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**Working Paper**

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# Religiosity, Smoking and Other Addictive Behaviours*

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**Abstract**

While under communism, identity-providing religion was suppressed; but today religiosity is strong even among the youth in post-communist countries. This provides an appropriate background to investigate how external and internal religiosity relates to addictive behaviours like smoking, drinking and drugs among the young. This study shows that not religion as such or internal religiosity, but largely observable (external) religiosity prevents them from wallowing in those vices.

**JEL Codes:** I12, N34, Z12

**Keywords:** addictive behaviour, Orthodox, external and internal religiosity, youth, smoking, drinking, drugs, Romania.

**Acknowledgments**

The Appendix contains a more detailed description and documentation of data, as well as a descriptive and robustness analysis supporting the major findings in this paper. Declarations of interest: none.

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## 1. Introduction

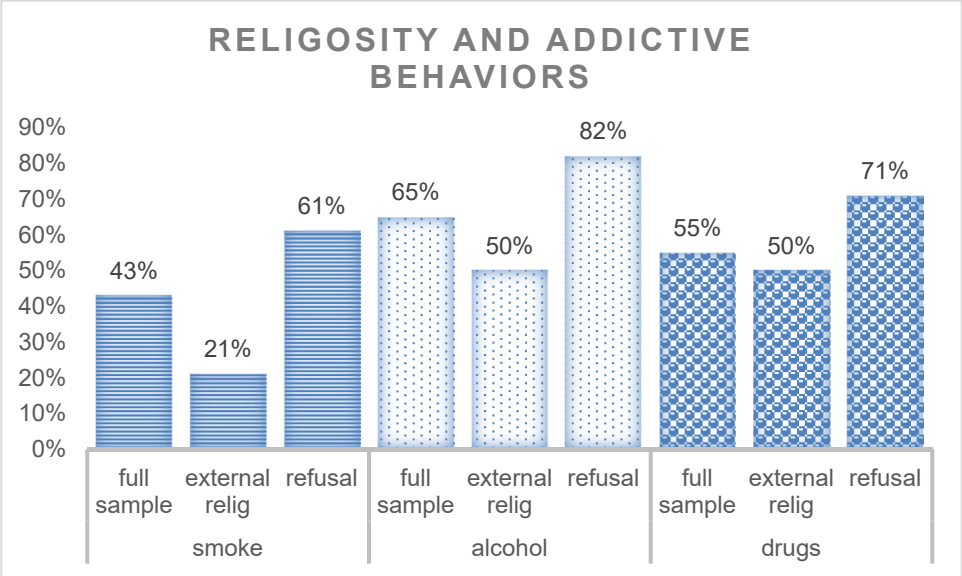
While it has been established that religion associates negatively with risky health behaviours such as smoking, drinking and drug use (Arani et al., 2019; Russell et al., 2020; Yonker et al., 2012; Brown et al., 2014), we study the role of religiosity, the intensive margin. We therefore focus on the two main facets of the multidimensional concept of religious behaviour: external and internal religiosity (Minton et al., 2016), separated by intrinsic beliefs and external practices or experiences. "Internal religiosity or faith is defined as belief in God and a trusting acceptance of God's will. External religiosity refers to all observable activities that are undertaken in a religious context, most conspicuously when going to church." Frey (2018, p. 60). Is it religious denominations, internal or external religiosity? With non-believers as reference group, we aim at decomposing the behavioural contributions of the diverse facets of religiosity.

Post-communist Orthodox Romania is a natural basis for such an analysis. After several decades of forced secularisation under an oppressive communist regime with a powerful persecution of external religiosity almost until its extinction (Stan and Turcescu, 2007), Romanians again freely expressed their religiosity. Romania reported the highest level of church construction in Europe (Andreescu, 2007), a sign of revival of visible religiosity, the strongest among all Orthodox countries in the region (Voicu, 2019). Young Romanians show a very high Orthodox affiliation and they are found to be highly spiritual (Vincett et al., 2014). Both types of religiosity play an important role in Orthodoxy, being the core of a rich, sincere, and active religious life (Fontaine, 2017).

Transition placed a high pressure on young people's lifestyle with a strong rise of risky health behaviours (Roberts et al., 2012; Appendix), and the paper studies how the facets of religiosity deal with it in Romania. A stronger participation in religious services or at least a regular church attendance was a protective factor against tobacco use among high school students or other young adults (Atkins et al., 2002; Albert-Lorincz et al., 2019). Complementary research among US adolescents by Longest and Vaisey (2008) found that external religiosity has a safety effect on previous bad habits only when internal religiosity is high enough or sufficiently internalised.

The Graphical Abstract exhibits the raw data concerning addictive behaviours (smoking, drinking and drug-openness) comparing the full sample with important subgroups. Individuals with external religiosity are substantially less affected than those refusing religion.

**Graphical Abstract: Religiosity and addictive behaviours**




## 2. Data and Methodology

The data set used ("FES Youth Studies in East Europe"; Umbreș et al., 2014) provides a representative sample of 1,302 respondents from the Romanian population of age 15-29. The *religious denomination* of young Romanians is similar to that of the general population: they are mainly Orthodox (85.3%), followed by Catholics (7.1%), Protestants and neo-Protestants (5.8%), and 0.3% other religions. Only a small share (1.5%) is atheist or without religion. Religiosity is measured by external and internal indicator variables: We use "frequency of going to church/mosque/synagogue to attend a religious service" with responses "regularly", "often", "sometimes" or "never" to measure *external religiosity*. *Internal religiosity* is captured by the belief of the respondents that "there is God" with alternatives "believe", "doubt" or "do not believe".

The external/internal cross-tabulation has entries $X_{ij}$ (see Appendix). Similar to Voicu and Constantin (2012), we find that Romanian youth is largely engaged in religion: the vast majority believes in God and Christian values and attend church services. Only 12.2% "doubt or do not believe" *and* "never go to church" ($X_{32}+X_{33}$), *the refusers*. About 79.7% "believe in god" ($X_{11}+X_{21}+X_{31}$), which we decompose in "never go to church *and* believe" as *internal* ($X_{31}$, 17.8%), "sometimes go to church *and* believe" as *reflecting* (weak internal, $X_{21}$, 37.7%) and "often or very often go to church *and* believe" as *external* ($X_{11}$, 24.2%). Those remaining ($X_{12}+X_{13}+X_{22}+X_{23}$, 8.0%) go to church, but are *doubting*. This classification enables us to

decompose the association of those variants with the risky behaviours under study, in particular the conjecture that mainly external religiosity drives the reduction.

Addictive behaviours: *Smoking* is measured with a dummy for regular or occasional smoking (with value 1) versus non-smoking (and value 0). 43.2 % of the respondents are smokers. Similarly we use *alcohol consumption* ("alcohol") with those reporting "no, almost never" = 0 and 1 "else" or yes (65.5%), and *drug openness* (agreement on "it is fashionable to use drugs"), with "disagree"=0 and "agree" or "partly agree" = 1 (55.8%). Control variables used are *gender* ("male"), *age*, *age squared*, *education* ("medium", "high", with reference "low"), *social class* ("working", "middle", "upper", with reference "low"), *family* (dummy variables for "married" and "child", if children), and *trust* (an index of the number of positive responses to respective questions).[1]

We analyse variables smoking, alcohol and drugs through:

$$y_i = \mu + \alpha R_i + \gamma X_i + \varepsilon_i \qquad (1)$$

$y_i$ covers risky behaviours, $R_i$ represents the religiosity variables, $X_i$ denotes the controls, and $\varepsilon_i$ is the error term. The estimation method is OLS with robust standard errors. We focus on smoking using the other addictive behaviours as robustness checks. We further include only those who are of age (18-29), employing the younger (15-17) as controls.

**3. Results**

The Table measures religiosity association effects referring to those who clearly refuse a religious affiliation. Column 1 for smoking including only those variables finds that the internal religiosity effect is negative, but not statistically different while external religiosity substantially is. Visibility together with true belief matters a lot in avoiding the vice. This is already the core observation the data reveal. Those reflecting have a marginally more negative association, also than those doubting (but attending church). All in all: External religiosity stands out negatively, while all other types of religiosity have a similar size and only small effect in comparison with the refusers.

These findings remain robust when including variables male, age, age-squared and education (column 2) and respondent's social class (column 3). Alcohol and drug openness are expected substitutes to smoking; hence the basic story prevails with those dependent variables in columns (4) and (5). However, the size of the coefficients are somewhat smaller for alcohol,

[1] The Online Appendix contains a descriptive data analysis.

and religiosity has a much stronger and more equal negative association for drug openness than for the refusers. The somewhat different results for drugs may have to do with the different respective survey question or with differences in the visibility of actual drug use.

While age does not play a role in any of the regressions for the studied risky behaviours in columns (1)-(5), it drives external religiosity (see column (6)) U-shaped together with gender (males are less religious) and education, whereas the educated youth exhibit it with higher probability. Social class has no role. A further robustness check adds to the smoking regression of column (3) as controls alcohol and drug openness, and extra variables married, child and trust. This (see column (7)) does not affect the basic story, although the religiosity coefficients are smaller in size. Alcohol and drug openness have positive and strongly significant associations, revealing that there are positive interactions between addictive risky behaviours. The other extra variables do not matter. We further examine the smoking regression of column (3) for the younger (15-17 years) cohort, confirming again the basic story: external religiosity reduces smoking, while all other religiosity variants are not different from the refusers. The Appendix replicates columns (3)-(5) robust with a broader set of religiosity variables.

## 4. Conclusion

Data for the deeply religious Orthodox country Romania reveals that in fact active and engaged (external) religiosity and not religion as such nor internal religiosity is what prevents Romanian youngsters from unhealthy, addictive risky behaviours.

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# Table.

| VARIABLES | (1)<br>Smoke1 | (2)<br>Smoke2 | (3)<br>Smoke3 | (4)<br>Alcohol | (5)<br>Drugs | (6)<br>Religiosity | (7)<br>Smoke 4 | (8)<br>Smoke<18 |
|---|---|---|---|---|---|---|---|---|
| External Religion | -0.406*** | -0.346*** | -0.355*** | -0.184*** | -0.252*** | | -0.262*** | -0.205** |
| | (0.0493) | (0.0514) | (0.0523) | (0.0456) | (0.0554) | | (0.0786) | (0.0920) |
| Internal Religion | -0.0668 | -0.0789 | -0.0891 | -0.0582 | -0.259*** | | -0.00217 | -0.154 |
| | (0.0539) | (0.0543) | (0.0547) | (0.0437) | (0.0582) | | (0.0746) | (0.104) |
| Weak Internal Religion/Reflect | -0.152*** | -0.129*** | -0.137*** | -0.109*** | -0.189*** | | -0.117* | -0.0624 |
| | (0.0479) | (0.0487) | (0.0496) | (0.0389) | (0.0504) | | (0.0705) | (0.0941) |
| Doubt | -0.129* | -0.101 | -0.142** | -0.0596 | -0.191*** | | -0.0240 | -0.0746 |
| | (0.0675) | (0.0668) | (0.0683) | (0.0551) | (0.0692) | | (0.0920) | (0.137) |
| Male | | 0.171*** | 0.174*** | 0.252*** | -0.0188 | -0.152*** | 0.122** | 0.169*** |
| | | (0.0320) | (0.0324) | (0.0289) | (0.0349) | (0.0268) | (0.0544) | (0.0461) |
| Age | | 0.0310 | 0.0237 | -0.0200 | 0.0445 | -0.142** | 0.0216 | -0.767 |
| | | (0.0709) | (0.0725) | (0.0662) | (0.0820) | (0.0626) | (0.123) | (1.616) |
| $Age^2$ | | -0.000309 | -0.000198 | 0.000414 | -0.000990 | 0.00293** | -7.27e-05 | 0.0284 |
| | | (0.00150) | (0.00153) | (0.00140) | (0.00173) | (0.00133) | (0.00255) | (0.0507) |
| Medium Education | | -0.0887** | -0.0585 | 0.103** | 0.0546 | 0.0988*** | -0.192*** | 0.0840 |
| | | (0.0450) | (0.0478) | (0.0463) | (0.0536) | (0.0378) | (0.0706) | (0.0856) |
| Higher Education | | -0.147*** | -0.0949 | 0.169*** | 0.0154 | 0.105** | -0.251*** | |
| | | (0.0549) | (0.0596) | (0.0547) | (0.0667) | (0.0486) | (0.0841) | |
| Working class | | | -0.112* | 0.0369 | -0.0193 | -0.00476 | -0.160* | 0.0195 |
| | | | (0.0631) | (0.0630) | (0.0658) | (0.0599) | (0.0868) | (0.0807) |
| Medium class | | | -0.0437 | 0.0584 | -0.0386 | -0.0481 | -0.119 | -0.0625 |
| | | | (0.0649) | (0.0642) | (0.0684) | (0.0609) | (0.0908) | (0.0829) |
| Upper class | | | 0.0345 | 0.00420 | 0.130 | 0.0390 | 0.0320 | 0.0568 |
| | | | (0.0796) | (0.0778) | (0.0828) | (0.0728) | (0.107) | (0.102) |
| Alcohol | | | | | | | 0.198*** | |
| | | | | | | | (0.0566) | |
| Drugs | | | | | | | 0.111** | |
| | | | | | | | (0.0465) | |
| Married | | | | | | | -0.0707 | |
| | | | | | | | (0.0530) | |
| Child | | | | | | | -0.0555 | |
| | | | | | | | (0.0631) | |
| Trust | | | | | | | 0.00175 | |
| | | | | | | | (0.00186) | |
| Constant | 0.671*** | 0.102 | 0.251 | 0.773 | 0.246 | 1.923*** | 0.179 | 5.238 |
| | (0.0394) | (0.814) | (0.828) | (0.760) | (0.936) | (0.717) | (1.455) | (12.84) |
| Observations | 964 | 963 | 935 | 948 | 850 | 953 | 425 | 304 |
| R-squared | 0.077 | 0.119 | 0.129 | 0.124 | 0.034 | 0.049 | 0.207 | 0.189 |

**Notes:** Column (1)-(6): 18-29 years old; (7):15-17 years old. Robust standard errors in parentheses. Statistical significance at level 10% (*), 5% (**), and 1% (***). Reference groups in parenthesis: Religiosity (those who never go to church and doubt or do not believe in god); education (low); parents social class (lower). Alcohol, drugs=drug openness, married, child are all 0,1 dummies. Trust is an index of the size of trust measured according to variables.

# Appendix

### Appendix A1. Smoking as Risky Health Behaviour and Religion

The transition to market economies in ex-communist countries was accompanied by a strong rise of risky health behaviours. For instance, smoking among Romanian youngsters reached alarming levels and raised concerns among public health authorities. Romanian authorities managed to contain the process through measures to reduce advertising and sponsorship of tobacco products (Law no. 457/2004), but youth smoking behaviour got out of control after 2014. This is indicated by the 2016 adoption of Law no. 15 by the Romanian Parliament which banned smoking in any enclosed public spaces.

The association of religion with smoking habits has been reflected in numerous studies (Karlsen and Nazroo 2010; Ford and Hill 2012; Garrusi and Nakhaee 2012; Anthony et al. 2013). Regardless of country of origin, culture or dominant religion, young people smoke less when religious (Alexander et al., 2016). Religious attitudes and activities prevent harmful behaviours to health, namely smoking, use of drugs and alcohol dependence, while improving the quality of life and self-esteem (Turiano et al., 2012)

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## Appendix A2. Internal and External Religiosity

Table A2 provides the external/internal cross-tabulation for 1,285 available observations with entries $X_{ij}$. Romanian youth is largely engaged in religion: the vast majority believes in God and Christian values and attend church services. Only 12.2% "doubt or do not believe" *and* "never go to church" ($X_{32}+X_{33}$), *the refusers.* About 79.7% "believe in god" (the first column $X_{11}+X_{21}+X_{31}$), which we decompose in "never go to church *and* believe" as *internal* ($X_{31}$, 17.8%), "sometimes go to church *and* believe" as *reflecting* (weak internal, $X_{21}$, 37.7%) and "often or very often go to church *and* believe" as *external* ($X_{11,}$ 24.2%). Those remaining ($X_{12}+X_{13}+X_{22}+X_{23}$, 8.0%) go to church, but are *doubting*.

**Table A1.** Cross-tabulation of internal and external religiosity

| Go to church/ Believe in God | I believe | I doubt | I do not believe | Total |
|---|---|---|---|---|
| Often or very often | 310 | 10 | 0 | 320 |
| Sometimes | 485 | 84 | 9 | 578 |
| Never | 229 | 101 | 57 | 387 |
| **Total** | **1,024** | **195** | **66** | **1,285** |

**Note: "believe in god" (internal); "go to church" (external)**

## Appendix A3. Data

Descriptive statistics for all used variables are provided in Table A2 for the two distinct age groups young adults (18-29, our main data set) and teenagers (15-17, comparison group). Trust is a variable that sums the values of the responses to the following questions: How much trust do you have in the following: Parliament, Political Parties, Government, Mayor, General attorney, Police, Judges, Media, Trade Unions, NGOs, Church. The answers were coded from 1 (very much) to 4 (not at all). Education counts for the highest education level by the respondent. Low education level corresponds to primary education, medium education covers lower and upper secondary education, as well as vocational studies, while higher education level includes graduate and post graduate studies. Social class refers to the self-assessed parent's social class on a scale ranging from 1 (lower class) to 4 (upper class).

The religiosity structure between both age groups is not very different, and the same holds for drug openness. Young adults smoke and drink more, while most of the other

differences result implicitly from age: they are better educated, more married, with kids, and have a somewhat lower level of trust.

**Table A2. Descriptive Statistics**

| | Young adults (18-29) | | | | | Teenagers (15-17) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Obs. | Mean | Std. Dev. | Min. | Max. | Obs. | Mean | Std. Dev. | Min. | Max. |
| Smoke | 964 | .501 | .5 | 0 | 1 | 318 | .223 | .417 | 0 | 1 |
| ALCO | 978 | .707 | .456 | 0 | 1 | 318 | .497 | .501 | 0 | 1 |
| DRUGS | 878 | .563 | .496 | 0 | 1 | 288 | .545 | .499 | 0 | 1 |
| RELIGIOSITY | | | | | | | | | | |
| External | 983 | .228 | .42 | 0 | 1 | 319 | .27 | .444 | 0 | 1 |
| Internal | 983 | .183 | .387 | 0 | 1 | 319 | .154 | .361 | 0 | 1 |
| Weak external | 983 | .354 | .478 | 0 | 1 | 319 | .429 | .496 | 0 | 1 |
| Doubts | 983 | .086 | .281 | 0 | 1 | 319 | .056 | .231 | 0 | 1 |
| Male | 983 | .505 | .5 | 0 | 1 | 319 | .476 | .5 | 0 | 1 |
| Age | 983 | 23.308 | 3.386 | 18 | 29 | 319 | 16.034 | .837 | 15 | 17 |
| EDUCATION | | | | | | | | | | |
| Low Education | 982 | .152 | .359 | 0 | 1 | 318 | .884 | .321 | 0 | 1 |
| Medium Education | 982 | .624 | .485 | 0 | 1 | 318 | .116 | .321 | 0 | 1 |
| Higher Education | 982 | .224 | .417 | 0 | 1 | 318 | 0 | 0 | 0 | 0 |
| SOCIAL CLASS | | | | | | | | | | |
| Low social class | 954 | .063 | .243 | 0 | 1 | 306 | .092 | .289 | 0 | 1 |
| Working class | 954 | .494 | .5 | 0 | 1 | 306 | .503 | .501 | 0 | 1 |
| Medium Social class | 954 | .345 | .476 | 0 | 1 | 306 | .301 | .459 | 0 | 1 |
| Upper social class | 954 | .099 | .298 | 0 | 1 | 306 | .105 | .307 | 0 | 1 |
| Married | 978 | .422 | .494 | 0 | 1 | 319 | .056 | .231 | 0 | 1 |
| Child | 981 | .173 | .379 | 0 | 1 | 319 | .003 | .056 | 0 | 1 |
| Trust | 983 | 48.141 | 13.90 | 23 | 135 | 319 | 51.9 | 23.841 | 24 | 135 |

**Appendix A4. Robustness Analysis**

The data set provides a broader set of variables to measure external and internal religiosity, namely

1. External religiosity is captured by the following ordinal variables: (i) "frequency of going to church/mosque/synagogue to attend a religious service", (ii) "frequency of praying", (iii) "frequency of celebrating religious holidays", and (iv) "frequency of fasting". All these variables have responses "regularly", "often", "sometimes", or "never", which were categorised (1) "regularly" or "often", (2) "sometimes" and (3) "never".

2. Internal religiosity is measured by the following ordinal set of beliefs of the respondents: (i) "there is God", (ii) "there is heaven and hell", (iii) "God created the world", and (iv) "God is the source of moral prescriptions and duties". These variables have the values (1) "true", (2) "doubt" or (3) "do not believe".

The paper uses 1. (i) to measure external religiosity and 2. (i) to cover internal religiosity on the judgment that those two variables proxy best the respective sentiments. To check the robustness of the analysis, we first calculate the sum of the four external and internal measures of religiosity, $E_s$ and $I_s$. Calculating the correlation coefficients between the variables used in the paper and those others available reveal: The correlation coefficient of the frequency of "going to religious service" is 0.600 for (1.ii) "praying", 0.486 for (1.iii) "religious holidays", 0.594 for (1.iv) "fasting", and 0.834 for $E_s$. The correlation coefficient of the "belief in God" is 0.752 for (2.ii) "there is heaven and hell", 0.816 for (2.iii) "God created the world", 0.559 for (2.iv) "God is the source of moral prescriptions and duties", and 0.882 for $I_s$.

All variables show a substantial degree of correlation. After classification of each individual into the two-way typology with respect to external or internal based on the maximum of answers given one obtains Table A3. Note that in cases of draws among the four observations for internal and external for each variable, the decision rule was: draw between "1" and "2": "1", "1" and "3": "2", and "2" and "3": "3". This makes the distribution a bit broader which likely reduces the observed association for external religiosity, which is an additional robustness check. The distribution in Table A3 is broadly similar to Table A1 with the major difference in $X_{21}$ as expected.

**Table A3. Tabulation of ERS x IRS**

| ERS | IRS | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | Total |
| 1 | 573 | 36 | 6 | 615 |
| 2 | 269 | 81 | 18 | 368 |
| 3 | 144 | 100 | 75 | 319 |
| Total | 986 | 217 | 99 | 1302 |

Note: ERS: External religiosity; IRS: Internal religiosity
both based the complete set of the 8 base variables.

A replication of the three core regressions in the paper table (see columns 3-5) have findings provided in Table A4. The results, in particular for the religiosity variables, are very similar. Only the (crucial) coefficient for the external religiosity group for smoking is less negative (-0.254 against -0.355), but still dominant and highly significant. We conclude that our findings are robust against other use of the available data.

**Table A4. Risky Health Behaviours with Extended Religiosity ERS x IRS**

| VARIABLES | (1)<br>Smoke3 | (2)<br>Alcohol | (3)<br>Drugs |
|---|---|---|---|
| External Religion New | -0.254*** | -0.165*** | -0.252*** |
| | (0.0482) | (0.0386) | (0.0479) |
| Internal Religion New | -0.0686 | -0.0413 | -0.294*** |
| | (0.0614) | (0.0503) | (0.0658) |
| Weak Internal Religion New | -0.114** | -0.0637 | -0.212*** |
| | (0.0534) | (0.0414) | (0.0543) |
| Doubt New | -0.155** | -0.101** | -0.240*** |
| | (0.0620) | (0.0506) | (0.0635) |
| Male | 0.185*** | 0.254*** | -0.0187 |
| | (0.0326) | (0.0288) | (0.0348) |
| Age | 0.0535 | -0.0106 | 0.0657 |
| | (0.0733) | (0.0653) | (0.0817) |
| Age2 | -0.000796 | 0.000228 | -0.00143 |
| | (0.00155) | (0.00138) | (0.00172) |
| Education (Low education as reference) | | | |
| Medium Education | -0.0663 | 0.106** | 0.0422 |
| | (0.0484) | (0.0460) | (0.0536) |
| Higher Education | -0.107* | 0.172*** | 0.00709 |
| | (0.0602) | (0.0544) | (0.0664) |
| Social Class (Low class as reference) | | | |
| Working class | -0.109 | 0.0329 | -0.0352 |
| | (0.0671) | (0.0645) | (0.0685) |
| Medium social class | -0.0429 | 0.0524 | -0.0529 |
| | (0.0687) | (0.0658) | (0.0708) |
| Upper social class | 0.0135 | -0.00924 | 0.106 |
| | (0.0820) | (0.0789) | (0.0852) |
| Constant | -0.111 | 0.659 | 0.0457 |
| | (0.838) | (0.749) | (0.934) |
| Observations | 935 | 948 | 850 |
| R-squared | 0.112 | 0.126 | 0.039 |

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