suggests that, in our Berlin survey, not more than one or two respondents might have been personally affected by the regime-run doping system. Consequently, interviewed victims of GDR state doping are very unlikely to affect our estimates. By surveying the state socialization and individual sports history of respondents, we identify respondents who knew the GDR development system well enough—since they were former amateur athletes—and could have been potentially (but were most likely not actually) affected by the doping practices of the GDR regime.
Literature Online Appendix


**Figure B1:** Berlin Wall, 1961

Figure B2: Germany after the Second World War, 1945

Germany after the Second World War, Sept. 1, 1945

Figure B3a: Division of Germany, 1947

Figure B3b: Division of Germany, 1961

Figure B4: Population Development of Berlin: 1816-2010