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ROSTOCKER ZENTRUM – DISKUSSIONSPAPIER
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No. 30

The Diffusion of Smoking in East and West Germany: Smoking Patterns by Birth Year

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März 2012

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The Diffusion of Smoking in East and West Germany: Smoking Patterns by Birth Year

Christina Westphal & Gabriele Doblhammer

1. Introduction:

Along with remarkable increases in life expectancy in recent decades (Christensen, et al., 2009; Oeppen and Vaupel, 2002), we have experienced a shift away from acute illnesses and towards chronic diseases—e.g., cardiovascular diseases, cancers, respiratory diseases, skin diseases and metabolic diseases—that now pose major challenges for our health care system (Hurrelmann, 2006). Besides overweight and obesity, which can lead to the development of chronic illnesses, smoking has been identified as one of the most important risk factors for population health and premature mortality (Cutler, et al., 2007; Doblhammer, et al., 2009; Peto and Lopez, 2004; Preston, et al., 2010; Preston and Wang, 2006; Sassi, 2010). In the 19th and 20th centuries, smoking was almost exclusively a male habit; however, in recent decades smoking has also become common among women. Thus, the gender gap in smoking has been narrowing across Europe and in the United States (Gilman and Xun, 2004; Graham, 1996; Kuntsche and Gmel, 2005; Pampel, 2001; Preston and Wang, 2006; Waldron, 1991). Moreover, studies have shown that socioeconomic status has a major impact on differences in smoking within a population (Cavelaars, et al., 2000; Escobedo, et al., 1990; Pampel, 2005b).

The *theory of cigarette diffusion* is capable of explaining both, the closing of the gap between males and females, as well as long-term differences in smoking patterns between the various socioeconomic groups (Cavelaars, et al., 2000; Huisman, et al., 2005; Pampel, 2005a; Pampel, 2001; Pampel, 2005b; Schaap, et al., 2009). The theory suggests that smoking spreads throughout society in four stages. During the first stage, smoking emerges mainly among men of higher social status, who are most open to innovations and advantaged in terms of upward social mobility. Thus, the sex gap as well as the gap between socioeconomic groups widens, favouring those with low SES. During the second stage, smoking spreads, or "diffuses," to lower socioeconomic groups in the population, and the rate of adoption increases rapidly, resulting in a narrowing of the SES gap. At the same time, cigarette consumption among women starts to increase first among those with high SES—as it did among men one or two decades previously—and the sex gap starts to

narrow. During the third stage, smoking rates decline, first among males with high status, as they become concerned about the negative consequences of smoking and separate themselves from other groups by rejecting smoking and adopting healthy life styles; while smoking rates peak among females. This results in a further narrowing of the sex gap. During the fourth stage, smoking rates continue to decline for both sexes, but socio-economic differences in smoking increase, and smoking becomes a problem among lower socioeconomic groups. Hence, the more advanced the diffusion process, the smaller the sex differences, but the wider the socioeconomic differences, to the disadvantage of low SES groups.

The stages of the smoking diffusion process differ across countries: there is generally a North-South gradient, with Northern European countries being at a more advanced stage of the diffusion process than Southern European countries (Cavelaars, et al., 2000; Giskes, et al., 2005; Graham, 1996; Huisman, et al., 2005; Pampel, 2001; Schaap, et al., 2009). The trends for Germany identified through representative National Health Surveys suggest that smoking in Germany has been spreading in line with this diffusion pattern (Helmert, et al., 2001; Helmert and Buitkamp, 2004; Lampert and Burger, 2004; Lampert and Burger, 2005; Robert-Koch-Institut, 2009; Robert-Koch-Institut, 2011) In 1990, 40 percent of males and 27 percent females aged 25-69 smoked regularly or occasionally. Whereas prevalences increased gradually for females, they remained constant for males, resulting in a narrowing of the sex gap. Between 2003 and 2009, prevalences decreased for both sexes (to 30 percent for females and to 38 percent for males), mostly due to reductions in smoking among younger age groups. There is also a pronounced social gradient that has increased among younger ages (Robert-Koch-Institut, 2011). However, studies presenting empirical evidence on the theory of cigarette diffusion for Germany are scarce, and generally focus on West Germany only (Brenner, 1993; Graham, 1996) or ignore the role played by socioeconomic factors in the diffusion process (Schulze and Mons, 2005).

This study seeks to analyze differences in smoking between socioeconomic groups and between males and females in Germany, focusing on the socioeconomic components of diffusion theory. We use level of education as a proxy for socioeconomic status. The advantage of using education, rather than income or occupation, is that education is easy

to measure, and is generally fixed early in life. Furthermore, the attained educational level anticipates future occupational opportunity and income, and thus affects access to material resources. To capture how the level of education influences smoking initiation and cessation, we look at two independent variables: *ever smoking* and *former smoking*. According to the smoking diffusion theory, we would expect to see higher rates of smoking initiation among older cohorts with higher levels of education. Among younger cohorts, initiation rates should be higher for the less educated. Smoking cessation rates should be higher among the highly educated, particularly those in the older cohorts. We would expect to find the same smoking patterns for males and females, but with time delays, with men being ahead by 10 to 20 years.

Since Germany is a country that is characterized by the "natural experiment" of reunification, and is therefore predestined to be explored with regard to the long-term effects of different socioeconomic and political environments on health, we will also analyze whether there are variations in the smoking diffusion patterns between East and West Germany. In the 1980s, smoking prevalences for males were almost identical in the two parts of the country (Heinemann, et al., 1996)). Since 1990, prevalences have decreased equally in both East and West, from 40 percent to 35 percent in 2009 (Robert-Koch-Institut, 2009). Hence, we would expect to find no difference in the diffusion process for males in East and West Germany. For women, smoking was the only cardiovascular risk factor that was more favourable in the East before reunification (Müller-Nordhorn, et al., 2004); i.e. smoking prevalences were higher among West German females. After reunification, between 1990 and 2009, prevalences remained relatively constant, at about 30 percent for females in the West. For women in the East, prevalences increased between 1990 and 1998, from 22 to 29 percent, and remained at 26 percent over the successive years. Hence, smoking rates among women are still lower in the East than in the West. We expect that smoking will spread at similar rates in the two parts of the country; however, peak prevalences should be lower for females in the East.

For Germany, information on smoking behaviour is typically collected through single or repeated cross-sectional surveys. However, the status-related process of cigarette diffusion translates into different smoking patterns across generations, depending on the respective smoking context (Pampel, 2005b). Since an examination of age-specific dif-

ferences in smoking between cross-sectional samples would not adequately reflect lifetime smoking histories (Deutsches Krebsforschungszentrum, 2009; Schulze and Mons, 2005), we use a birth cohort perspective to depict the historical development of smoking behaviour.

2. Data and Methods

Our analysis is based on the Scientific Use File of the German Microcensus, which is a 70 percent subsample of the original sample, provided for scientific usage without restrictions. The German Microcensus is a one percent cross-sectional household sample conducted once a year since 1957 in the former BRD, and, since 1991, also in East Germany. Participation in the survey is obligatory by law.[1] Registered residents living in private households or public institutions, including foreign households, are eligible to participate. Family members of foreign armed forces and diplomatic missions are not included in the sample. The participating households are randomly selected by cluster sampling. Information on smoking is included for the years 1995, 1999, 2003 and 2005. The overall sample size of each wave is about 500,000 individuals. All four waves were pooled into one dataset; thus, the dataset on smoking contains 1,809,796 individuals.

The two dependent variables "ever smoking" and "former smoking" were generated by the following two questions that were asked in the same wording for all four waves: "Are you a current smoker?" and "Have you ever smoked in the past?" The possible answer categories for both questions were "regularly," "occasionally," "no" and "no answer." Respondents who reported smoking on a regular or occasional basis, or having smoked in the past, are classified as "ever smokers." The number of former smokers who eventually quit smoking results from the difference between ever and current smokers. Hence, those who reported that they have smoked in the past, but are not smoking currently, are classified as "former smokers." Educational status is based on self-reported information on the level of education attained. Individuals with no or only basic education (elementary school), as well as those with a secondary degree—in Germany, individuals who attended school for 10 years—are classified as less educated. Those with

[1] For more information see www.destatis.de

more than secondary education are classified as highly educated. East and West Germany are generated by combining information on federal states. Berlin is divided into East and West according to the code key provided by the Statistical Office.

For two reasons, we have chosen to include only individuals who were born in 1970 or in earlier years. First, this article was written in the context of the EU-funded project MAGGIE (Major Ageing and Gender Issues in Europe). The aim of MAGGIE is to identify and analyze indicators of quality of life among the population aged 65+, with a focus on cohorts who are currently old, and on those who will be aged 65+ in 2030. For this article, we extended our analyses to cohorts who are aged 60+ today, and who will be aged 60+ in 2030. Second, we observed people at a minimum age of 27. At this age, individuals have mostly completed their education. Moreover, we captured the majority of people with a smoking history, since most people have their first smoking experiences at young ages, often prior to age 18. We generated 11 synthetic birth cohorts, each encompassing five cohorts of successive birth years. We excluded individuals who provided incomplete or ambiguous information on the variables of interest. Thus, the final sample size for our analysis is 659,212.

In a first step, we presented age-specific ever and former smoking rates by education for males and females in East and West Germany. We grouped 5 cohorts in successive years and assessed the mean age of each group and followed them over the four waves. For example, the individuals observed in 1995, who were born between 1966 and 1970, were between 25 and 29 years old; hence, the synthetic age of people born between 1966 and 1970 is 27. In 1999, this cohort was 31 years old; in 2003, 35 years old; and in 2005, 37 years old. The oldest age in our analysis is 85. For the sake of brevity, we named these cohorts birth cohorts, being fully aware that our data do not cover full birth cohorts, but only a snapshot of individuals born in a specific year at a specific age.

In a second step, we used logistic regression models to explore whether the differences in smoking rates between educational groups are significant and whether they differ between East and West Germany according to formula (I). We therefore included a threefold interaction term between region (East or West Germany), educational status and cohort. When presenting the he interaction term and the corresponding confidence intervals we standardized for the main effects of region and cohort. This means that our results

show the difference between low and high education in smoking by birth year for East and West Germany, with low education as the reference group after taking out the effect of region and cohort. We controlled for age, marital status, nationality, income type and community size.

(I)

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 * age + \beta_2 * maritalstatus + \beta_3 * nationality + \beta_4 * incometype + \beta_5 * communitysize + \beta_6 * region * education * cohort$$

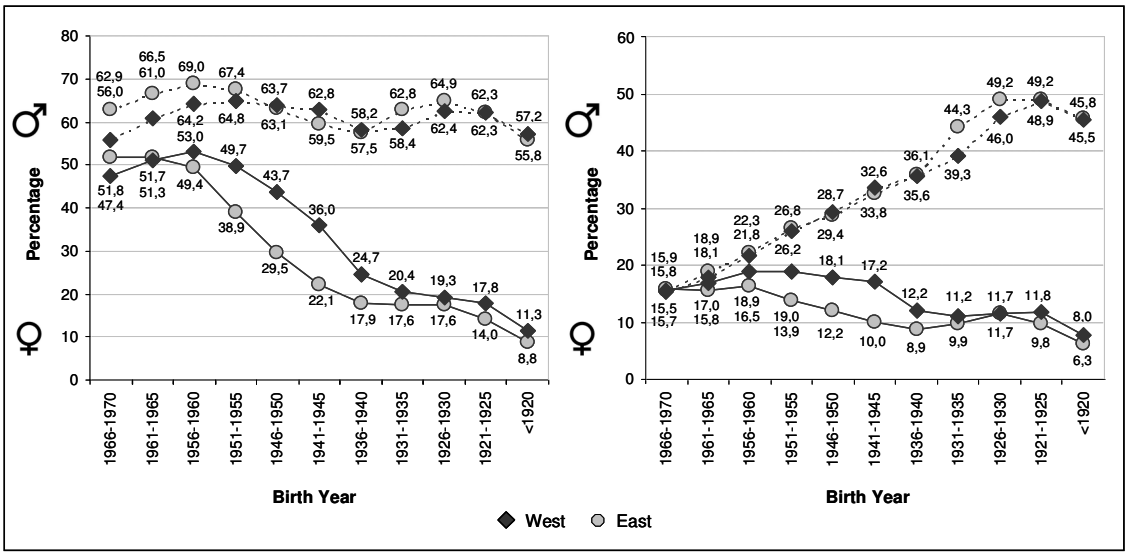
Using the confidence intervals we test whether educational differences exist in smoking behaviour in the particular region and cohort. If the confidence interval of the odds ratio overlaps the value one then no educational difference exists, if the value one is excluded then a significant difference exists. When comparing the stages of smoking transition between East and West Germany, we evaluate whether the differences in the educational smoking pattern differ between the two regions. In other words we explore e.g. whether significant differences exist in one region, but not in the other.

We considered four marital states: single, married, divorced and widowed. Single persons serve as the reference category in all models. The variable "nationality" distinguishes between Germans and non-Germans. The non-German group includes all individuals whose first nationality is not German. In all of the models, Germans serve as the reference group. The variable "income type" distinguishes between gainful employment, state subsidies, retirement pension, support other than public and personal assets. Gainful employment serves as the reference group for all models. The variable "community size" is divided into communities with fewer than 20,000, 20,000 to 500,000 and more than 500,000 inhabitants.

3. Results

Figure 1: Proportion of ever (A) and former smokers (B) in East and West Germany by birth year and sex

A B



The process of cigarette diffusion is characterized by the spread of smoking in four stages, which males and females enter with time delays. Our results confirm the existence of these stages, as well as a lag between the points in time when males and females enter these stages. Figure 1a shows that the gap between males and females in ever smoking has decreased over succeeding birth years, with females now almost having the same smoking levels as males. The prevalence of ever smokers among males is relatively stable over all of the birth years, but is declining slightly among the most recently born. Prevalences among females increase continuously over succeeding birth years. Prevalences differ between females in East and West Germany, with higher prevalences found among females in the West. This regional gap closes among the most recent born.

The stages of smoking diffusion in Germany

The first stage of the smoking diffusion process is characterized by the taking up of smoking by high status males, which results in a widening of the gap between males and females, and between SES groups. The second stage is characterized by similar smoking prevalences among less and highly educated males, and by increases in smoking among

females. Our results suggest that the oldest males in our study, who were born between 1920 and 1921-1925, and whom we observe between the ages of 72 and 85+, are already in the second stage of the diffusion process. For them, ever smoking prevalences are similar among high and less educated men in both parts of Germany (Figure 2). The results from the logistic regressions confirm that the difference in ever smoking between educational groups is not significant for these male cohorts, and that there is no difference between East and West German men (Figure 4a). The third stage of the diffusion process is characterized by declining smoking rates among highly educated males, resulting in a widening of the educational gap favoring the highly educated. At the same time, smoking rates increase further for females in both educational groups, and eventually peak. This is confirmed by our findings for males. For male cohorts born from 1926-1930 (age 67-77) onwards, the educational gap starts to widen significantly in the two parts of the country due to decreasing ever smoking prevalences among highly educated males, whereas prevalences remain relatively constant among the less educated (Figure 2 and Figure 4a). However, generally, there exist no significant differences in former smoking prevalences between educational groups in both parts of the country (Figure 3 and Figure 4b). Hence the educational gap in smoking for these cohorts stems rather from lower uptakes of smoking than from increased smoking cessation among high educated men. The fourth stage of the diffusion process is characterized by continuously declining smoking rates for both sexes, but a widening of the SES gap. Our results confirm this for males. Ever smoking rates decrease significantly in both educational groups from the cohort 1956-60 (age 37-47) onwards, but the reductions are greater among the highly educated, resulting in a widening of the educational gap disadvantaging the less educated Figure 2 and Figure 4a). There is no significant difference in this development between East and West Germany.

Our results for females suggest that we start to observe them in the first stage of the diffusion process. Figure 5 shows that ever smoking prevalences are highest for highly educated females born between 1921-1925 and 1926-1930, whom we observe between the ages of 67 and 82. These educational differences are significant and do not differ between East and West Germany (Figure 7a). An examination of former smoking patterns (Figure

6 and Figure 7b) reveals that smoking cessation is also significantly more common among highly educated females in these cohorts in both parts of the country. Hence, high educated females in these cohorts were the first to adopt smoking, but also to quit. For the female cohorts born from 1931-1935 (aged 62-72) onwards, ever smoking prevalences increase, however, different patterns existed in East and West Germany (Figure 5 and Figure 7a). In the East, ever smoking prevalences between less educated and highly educated females are quite similar, and the difference between educational groups is not significant for the cohorts born between 1941 and 1950. This finding indicates that these females are in the second stage of the diffusion process, in which the less educated catch up with the high educated. In the West, prevalences are generally higher than in the East, but peak later (Figure 1a). Moreover, ever smoking prevalences among highly educated females are significantly higher than in the less educated group until the birth cohort 1941-1945 (ages 52-62). This finding suggests that West German females lag behind East German females in entering the second stage of the diffusion process, since the gap between educational groups closes later in the West. Former smoking patterns differ as well between East and West. For the cohorts born between 1946 and 1950 there is no significant difference in former smoking between educational groups for females in the East, but in the West, with higher former smoking rates among the high educated. Thus, compared to the East, high educated females in the West have a higher propensity to start smoking but also to quit smoking. Women born 1951 and thereafter are in the third stage of the diffusion process. For them, the gap between educational groups widens significantly, with higher ever-smoking prevalences found among the less educated. There is no difference in this development between East and West Germany (Figure 5 and Figure 7a). The differences between educational groups in former smoking, by contrast, becomes insignificant in both parts of the country (Figure 6 and Figure 7b) Hence, educational differences in smoking for these cohorts are the results of an increased uptake of smoking among the less educated, but not of a difference in the propensity to quit smoking.

Figure 2: Male ever smoker in East and West Germany by education and birth cohort

East **West**

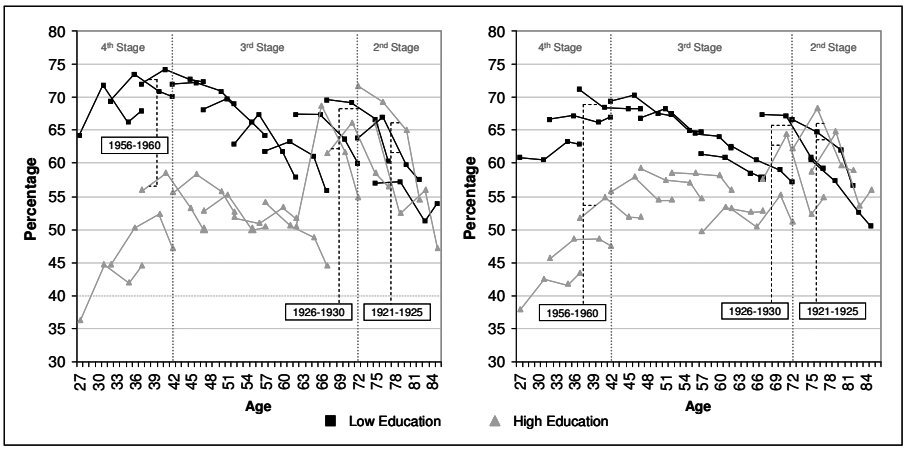


Figure 3: Male former smoker in East and West Germany by education and birth cohort

East **West**

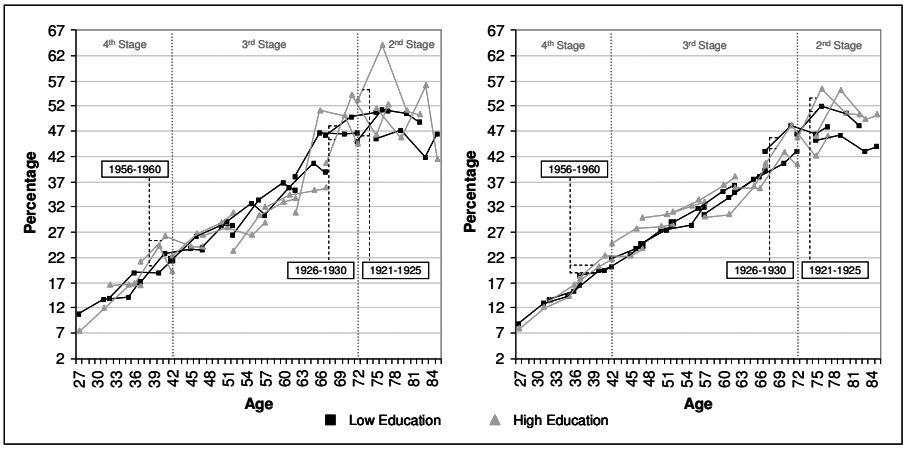


Figure 4: Standardized odds ratios of the difference between low and high education in ever smoking (A) and former smoking (B) for males by birth cohort (RG=Low Education)

A **B**

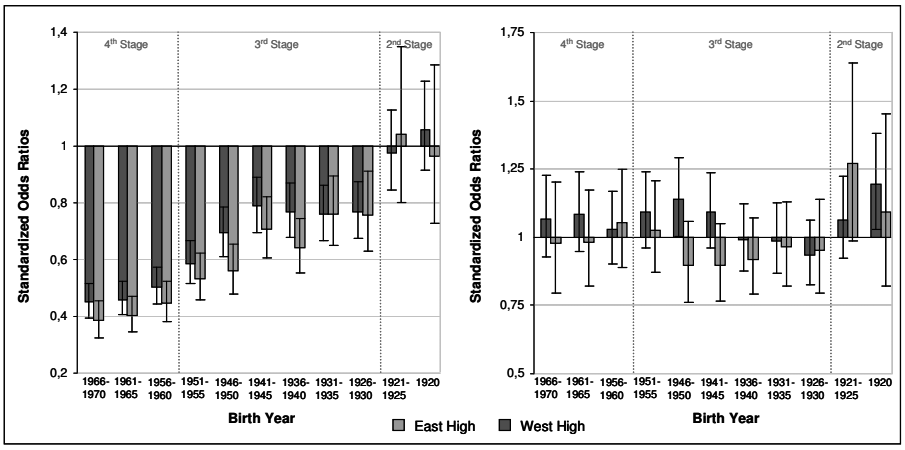


Figure 5: Female ever smoker in East and West Germany by education and birth cohort

East **West**

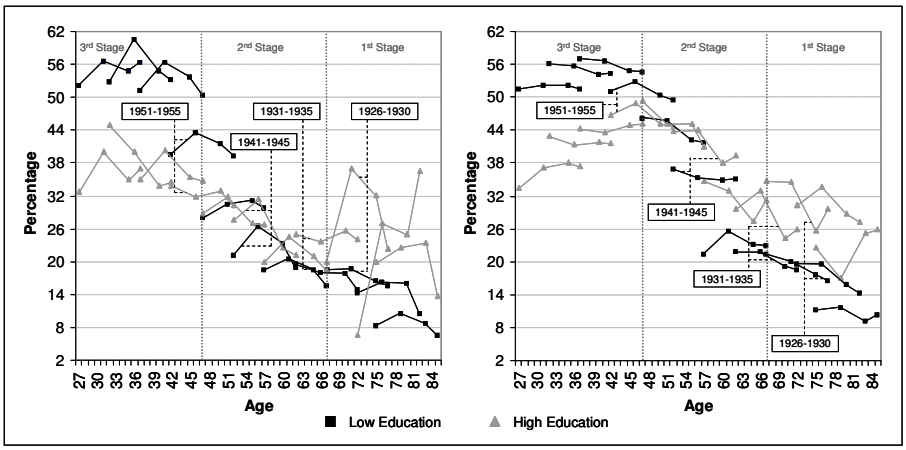


Figure 6: Female former smokers in East and West Germany by education and birth cohort

East **West**

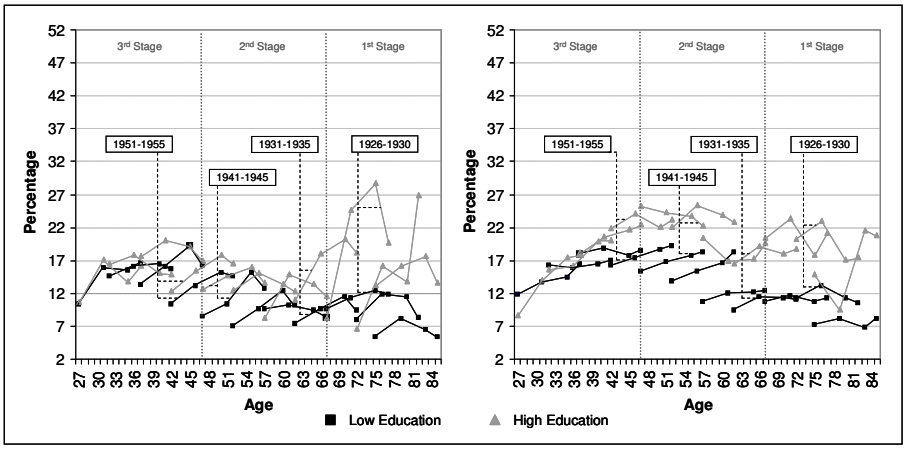
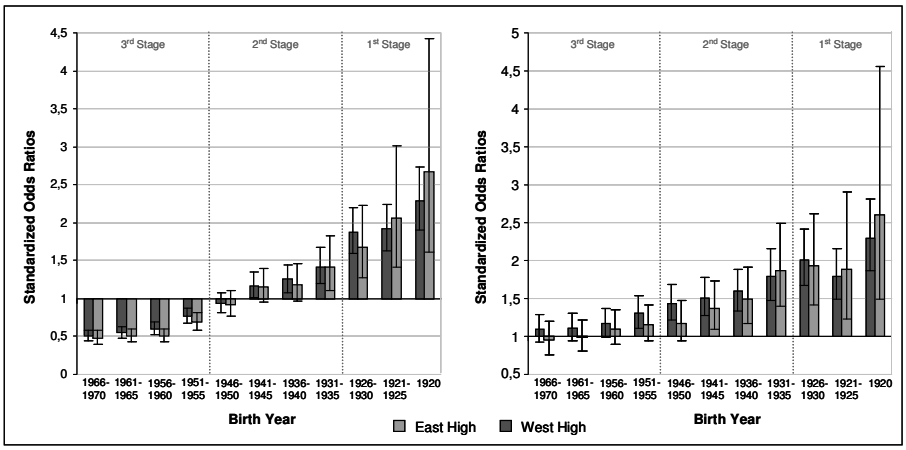


Figure 7: Standardized odds ratios of the difference between low and high education in ever smoking (A) and former smoking (B) for females by birth cohort (RG=Low Education)

A **B**



4. Discussion

This is the first study that provides empirical evidence for the diffusion theory of smoking for Germany using representative data for the whole German population. We focus not only on sex and educational differences in the propensity to take up and, eventually, to quit smoking, but we extend previous studies by investigating whether the process of cigarette diffusion differed between East and West Germany. Our results are in line with the assumptions of diffusion theory, in that males are ahead of females in the process of diffusion, and smoking patterns differ between educational groups. Our findings suggest that males enter our observation at the second stage of the diffusion process. These are the cohorts born through 1925. Males born in 1926 and thereafter have entered the third stage of the diffusion process. The transition into stage four is seen among males born after 1956. Among females, the cohorts born between 1920 and 1930 are the first to have consumed cigarettes in the two parts of Germany. These females are observed at the first stage of the diffusion process. We have also observed females born between 1931 and 1950 in the second stage, and the subsequent born cohorts in the third stage of the diffusion process. These findings support the notion that females lag behind males in the diffusion process. In a separate analysis (not depicted), we found a significant sex gap over all of the cohorts, which is quite large for the oldest cohorts, but which decreases over successive younger cohorts.

Tobacco consumption among men dates back to the 16th century, and has long been established as a male habit. Cigarette smoking among men became fashionable with the introduction of the manufactured cigarette in Germany in the middle of the 19th century. It first started among high status males, and then spread to males of all classes, while it was proscribed for females. Among women, cigarette consumption did not become common until the 1920s and 1930s, when the suffrage movement was struggling to achieve female equality. Smoking emerged first among highly educated females, who adopted it as a distinguishing feature (Hess, 1987). It served as a catalyst for the female emancipation process. One the one hand, smoking was viewed as an expression of female liberation, as taking up smoking meant adopting a habit that had previously been almost exclusively reserved for males (Hess, 1987). On the other hand, this perception of smok-

ing was used by the advertising industry, which discovered women as a new target group, thus enabling companies to expand the market for cigarettes. Advertisers linked female smoking to images of beauty, autonomy, equality and slimness; thereby increasing the diffusion and acceptance of smoking among women. (Gilman and Xun, 2004). After World War II, smoking became widespread among women of all social classes, and peaked in the 1970s (Hess, 1987), which is reflected in our results by a peak for the cohort 1956-1960. Our analyses are restricted to cohorts born through 1970. However, according to diffusion theory, it is reasonable to assume that today's women are also in the fourth stage of the diffusion process. Recent trends indicate that there is little difference in tobacco consumption between males and females, but that smoking rates are declining for both sexes (Robert-Koch-Institut, 2011). However, smoking rates continue to be higher among people with lower SES (Lampert and Burger, 2004; 2005).

Concerning smoking cessation, our results show that there is no difference in the pattern of smoking cessation between educational groups among males. For females we find, in line with diffusion theory, that cessation rates are higher among highly educated females in the oldest cohorts. For the younger females, however, cessation patterns are not shown to differ between educational groups in both parts of the country. Hence, declining smoking prevalences among younger age groups stem from refraining from starting to smoke, rather than from increased smoking cessation. These findings suggest that smoking prevention measures aiming at reducing the onset of smoking are more likely to be successful than those aiming at smoking cessation.

Striking East-West differences in smoking are found among women born between 1935 and 1960. When these females reached the ages at which smoking initiation is likely, Germany was already divided into two states. Smoking advertising was strictly prohibited in the former GDR (Heinemann, et al., 1995). Although the effect of advertising on smoking behavior is a matter of controversy, Capella et al (2011) showed in their latest review that cigarette advertising is a significant predictor of smoking initiation, and also of the consumer's decision to continue smoking. Hence, the different levels of exposure to cigarette advertising in the two parts of Germany might explain the differences in the rates of smoking among women in the two parts of the country during that time. Since smoking among males had been established long before the division of Germany, men

would have been less influenced by tobacco advertisements.

Our results for the oldest cohorts might be distorted by differential mortality of smokers due to selection. We might have underestimated the number of smokers at the oldest ages, since some potential smokers could have already died due to smoking-related conditions. Additionally, we might have overestimated the number of smokers in the highly educated group, since they may have a better overall health profile, and may thus be less likely to die from smoking-related illnesses then less educated people. On the other hand, we may have also underestimated the number of smokers in the highly educated group. Educational levels are generally lower among older cohorts than among younger age groups. Hence, we may have categorized somebody as having a low level of education who might have been rather well educated under past conditions. Moreover, our sample might be distorted by immigrants, who may have started to smoke before they migrated to Germany under different conditions. But since we controlled for nationality in the regression analysis, the degree of distortion of our results due to migration should be low.

Smoking in Germany has already peaked among both males and females. According to diffusion theory, we should expect a further convergence of mortality attributable to smoking between males and females in the future. However, our findings also suggest that smoking disperses differently among educational groups. Since future smoking-related diseases are a result of past smoking behaviour (Pampel, 2005a), the negative consequences of smoking should emerge as a problem of the less educated in the near future. Higher smoking rates among the less educated are often explained by the lower levels of health awareness and the reduced financial means for supporting a healthy life style often found among these groups. Moreover, socially disadvantaged individuals are more likely to have a physically and mentally demanding work environment, and to face problems and conflicts within the family (Lampert and Burger, 2005; Pampel, 2005b). Hence, less advantaged people might, however mistakenly, see smoking as a compensation for these stressors. Thus, in order to reduce smoking in the future, policy measures should target individuals in the lower educational groups, and seek to alleviate stressors and settings that promote smoking. A special emphasis should be put on younger people, since social inequalities in smoking were found to be more pronounced among those who were born more recently.

Literature

Brenner H., 1993, "A birth cohort analysis of the smoking epidemic in West Germany." Journal of Epidemiology and Community Health, 47, pp. 54-58

Capella M. L., Webster C. and Kinard B. R., 2011, "A review of the effect of cigarette advertising", International Journal of Research in Marketing, 28, pp. 269-279

Cavelaars A. E. J. M., Kunst A. E., Geurts J. J. M., Crialesi R., Grötvedt L., Helmert U., et al., 2000, "Educational differences in smoking: international comparison." British Medical Journal, 320, pp. 1102-1107

Christensen K., Doblhammer G., Rau R. and Vaupel J. W., 2009, "Ageing populations: the challenges ahead." The Lancet, 374, pp. 1196-1208

Deutsches Krebsforschungszentrum, 2009, Tabakatlas Deutschland 2009. Heidelberg, Steinkopff Verlag.

Doblhammer G., Hoffmann R., Muth E., Westphal C. and Kruse A., 2009, "A systematic literature review of studies analyzing the effects of sex, age, education, marital status, obesity, and smoking on health transitions." Demographic Research, 20, pp. 37-64

Escobedo L. G., Anda R. F., Smith P. F., Remington P. L. and Mast E. E., 1990, "Sociodemographic characteristics of cigarette smoking initiation in the United States. Implications for smoking prevention policy." JAMA, 264(12), pp. 1550-1555

Gilman S. L. and Xun Z., 2004, Smoke: a global history of smoking. Hong Kong, Reaktion Books.

Giskes K., Kunst A. E., Benach J., Borrell C., Costa G., Dahl E., et al., 2005, "Trends in smoking behaviour between 1985 and 2000 in nine european countries by education." Journal of Epidemiology and Community Health, 59, pp. 395-401

Graham H., 1996, "Smoking prevalence among women in the European Community 1950-1990." Social Science and Medicine, 43(2), pp. 243-254

Heinemann L., Barth W. and Hoffmeister H., 1995, "Trends of cardiovascular risk factors in East German population." Journal of Clinical Epidemiology, 48(6), pp. 787 - 796

Heinemann L., Helmert U., Classen E. and Greiser E., 1996, "Social gradient of CVD risk in Germany before/after Reunification." Reviews on environmental health, 11(1-2), pp. 7 - 14

Helmert U., Borgers D. and Bammann K., 2001, "Soziale Determinanten des Rauchverhaltens in Deutschland: Ergebnisse des Mikrozensus 1995." Sozial- und Präventivmedizin/Social and Preventive Medicine, 46(3), pp. 172 - 181

Helmert U. and Buitkamp M., 2004, "Die Veränderung des Rauchverhaltens in Deutschland von 1985-2002." Gesundheitswesen, 66, pp. 102-104

Hess H., 1987, Rauchen. Geschichte, Geschäfte Gefahren. Frankfurt, New York, Campus Verlag.

Huisman M., Kunst A. E. and Mackenbach J. P., 2005, "Educational inequalities in smoking among men and women aged 16 years and older in 11 European countries." Tobacco Control, 14, pp. 106-113

Hurrelmann K., 2006, Gesundheitssoziologie. Eine Einführung in Sozialwissenschaftliche Theorien von Krankheitsprävention und Gesundheitsförderung. Weinheim und München, Juventa Verlag.

Kuntsche S. and Gmel G., 2005, "The smoking epidemic in Switzerland - an empirical examination of the theory of diffusion of innovations." Social and Preventive Medicine, 50, pp. 344-354

Lampert T. and Burger M., 2004, "Rauchgewohnheiten in Deutschland - Ergebnisse des telefonischen Bundes-Gesundheitssurveys 2003." Gesundheitswesen, 66, pp. 511-517
Lampert T. and Burger M., 2005, "Verbreitung und Strukturen des Tabakkonsums in Deutschland." Bundesgesundheitsblatt. Gesundheitsforschung. Gesundheitsschutz, 48, pp. 1231-1241
Müller-Nordhorn J., Rossnagel K., Mey W. and Willich S. N., 2004, "Regional variatons and time trends in mortality from ischaemic heart disease: East and West Germany ten years after reunification." Journal of Epidemiology & Community Health, 58(6), pp. 481 - 485
Oeppen J. and Vaupel J. W., 2002, "Broken limits to life expectancy." Science, 296, pp. 1029-1031
Pampel F., 2005a, "Forecasting sex differences in mortality in high income nations: the contribution of smoking." Demographic Research, 13, pp. 455-484
Pampel F. C., 2001, "Cigarette diffusion and sex differences in smoking." Journal of Health and Social Behaviour, 42(4), pp. 388-404
Pampel F. C., 2005b, "Diffusion, cohort change, and social patterns of smoking." Social Science Research, 34, pp. 117-139
Preston S. H., Glei D. A. and Wilmoth J. R., 2010, "A new method for estimating smoking-attributable mortality in high income countries." International Journal of Epidemiology, 39, pp. 430-438
Preston S. H. and Wang H., 2006, "Sex mortality differences in the United States: the role of cohort smoking patterns." Demography, 43(4), pp. 631-646
Robert-Koch-Institut, 2011, "Rauchen - Aktuelle Entwicklungen bei Erwachsenen." GBE kompakt, 4/2011, pp.
Schaap M. M., Kunst A. E., Leinsalu M., Regidor E., Espelt A., Ekholm O., et al., 2009, "Female ever-smoking, education, emancipation and economic development in 19 European countries." Social Science and Medicine, 68, pp. 1271-1278
Schulze U. and Mons U., 2005, "Trends in cigarette smoking initiation and cessation among birth cohorts of 1926-1970 in Germany." European Journal of Cancer Prevention, 14, pp. 477-483
Waldron I., 1991, "Patterns and causes of gender differences in smoking." Social Science and Medicine, 32(9), pp. 989-1005