Family Smoking, Exposure to Secondhand Smoke at Home and Family Unhappiness in Children

Jian Jiu Chen 1, Sai Yin Ho 1,*, Wing Man Au 1, Man Ping Wang 2 and Tai Hing Lam 1

1 School of Public Health, University of Hong Kong, Hong Kong, China; E-Mails: chenjianjiu@gmail.com (J.J.C.); awm_anson1210@hotmail.com (W.M.A.); hrmrlth@hku.hk (T.H.L.)

2 School of Nursing, University of Hong Kong, Hong Kong, China; E-Mail: mpwang@hku.hk

* Author to whom correspondence should be addressed; E-Mail: syho@hku.hk;
Tel.: +852-3917-9883; Fax: +852-2855-9528.

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Abstract: Tobacco use adversely affects many aspects of well-being and is disliked by non-smokers. However, its association with family happiness is unknown. We investigated the associations of family unhappiness with smoking in family members and secondhand smoke (SHS) exposure at home in Hong Kong children. In a school-based survey in 2012–2013, 1238 primary school students (mean age 8.5 years, standard deviation 0.9; 42.6% boys) reported family smoking, SHS exposure at home and whether their families had any unpleasant experience caused by smoking or SHS in the past 30 days (tobacco-related unpleasant experience), and rated the overall level of happiness in their families (family unhappiness). Multivariable logistic regression was used to study the associations of tobacco-related unpleasant experience and family unhappiness with family smoking and SHS exposure at home. Tobacco-related unpleasant experience and family unhappiness were reported by 27.5% and 16.5% of students. Unpleasant experience was more strongly associated with family smoking than SHS exposure at home. Family unhappiness was associated with both family smoking (odds ratio 2.37; 95% confidence interval 1.51–3.71) and SHS exposure at home (1.82; 1.39–2.40). These results suggest a previously neglected possible impact of tobacco use on family happiness.
Keywords: happiness; secondhand smoke; family; children

1. Introduction

Smoking [1] and exposure to secondhand smoke (SHS) [2] are both major hazards to physical health. The prospective associations of smoking with depression [3–9] and anxiety [10–15] are well established, and a causal interpretation is underpinned by biological [16–20] and psychosocial mechanisms [3]. SHS has also recently been associated with mental disorders on cross-sectional [21–26] and longitudinal levels [26,27].

Recent research suggests an impact of smoking on happiness. In a cross-sectional survey of ex-smokers in the United Kingdom (UK), 69.3% reported feeling happier now than when they were smokers [28]. In two cross-sectional studies, one in England [29] and the other in nine former Soviet Union (fSU) countries [30], ex-smokers and those who had never smoked were both happier than current smokers. In a cross-sectional study in Hong Kong, ex-smokers were happier than those who had never smoked, yet those who had never smoked and current smokers were similar [31]. A study in the United States (US) recruited a sample of smoking parents and found 12 months after recruitment that the parents who quit smoking were happier than those who did not quit [32]. An opposite finding, i.e., smokers being happier than non-smokers, was reported in Chilean college students [33], and a null finding was reported in Japanese workers [34].

Research suggests that non-smokers’ perceptions of SHS and family members’ smoking are generally negative, although such research is surprisingly limited. In a survey in US preteens, when asked about the reactions towards SHS, 76.6%, 56.6%, 24.1% and 21.7% reported “unpleasant or gross”, “coughed or choked”, “dizzy” and “wanted to throw up”, respectively [35]. In a survey of adolescents in Scotland, 93.6% strongly disapproved of people smoking near them [36]. Other surveys suggest similar dislike of SHS [37,38]. Moreover, a cross-sectional study of Iranian adolescent girls found that SHS was associated with unhappiness [39]. Qualitative studies in children [40], adolescents [41] and adults [42] have consistently showed strong negative feelings towards family members’ smoking and SHS. While the negative feelings in children and adolescents were largely due to the health concerns for smoking family members and themselves as well as the physical discomforts induced by SHS, such as coughing and eye irritation [40,41], the negative feelings in adults were additionally due to the expenditure on buying cigarettes [42].

Given the various negative impacts of tobacco use and the dislike of tobacco use in non-smokers, it is possible for smoking and SHS to lead to unhappiness in a family. However, we found no such studies in the literature. Family happiness is highly valued in many cultures and may have important implications for children. Children from unhappy families tend to have poorer personal and social adjustment in later life [43]. Therefore, the present study aimed to investigate the associations of smoking in family members and SHS exposure at home with family unhappiness using cross-sectional data from primary school students in Hong Kong.
2. Methods

2.1. Sampling and Ethics Statement

Each year, all primary schools in Hong Kong (about 500) received invitation to enroll for an educational theatre stage performance organised by the Hong Kong Council on Smoking and Health, and the first 99 schools to respond were accepted. In 2012–2013, 10 schools were randomly selected from the 99 accepted schools to be invited to participate in a cross-sectional survey for students in Grade 2–4 (equivalent to Grades 2–4 in the US). Invitation letters were sent to parents via students. Declining parents were to ask their child to return a blank questionnaire after the survey. Student participation was voluntary even with parental permission. Ethical approval was obtained from the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

2.2. Measurement

An anonymous and self-administered questionnaire in simple Chinese was used. Two questions were related to family happiness: (1) “In the past 30 days, was there any unpleasant experience caused by smoking or secondhand smoke in your family?” (tobacco-related unpleasant experience) with response options of no, seldom, sometimes and often; (2) “In general, you think your family is:” (family unhappiness) with response options of very unhappy, unhappy, happy and very happy.

SHS exposure at home was measured by one question: “How many days in the past 7 days did someone smoke near you at home?” Response options of 0 to 7 days/week were grouped into 2 (none, any) and 3 (none, 1–3 days/week, 4–7 days/week) levels. The number of co-residing smokers (family smoking) was also grouped into 2 (none, any) and 3 (none, 1 smoker, 2 or more smokers) levels.

Students also reported their age (<7/7/8/9/10/11/≥12), sex (male/female), perceived family affluence (rather poor/medium low/medium high/rather wealthy), number of bedrooms at home (0/1/2/3/4/5), SHS exposure outside home (0/1/2/3/4/5/6/7 days/week) and biological parents’ marital status (married/divorced/father deceased/mother deceased/others). Marital status of biological parents’ was recoded as “married” and “others” because the proportion of students choosing items other than married was small. Number of bedrooms was used as a proxy indicator of socioeconomic status (SES) because living area is regarded as a good indicator of family SES in Hong Kong, where housing price is highest in the world [44].

2.3. Statistical Analysis

Ordinal logistic regression was considered for studying the associations between the study factors (family smoking and SHS at home) and the outcome variables (tobacco-related unpleasant experience and family unhappiness) but was not used because the proportional odds assumption was violated for both of the outcome variables ($p < 0.001$). Logistic regression was thus used with family unhappiness dichotomised as “happy” (very happy/happy) and “unhappy” (unhappy/ very unhappy) and tobacco-related unpleasant experience dichotomised as “no” and “any” (seldom/sometimes/often).

To study the associations of family smoking (study factor) with tobacco-related unpleasant experience and family unhappiness (outcome variables), multivariable logistic regression was used, adjusting for
age, sex, perceived family affluence and marital status of biological parents and school clustering effect (Model 1). To further study the above associations independent of SHS at home, the above analyses were conducted again after excluding students with SHS at home (Model 2). To study the associations of SHS at home (study factor) with the outcome variables independent of family smoking, the students without co-residing smokers were excluded and multivariable logistic regression was used, adjusting for the number of co-residing smokers at home (1/2/3/4/5 or more) in addition to the same set of covariates adjusted in the previous model and school clustering (Model 3). In the above analyses, the study factors (family smoking and SHS at home) were analysed as binary and 3-level variables, and the dose-response relationships were studied by treating the 3-level study factors as continuous variables. Exclusion was used in the above analyses for the following reasons. The associations of interest in the excluded and remained students might be theoretically different (e.g., the associations of SHS at home with the outcome variables in students with and without family smoking might be different). The potential interaction effect was thus tested using an interaction term of SHS at home * family smoking and significant p values were found for interaction between 5–7 days/week of SHS at home (vs. 0 days/week) and 2 or more co-residing smokers (vs. no co-residing smoker) for both outcome variables (p < 0.05). Such interaction effects suggested stratification of analyses. However, an exclusion was used because the situation in which students were exposed to SHS at home but with no family smoking was rare (n = 19, 1.5% of the sample), making the associations of interest in the excluded students (strata) less relevant to real life and their estimates susceptible to random variation.

It is worth noting that tobacco-related unpleasant experience is, by definition, caused by smoking or SHS. The purpose of studying its associations with family smoking and SHS was to compare the relative importance of these 2 study factors.

The reliability of the variables related to family happiness and SHS was assessed in a test-retest study with an interval of 8 days in 298 Grade 2–4 students in another primary school (boys 52.4%; mean age 8.9, standard deviation 1.1 years). The intra-class correlation coefficients were 0.82, 0.71 and 0.88 for tobacco-related unpleasant experience, family unhappiness and SHS exposure, respectively; the intra-class correlation coefficient was 0.86 for SHS exposure when 3-level responses were compared; and percentage agreement (comparing dichotomized responses) were 87.3%, 84.2% and 86.0%, respectively. These results indicated good test-retest reliability.

A series of sensitivity analyses were conducted. Firstly, to examine whether the results were robust when the outcomes were analysed as 4-level instead of binary variables, the main analysis was conducted again using multi-nominal logistic regression and setting “very happy” as the reference level for family unhappiness and “no” as the reference level for tobacco-related unpleasant experience.

Secondly, since complete case analysis was used, the Model 1 for tobacco-related unpleasant experience and family unhappiness used 1075 and 1091 cases, accounting for 86.8% and 88.1% of the cases remained for analysis (1238). Although such proportions of missingness were unlikely to induce severe bias, multiple imputation was conducted for the analysis for family unhappiness, which was the more important outcome variable. The imputation model incorporated both of the outcome variables, both of the study factors, the covariates in the main analysis and number of bedrooms at home.

Thirdly, we added a step of coarsened exact matching (CEM) before the multivariable regression and after the exclusion, if any, in the main analysis. This approach is considered to produce estimates that
are less model dependent, more accurate and have less potential for confounding bias [45,46]. A description of the sensitivity analyses is shown in the Supplementary Files.

All analyses were conducted in STATA 13.0.

3. Results

Of the 10 randomly selected schools, seven agreed to participate in the survey. The seven schools had 1367 students in Grade 2–4, and 1255 students (91.8%) returned a valid questionnaire. After excluding 17 (1%) questionnaires with inconsistent information, 1238 questionnaires remained for analysis.

Table 1 shows that 42.6% of subjects were boys and the mean age (standard deviation) was 8.5 (0.9) years. The proportions of students reporting tobacco-related unpleasant experience was 27.5% overall and 48% (shown in Table 2) in those with at least one co-residing smoker. Family unhappiness was reported by 16.5% of students. The prevalence of family smoking and SHS exposure at home was 41.0% and 24.0%, respectively.

| Characteristics                                           | N   | %    |
|-----------------------------------------------------------|-----|------|
| Sex                                                       |     |      |
| Boys                                                      | 507 | 42.6 |
| Girls                                                     | 682 | 57.4 |
| Age                                                       |     |      |
| ≤7 to 8                                                   | 667 | 54.3 |
| 9 to ≥12                                                  | 562 | 45.7 |
| Mean age (standard deviation) in years                    | 1229| 8.5 (0.9) |
| Number of bedrooms at home                               |     |      |
| 1 or no                                                   | 160 | 13.2 |
| 2                                                         | 597 | 49.3 |
| 3 or more                                                 | 453 | 37.4 |
| Perceived family affluence                               |     |      |
| Poor and poor to medium                                   | 150 | 12.4 |
| Medium                                                    | 657 | 54.2 |
| Medium to rich and rich                                   | 405 | 33.4 |
| Marital status of biological parents                      |     |      |
| Married                                                   | 1007| 84.3 |
| Others                                                    | 188 | 15.7 |
| Number of co-residing smokers                             |     |      |
| None                                                      | 724 | 59.1 |
| 1                                                         | 373 | 30.4 |
| 2 or more                                                 | 129 | 10.5 |
| Any                                                       | 502 | 41.0 |
Table 1. Cont.

| Characteristics          | N    | % a  |
|--------------------------|------|------|
| SHS at home              |      |      |
| None                     | 912  | 76.0 |
| 1–4 days/week            | 145  | 12.1 |
| 5–7 days/week            | 143  | 11.9 |
| Any                      | 288  | 24.0 |
| SHS outside home         |      |      |
| None                     | 672  | 55.5 |
| 1–4 days/week            | 352  | 29.0 |
| 5–7 days/week            | 188  | 15.5 |
| Any                      | 540  | 44.5 |
| Tobacco-related unpleasant experience in the past 30 | | |
| No                       | 853  | 72.5 |
| Yes                      | 323  | 27.5 |
| Family unhappiness       |      |      |
| No                       | 1000 | 83.5 |
| Yes                      | 197  | 16.5 |

Note: a Proportion of students unless otherwise stated.

Table 2 shows that among students without SHS at home, tobacco-related unpleasant experience was significantly and strongly associated with family smoking. In contrast, among students with co-residing smokers, the associations between tobacco-related unpleasant experience and SHS at home were apparently weaker and either marginally significant or non-significant.

Table 2. Adjusted odds ratio (AOR) of tobacco-related unpleasant experience by family smoking and secondhand smoke (SHS) exposure at home in primary students in Hong Kong.

| Study Factors | Model 1 | Model 2 |
|---------------|---------|---------|
|               | N = 1075 a | N = 836  c |
| Number of co-residing smokers at home | Unpleasant experience (%) | AOR (95% CI) b | Unpleasant experience (%) | AOR (95% CI) d |
| None          | 13.6     | 1       | 13.5     | 1       |
| 1             | 46.9     | 5.93 (4.36–8.06) *** | 41.6     | 4.64 (3.55–6.06) *** |
| 2 or more     | 51.2     | 6.74 (5.06–8.97) *** | 46.9     | 6.60 (3.53–12.33) *** |
| Any           | 48.0     | 6.11 (4.82–7.75) *** | 42.8     | 4.97 (4.19–5.89) *** |
| p for trend   | <0.001   | <0.001  |
Table 2. Cont.

| Study Factors | Model 3 |
|---------------|---------|
|               | N = 421 * |
| SHS exposure at home | Unpleasant experience (%) | AOR (95% CI) f |
| None          | 41.2    | 1 |
| 1–4 days/week | 46.3    | 1.15 (1.01–1.32) * |
| 5–7 days/week | 58.9    | 1.77 (0.82–3.83) |
| Any           | 52.8    | 1.43 (0.98–2.07) |
| p for trend   |         | 0.13 |

Note: * p < 0.05; ** p < 0.001; a Complete case analysis; b Adjusting for age, sex, perceived family affluence, marital status of biological parents and school clustering; c Complete case analysis and excluding students with SHS at home; d Adjusting for age, sex, perceived family affluence, marital status of biological parents and school clustering; e Complete case analysis and excluding students without family smoking; f Adjusting for the number of co-residing smokers at home, age, sex, perceived family affluence, marital status of biological parents and school clustering.

Table 3 shows that any co-residing smoker was associated with an adjusted odds ratio (AOR) (95% confidence interval (CI)) of 2.99 (1.96–4.54) for family unhappiness, compared with no co-residing smoker. The corresponding AORs for one and two or more co-residing smokers were 3.01 (2.10–4.32) and 2.90 (1.39–6.06), respectively (p for trend < 0.001). When restricting the analysis to students without SHS at home, such associations remained statistically significant. Among students with co-residing smokers, any SHS at home was associated with an AOR of 1.82 (1.39–2.40) for family unhappiness, compared with no SHS at home. The corresponding AORs for 1–4 and 5–7 days/week of SHS at home were 1.53 (1.12–2.09) and 2.17 (1.35–3.50), respectively (p for trend = 0.001).

Table 3. Adjusted odds ratio (AOR) of family unhappiness by family smoking and SHS exposure at home in primary students in Hong Kong.

| Study factors | Model 1 | Model 2 |
|---------------|---------|---------|
|               | N = 1091 a | N = 844 c |
| Number of co-residing smokers at home | Family unhappiness (%) | AOR (95% CI) b | Family unhappiness (%) | AOR (95% CI) d |
| None          | 8.8     | 1       | 8.8     | 1       |
| 1             | 25.5    | 3.01 (2.10–4.32) *** | 20.1    | 2.10 (1.38–3.20) ** |
| 2 or more     | 27.9    | 2.90 (1.39–6.06) ** | 30.8    | 3.66 (1.28–10.46) * |
| Any           | 26.1    | 2.99 (1.96–4.54) *** | 22.6    | 2.37 (1.51–3.71) *** |
| p for trend   | <0.001  | 0.001   |
### Table 3. Cont.

| Study Factors | Model 3 |
|---------------|---------|
|               | N = 429 * |
|               | Family unhappiness (%) | AOR (95% CI) f |
| SHS exposure at home |       |
| None | 20.7 | 1 |
| 1–4 days/week | 26.8 | 1.53 (1.12–2.09) ** |
| 5–7 days/week | 35.3 | 2.17 (1.35–3.50) ** |
| Any | 31.1 | 1.82 (1.39–2.40) *** |
| p for trend |       | 0.001 |

Notes: * p < 0.05; ** p < 0.01; *** p < 0.001; a Complete case analysis; b Adjusting for age, sex, perceived family affluence, marital status of biological parents and school clustering; c Complete case analysis and excluding students with SHS at home; d Adjusting for age, sex, perceived family affluence, marital status of biological parents and school clustering; e Complete case analysis and excluding students without family smoking; f Adjusting for the number of co-residing smokers at home, age, sex, perceived family affluence, marital status of biological parents and school clustering.

The results of the multi-nominal logistic regression (Tables S1 and S2 in the Supplementary Files), multiple imputation (Table S3 in the Supplementary Files) and CEM (Tables S4 and S5 in the Supplementary Files) were not meaningfully different from the main analyses (Tables 2 and 3).

### 4. Discussion

Our study found that family smoking, SHS exposure at home, and tobacco-related unpleasant experience were prevalent in Hong Kong families. In particular, half of the families with one or more smokers had tobacco-related unpleasant experience in the past 30 days. Such unpleasant experience was more strongly associated with family smoking than SHS, suggesting that, to avoid the unpleasant experience, merely avoiding smoking at home is insufficient, and quitting smoking is needed.

Our study found that family smoking was associated with family unhappiness. Such associations remained statistically significant among students without SHS at home, which indicated that having co-residing smokers who did not smoke at home was associated with increased family unhappiness compared with having neither co-residing smoker nor SHS at home. We also found that SHS at home was associated with family unhappiness among students with co-residing smoker(s), which indicated that, for students who had co-residing smoker(s), no SHS at home was associated with increased family happiness. All the observed associations were robust in the sensitivity analyses.

Family smoking and SHS may lead to dissatisfaction in non-smoking family members for many reasons. Apart from the physical discomforts caused by SHS, such as coughing and eye irritation, dissatisfaction in passive smokers may spring from the health concerns for themselves and their smoking family members. Such health concerns have been consistently documented in qualitative studies in non-smokers of various age groups and socio-economic status [40–42]. Furthermore, a qualitative study in the UK showed that adolescents challenged their parents’ smoking, expressed disgust and concern and hid or destroyed cigarettes [41]. Such resistance also reflected the adolescents’ dissatisfaction and health concerns related to tobacco. In Hong Kong, the dissatisfaction due to health concern may be particularly strong, because of the widespread health education on the harm of tobacco, the stringent tobacco control legislation and the smoking prevalence (10.7% in 2012) that is among the lowest in the world [47].
The dissatisfaction could be exacerbated by the financial burden of buying cigarettes. It is well established in population studies that expenditure on cigarettes crowds out the expenditure on other household essentials, such as food, housing and clothing [48–51]. A non-smoking adult subject said in a qualitative study: “How can they (smokers) use money for cigarettes? It’s like taking food off the table.” [42]. In Hong Kong, the expenditure on cigarettes can be substantial. Given that a pack of cigarettes costs about 54 Hong Kong (HK) dollars (US$ 7.0), a smoker consuming one pack per day would spend HK$19710 per year on cigarettes, nearly the median monthly household income of HK$22,400 in 2013 [52]. Such avoidable expenditure that brings harm may easily displease non-smoking family members. In the present study, the high prevalence of tobacco-related unpleasant experience is a clear indication of the dissatisfaction in the non-smoking family members. The dissatisfaction may in turn undermine family happiness.

To our knowledge, this is the first study to report associations of family smoking and SHS exposure at home with family unhappiness. The newly discovered associations, however, should be interpreted with caution because of the cross-sectional design. However, given the dissatisfaction in non-smokers, which could be compounded by multiple reasons, and the high prevalence of tobacco-related unpleasant experience, these associations suggest a previously neglected impact of tobacco use on interpersonal well-being and family happiness and also provide a justification for such impact to be further explored in future research.

The impact of tobacco use on family happiness, if confirmed in future research, shall have important implications. It expands the scope of the evaluation of the impact of tobacco use, adds to the justification for stronger tobacco control measures and suggests a new message for health education that focuses on interpersonal well-being and family happiness as the immediate benefits of smoking cessation and avoiding SHS. Interestingly, a study in Norway found that the introduction of a smoking ban in bars and restaurants increased the job satisfaction in non-smoking employees [53].

The present study has several limitations. First, residual confounding might exist given the limited number of potential confounders in our model. Nonetheless, we addressed this issue by controlling for all the covariates in our dataset (except those that could be affected by the study factors or outcomes) using CEM combined with adjustment in multivariable regression. Second, temporality between family smoking, SHS and family unhappiness cannot be ascertained because of the cross-sectional design. However, smoking initiation should generally precede marriage, because most smokers started smoking in adolescence or early adulthood. In addition, whether smokers avoid smoking at home may more likely to be determined by factors other than family happiness. Third, the two study factors (family smoking and SHS at home) were self-reported and thus subject to misclassification. However, the smoking behaviour of co-residing family members should be obvious to children, especially in Hong Kong, where homes are typically small. Self-reported SHS at home are needed in this study because biomarkers of SHS exposure cannot distinguish exposure from home and other places. Moreover, self-reported SHS exposure by children has been validated using hair nicotine levels in our previous study [54] and its test-retest reliability has been shown to be good in the present study. Any random misclassification of the study factors would have biased the associations towards null. Fourth, in addition to the two study factors, thirdhand smoke (THS) exposure at home may also contribute to unpleasant experience and family unhappiness, given the generally negative self-reported reactions to THS in children [55]. Since THS should also be associated with the study factors, it may have influenced our estimates. For example,
among the students with co-residing smoker(s), the lower level of family happiness in the group exposed to SHS at home than the group not exposed might partly be due to THS, because while the former group almost surely had THS exposure at home, only part of the latter group had such exposure (some co-residing smokers may smoke at home when children are not around, resulting in THS exposure). Future research should explore the association of family unhappiness with environmental tobacco smoke, including both SHS and THS [56], and how SHS and THS contribute to this association. Fifth, although the two outcome variables on family unhappiness reported by children showed good test-retest reliability, they only represent family happiness perceived by children and may not necessarily be the same with the perception of other family members. Nonetheless, children’s perception of family unhappiness is a meaningful outcome because it should be more directly relevant with the well-being and development of the children. Finally, these results from Hong Kong may not be generalisable to other areas. The dissatisfaction towards tobacco use may be stronger in areas where smoking is highly socially unacceptable.

5. Conclusions

Family smoking, SHS exposure at home and tobacco-related unpleasant experiences were prevalent in Hong Kong families. Family unhappiness reported by children was associated with both family smoking and SHS exposure at home. These results suggest a previously neglected impact of tobacco use on family happiness.

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Author Contributions

Jian Jiu Chen conceptualised the analysis plan, analysed data, interpreted results and drafted the initial manuscript. Sai Yin Ho designed the study, conceptualised the analysis plan and interpreted results. Wing Man Au designed the study, collected data and supervised the study. Man Ping Wang conceptualised the analysis plan and interpreted results. Tai Hing Lam gave advice on study design, the analysis plan and analysis results interpretation. All authors reviewed and revised the manuscript and approved the final manuscript as submitted.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. US Department of Health and Human Services. The Health Consequences of Smoking—50 years of Progress: A report of the Surgeon General. Available online: http://www.surgeongeneral.gov/library/reports/50-years-of-progress/full-report.pdf (accessed on 11 November 2015).
2. US Department of Health and Human Services. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General. Available online: http://www.ncbi.nlm.nih.gov/books/NBK44324/pdf/Bookshelf_NBK44324.pdf (accessed on 11 November 2015).

3. Choi, W.S.; Patten, C.A.; Gillin, J.C.; Kaplan, R.M.; Pierce, J.P. Cigarette smoking predicts development of depressive symptoms among US adolescents. Ann. Behav. Med. 1997, 19, 42–50.

4. Flensborg-Madsen, T.; von Scholten, M.B.; Flachs, E.M.; Mortensen, E.L.; Prescott, E.; Tolstrup, J.S. Tobacco smoking as a risk factor for depression. A 26-year population-based follow-up study. J. Psychiatr. Res. 2011, 45, 143–149.

5. Korhonen, T.; Broms, U.; Varjonen, J.; Romanov, K.; Koskenvuo, M.; Kinnunen, T.; Kaprio, J. Smoking behaviour as a predictor of depression among Finnish men and women: A prospective cohort study of adult twins. Psychol. Med. 2007, 37, 705–715.

6. Paffenbarger, R.S.; Lee, I.M.; Leung, R. Physical activity and personal characteristics associated with depression and suicide in American college men. Acta. Psychiatr. Scand. 1994, 89, 16–22.

7. Duncan, B.; Rees, D.I. Effect of smoking on depressive symptomatology: A reexamination of data from the National Longitudinal Study of Adolescent Health. Am. J. Epidemiol. 2005, 162, 461–470.

8. Pasco, J.A.; Williams, L.J.; Jacka, F.N.; Ng, F.; Henry, M.J.; Nicholson, G.C.; Kotowicz, M.A.; Berk, M. Tobacco smoking as a risk factor for major depressive disorder: Population-based study. Br. J. Psychiatry 2008, 193, 322–326.

9. Lam, T.; Stewart, S.M.; Ho, S.Y.; Lai, M.K.; Mak, K.H.; Chau, K.V.; Rao, U.; Salili, F. Depressive symptoms and smoking among Hong Kong Chinese adolescents. Addiction 2005, 100, 1003–1011.

10. Cuijpers, P.; Smit, F.; Have, M.; de Graaf, R. Smoking is associated with first-ever incidence of mental disorders: A prospective population-based study. Addiction 2007, 102, 1303–1309.

11. Patel, V.; Kirkwood, B.R.; Pednekar, S.; Weiss, H.; Mabey, D. Risk factors for common mental disorders in women Population-based longitudinal study. Br. J. Psychiatry 2006, 189, 547–555.

12. Van der Velden, P.G.; Grievenk, L.; Olff. M.; Gersons, B.P.; Kleber, R.J. Smoking as a risk factor for mental health disturbances after a disaster: A prospective comparative study. J. Clin. Psychiatry 2007, 68, 87–92.

13. Isensee, B.; Wittchen, H.-U.; Stein, M.B.; Höfler, M.; Lieb, R. Smoking increases the risk of panic: Findings from a prospective community study. Arch. Gen. Psychiatry 2003, 60, 692–700.

14. John, U.; Meyer, C.; Rumpf, H.-J.; Hapke, U. Smoking, nicotine dependence and psychiatric comorbidity—A population-based study including smoking cessation after three years. Drug Alcohol Depend. 2004, 76, 287–295.

15. Johnson, J.G.; Cohen, P.; Pine, D.S.; Klein, D.F.; Kasen, S.; Brook, J.S. Association between cigarette smoking and anxiety disorders during adolescence and early adulthood. JAMA 2000, 284, 2348–2351.

16. Moylan, S.; Jacka, F.N.; Pasco, J.A.; Berk, M. How cigarette smoking may increase the risk of anxiety symptoms and anxiety disorders: A critical review of biological pathways. Brain Behav. 2013, 3, 302–326.

17. Quattrocki, E.; Baird, A.; Yurgelun-Todd, D. Biological aspects of the link between smoking and depression. Harv. Rev. Psychiatry 2000, 8, 99–110.
18. Fowler, J.S.; Volkow, N.; Wang, G.-J.; Pappas, N.; Logan, J.; MacGregor, R.; Alexoff, D.; Shea, C.; Schlyer, D.; Wolf, A.P.; et al. Inhibition of monoamine oxidase B in the brains of smokers. *Nature* 1996, 379, 733–736.

19. Zvolensky, M.J.; Schmidt, N.B.; McCreary, B.T. The impact of smoking on panic disorder: An initial investigation of a pathoplastic relationship. *J. Anxiety Disord*. 2003, 17, 447–460.

20. Iniguez, S.D.; Warren, B.L.; Parise, E.M.; Alcantara, L.F.; Schuh, B.; Maffeo, M.L.; Manojlovic, Z.; Bolaños-Guzmán, C.A. Nicotine exposure during adolescence induces a depression-like state in adulthood. *Neuropsychopharmacology* 2009, 34, 1609–1624.

21. Nakata, A.; Takahashi, M.; Ikeda, T.; Hojou, M.; Nigam, J.A. Swanson, N.G. Active and passive smoking and depression among Japanese workers. *Prev. Med.* 2008, 46, 451–456.

22. Hamer, M.; Ford, T.; Stamatakis, E.; Dockray, S.; Batty, G.D. Objectively measured secondhand smoke exposure and mental health in children: Evidence from the Scottish Health Survey. *Arch. Pediatr. Adolesc. Med.* 2011, 165, 326–331.

23. Bandiera, F.C.; Richardson, A.K.; Lee, D.J.; He, J.-P.; Merikangas, K.R. Secondhand smoke exposure and mental health among children and adolescents. *Arch. Pediatr. Adolesc. Med.* 2011, 165, 332–338.

24. Bandiera, F.C.; Arheart, K.L.; Caban-Martinez, A.J.; Fleming, L.E.; McCollister, K.; Dietz, N.A.; LeBlanc, W.G.; Davila, E.P.; Lewis, J.E.; Serdar, B. Secondhand smoke exposure and depressive symptoms. *Psychosom Med.* 2010, 72, 68–72.

25. Padrón, A.; Galán, I.; Rodríguez-Artalejo, F. Second-hand smoke exposure and psychological distress in adolescents. A population-based study. *Tob. Control* 2014, 23, 302–307.

26. Hamer, M.; Stamatakis, E.; Batty, G.D. Objectively assessed secondhand smoke exposure and mental health in adults: Cross-sectional and prospective evidence from the Scottish Health Survey. *Arch. Gen. Psychiatry* 2010, 67, 850–855.

27. Taha, F.; Goodwin, R.D. Secondhand smoke exposure across the life course and the risk of adult-onset depression and anxiety disorder. *J. Affect. Disord.* 2014, 168, 367–372.

28. Shahab, L.; West, R. Do ex-smokers report feeling happier following cessation? Evidence from a cross-sectional survey. *Nicotine Tob. Res.* 2009, 11, 553–557.

29. Shahab, L.; West, R. Differences in happiness between smokers, ex-smokers and never smokers: Cross-sectional findings from a national household survey. *Drug Alcohol Depend.* 2012, 121, 38–44.

30. Stickley, A.; Koyanagi, A.; Roberts, B.; Leinsalu, M.; Goryakin, Y.; McKee, M. Smoking status, nicotine dependence and happiness in nine countries of the former Soviet Union. *Tob. Control* 2015, 24, 190–197.

31. Wang, M.P.; Wang, X.; Lam, T.H.; Viswanath, K.; Chan, S.S. Ex-smokers are happier than current smokers among Chinese adults in Hong Kong. *Addiction* 2014, 109, 1165–1171.

32. Drehmer, J.E.; Hipple, B.; Ossip, D.J.; Nabi-Burza, E.; Winickoff, J.P. A Cross-Sectional Study of Happiness and Smoking Cessation Among Parents. *J Smok Cessat* 2015. Available online: http://journals.cambridge.org/download.php?file=%2F289_D0EB4E16008FE04E689B9CF838A27055F8_journals__JSC_S1834261215000067a.pdf&cover=Y&code=070ae8ef0fc96cd88a9e7b504bddd5319 (accessed on 11 November 2015).
33. Piqueras, J.A.; Kuhne, W.; Vera-Villarroel, P.; van Straten, A.; Cuijpers, P. Happiness and health behaviours in Chilean college students: A cross-sectional survey. *BMC Public Health* 2011, 11, doi:10.1186/1471-2458-11-443.

34. Kawada, T.; Kuratomi, Y.; Kanai, T. Lifestyle determinants of depressive feeling and a feeling of unhappiness among workers: A study in Japan. *Work* 2008, 33, 255–260.

35. Lessov-Schlaggar, C.N.; Wahlgren, D.R.; Liles, S.; Jones, J.A.; Ji, M.; Hughes, S.C.; Swan, G.E.; Hovell, M.F. Sensitivity to secondhand smoke exposure predicts smoking susceptibility in 8–13-year-old never smokers. *J. Adolesc. Health* 2011, 48, 234–240.

36. Michell, L. Clean-air kids or ashtray kids-children’s views about other people smoking. *Health Educ. J.* 1989, 48, 157–161.

37. Quick, B.L.; Bates, B.R.; Quinlan, M.R. The utility of anger in promoting clean indoor air policies. *Health Commun.* 2009, 24, 548–561.

38. Aspropoulos, E.; Lazuras, L.; Rodafinos, A.; Eiser, J.R. Can you please put it out? Predicting non-smokers’ assertiveness intentions at work. *Tob. Control* 2010, 19, 148–152.

39. Fararouei, M.; Brown, I.; Toori, M.A.; Haghhighi, R.E.; Jafari, J. Happiness and health behaviour in Iranian adolescent girls. *J. Adolesc.* 2013, 36, 1187–1192.

40. Woods, S.E.; Springett, J.; Porcellato, L.; Dugdill, L. ‘Stop it, it’s bad for you and me’: Experiences of and views on passive smoking among primary-school children in Liverpool. *Health Educ. Res.* 2005, 20, 645–655.

41. Rowa-Dewar, N.; Amos, A.; Cunningham-Burley, S. Children’s resistance to parents’ smoking in the home and car: A qualitative study. *Addiction* 2014, 109, 645–652.

42. Yousey, Y. Family attitudes about tobacco smoke exposure of young children at home. *MCN Am. J. Matern. Child. Nurs.* 2007, 32, 178–183.

43. Raschke, H.J. Family structure, family happiness, and their effect on college students’ personal and social adjustment. *Fam. Court. Rev.* 1977, 15, 30–33.

44. Urban Expansion Project. 11th Annual Demographia International Housing Affordability Survey, 2015. Available online: http://www.demographia.com/dhi.pdf (accessed on 11 November 2015).

45. Ho, D.E.; Imai, K.; King, G.; Stuart, E.A. Matching as nonparametric preprocessing for reducing model dependence in parametric causal inference. *Polit. Anal.* 2007, 15, 199–236.

46. Iacus, S.M.; King, G.; Porro, G. Causal inference without balance checking: Coarsened exact matching. *Polit. Anal.* 2012, 20, 1–24.

47. Hong Kong Council on Smoking and Health. Living Smoke-Free, Annual Report 2012–2013. Available Online: http://www.smokefree.hk/UserFiles/resources/about_us/annual_reports/COSH_Annual_Report_2012_2013.pdf (accessed on 11 November 2015).

48. Xin, Y.; Qian, J.; Xu, L.; Tang, S.; Gao, J.; Critchley, J.A. The impact of smoking and quitting on household expenditure patterns and medical care costs in China. *Tob. Control* 2009, 18, 150–155.

49. John, R.M. Crowding out effect of tobacco expenditure and its implications on household resource allocation in India. *Soc. Sci. Med.* 2008, 66, 1356–1367.

50. Wang, H.; Sindelar, J.L.; Busch, S.H. The impact of tobacco expenditure on household consumption patterns in rural China. *Soc. Sci. Med.* 2006, 62, 1414–1426.
51. Siahpush, M.; Borland, R.; Scollo, M. Is household smoking status associated with expenditure on food at restaurants, alcohol, gambling and insurance? Results from the 1998–99 Household Expenditure Survey, Australia. Tob. Control 2004, 13, 409–414.

52. Information Service Department of HKSAR. Hong Kong: Fact Sheets. Available online: http://www.gov.hk/en/about/abouthk/factsheets/docs/population.pdf (accessed on 11 November 2015).

53. Hetland, J.; Hetland, H.; Mykletun, R.J.; Aarø, L.E.; Matthiesen, S.B. Employees’ job satisfaction after the introduction of a total smoke-ban in bars and restaurants in Norway. Health Promot. Int. 2008, 23, 302–310.

54. Ho, S.Y.; Wang, M.P.; Lo, W.S.; Mak, K.K.; Lai, H.K.; Thomas, G.N.; Lam, T.H. Comprehensive smoke-free legislation and displacement of smoking into the homes of young children in Hong Kong. Tob. Control 2010, 19, 129–133.

55. Chen, J.J.; Ho, S.Y.; Wang, M.P.; Lam, T.H. Reactions to Thirdhand Smoke are associated with Openness to Smoking in Young never Smoking Children. Available online: http://link.springer.com/article/10.1007%2Fs10900-015-0115-0 (accessed on 11 November 2015).

56. Protano, C.; Vitali, M. The new danger of thirdhand smoke: Why passive smoking does not stop at secondhand smoke. Environ. Health Perspect. 2011, 119, doi:10.1289/ehp.1103956.

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