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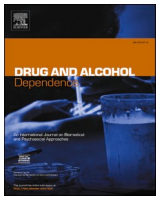

Social smoker identity and associations with smoking and quitting behaviour: A cross-sectional study in England☆

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ABSTRACT

Background: 'Social smoking' typically occurs predominantly or exclusively in the presence of others who are smoking. Relatively little is known about changes in the prevalence of 'social smoking identity' over time and its association with other smoking-related correlates.

Methods: Data were from the Smoking Toolkit Study, a nationally-representative cross-sectional survey in England. Participants were 26,774 adults who currently smoked or had quit in the past year, surveyed between February-2014 and April-2021. We estimated the proportion identifying as having a social smoking identity, changes over time, and associations with smoking in social situations, cigarette dependence, motivation to stop, quit attempts and success.

Results: Of adults who currently smoked or had quit in the past year, 34.0% (95% Confidence Interval (CI)= 33.5–34.6) identified as having a social smoking identity. There was a near linear increase in this proportion from 31.9% (95%CI=29.7–34.2) in February-2014 to 36.5% (95%CI=34.1–38.9) in April-2021. Adults who currenty smoked identifying as having a social smoking identity were less cigarette dependent (adjusted B=0.34, 95%CI=0.31–0.37) and more motivated to stop (aOR=1.20, 95%CI=1.15–1.26) than those who did not. Adults who currently smoked or had quit in the past year identifying as having a social smoking identity reported more smoking in social situations (aOR=6.45, 95%CI=6.13–6.80) and past-year quit attempts (aOR=1.22, 95% CI=1.14–1.30) than those who did not. Quit success was not associated with having a social smoking identity among adults who currently smoked or had quit in the past year and who had attempted to quit (aOR=0.90, 95% CI=0.79–1.02).

Conclusions: An increasing proportion, over a third, of adults who currently smoked or had quit in the past year in England identify as having a social smoking identity. Despite being associated with lower dependence, greater motivation to quit and more quit attempts, social smoking identity is not associated with greater quit success, suggesting a complex interplay between identity and smoking-related behaviours.

1. Introduction

Social smoking identity is defined as a self-identity in which the person describes themselves as someone who smokes predominantly or exclusively in the presence of others who are smoking (ADDICTO:0001168 (AddictO, 2020). People who smoke identifying as having a social smoking identity often differentiate themselves from other people who smoke as perceiving their smoking behaviour to be less habitual and more occasional (Berg and Lin, 2019; Schane et al., 2010). Yet, some people who identify as having a social smoking identity still smoke regularly and not only in the presence of others (Lisha et al., 2015). People who identify as having a social smoking identity also often view their smoking behaviour as less harmful due to low levels of consumption (Song et al., 2014) and believe they are less dependent on cigarettes than others who do not identify as having a social smoking identity (Moran et al., 2004). Some do not view themselves as people who smoke at all (Hastings et al., 2020; Levinson et al., 2007). However, social smoking still carries significant health consequences, potentially similar to other cigarette smoking behaviours (Schane et al., 2010). The present study estimates the overall proportion of adults who currently

☆ Registration: The analysis plan was pre-registered, and it is available at https://osf.io/26dyr/.

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smoked or had quit in the past year in England identifying as having a social smoking identity, and investigates the association between self-reported social smoking identity and smoking in social situations, cigarette dependence, motivation to stop, quit attempts and quit success to begin to understand these relationships.

The smoking behaviour of people who identify as having a social smoking identity is more likely to be triggered in the presence of other people who smoke or during social gatherings (Hastings et al., 2020), suggesting their dependency is more strongly socially cued. However, this is not always the case; a cross-sectional study suggests that almost half of those who identify as having a social smoking identity mostly smoke alone and not in the presence of others who smoke (Lisha et al., 2015). A cohort study among a representative study of US college students also suggests that social smoking has been associated with lower intensity and frequency of cigarette use compared with non-social smoking (Moran et al., 2004). Despite smoking less frequently, people who identify as having a social smoking identity can still develop cigarette dependence (Villanti et al., 2017), including physiological and psychological cravings for cigarettes, especially in social settings or when exposed to smoking cues (Shiffman et al., 2014, 2015). However, it is not clear how far their level of cigarette dependence differs from other peple who smoke.

Motivation to quit smoking among people who identify as having a social smoking identity might be low. Some people who identify as having a social smoking identity may feel less motivated to quit, given their perception of smoking as a social activity rather than an addiction (Moran et al., 2004; Song et al., 2014). Additionally, people who identify as having a social smoking identity might be less motivated to quit smoking because they do not recognise the health risks associated with their smoking (Moran et al., 2004). Although the health consequences of social smoking have not been specifically studied, people who smoke non-daily experience significant smoking-related morbidity and mortality compared with people who never smoke (Inoue-Choi et al., 2020), and smoking just one cigarette per day is associated with cardiovascular risk comparable with heavy smoking (smoking 20 cigarettes per day; Hackshaw et al., 2018).

If people who identify as having a social smoking identity are less motivated to quit smoking or do not recognise the health risks associated with their smoking (Moran et al., 2004; Song et al., 2014), they might be also less likely to try to quit smoking. Indeed, social smoking has been associated with fewer quit attempts (Moran et al., 2004) and fewer quit attempts lasting more than one month (Song and Ling, 2011) compared with non-social smoking. On the other hand, some people who identify as having a social smoking identity exhibit smoking cessation intention and cessation attempts (Song and Ling, 2011). However, they may find it challenging to maintain a smoke-free lifestyle when faced with social situations that trigger their smoking behaviour (Shiffman et al., 2014, 2015).

Overall, the literature suggests that having a social smoking identity as measured by a binary construct (do you consider yourself as having a social smoking identity: yes/no (i.e., Levinson et al., 2007; Lisha et al., 2015; Moran et al., 2004) could play a role in smoking behaviour, cigarette dependence, quit attempts and quit success. However, the picture is not clear, and – to the best of our knowledge – no study has examined this construct in a representative sample of adults who currently smoked or had quit in the past year in England or how this has changed across time, given that non-daily smoking (which often reflects social smoking) has risen as a proportion of all smoking (from 10.0% in 2012 to 23.9% in 2022; (Buss et al., 2023). Thus, the aim of the present study is to estimate the proportion of those who identify as having a social smoking identity in England, to assess changes in prevalence in the past decade and to characterise this population in terms of smoking-related correlates. Specifically, the study aims to address the following research questions:

1. What proportion of past-year adults who currently smoked or had quit in the past year in England identify as a having a social smoking identity and has it changed over time?
2. Is a social smoking identity associated with smoking in social situations, cigarette dependence, motivation to stop smoking, quit attempts and quit success, with and without adjustment for relevant covariates?

2. Methods

2.1. Pre-registration

The study protocol and analysis plan were pre-registered on Open Science Framework (https://osf.io/3ur6c). We made the following changes to the pre-registered analysis plan. We focused on quit success (proportion of adults who currently smoked or had quit in the past year who made a quit attempt and are not smoking) rather than smoking cessation (proportion of adults who currently smoked or had quit in the past year who are not smoking) due to the fact that some important determinants of smoking cessation were only asked of those who made a quit attempt (time since the most recent quit attempt began and use of evidence-based smoking cessation aids). Additionally, in the analysis assessing the association of social smoking identity with quit success we controlled for the interaction between time since the most recent quit attempt started and level of cigarette dependence defined as urges to smoke, rather than only controlling for these separately. We made this change because level of cigarette dependence is a collider for both social identity and smoking status, so adjusting for it would be inappropriate (Tönnies et al., 2022). We also undertook an exploratory analysis stratified by use of evidence-based support to investigate the association of social smoking identity with quit success among adults who currently smoked or had quit in the past year and who made at least one quit attempt in the past 12 months.

2.2. Study design

Data were drawn from the ongoing Smoking Toolkit Study, a monthly cross-sectional survey of a representative sample of adults in England (Fidler et al., 2011). The study uses a hybrid of random probability and simple quota sampling to select a new sample of approximately 1700 adults each month. Comparisons with other national surveys and sales data indicate that key variables such as sociodemographic characteristics, smoking prevalence, and cigarette consumption are nationally representative (Fidler et al., 2011; Jackson et al., 2019).

Data were initially collected through face-to-face computer-assisted interviews. However, social distancing restrictions under the Covid-19 pandemic meant no data were collected in March 2020 and data from April 2020 onwards have been collected via telephone. The telephone-based data collection used similar sampling and weighting approaches as the face-to-face interviews and comparisons of the two data collection modalities indicate good comparability (Kock et al., 2022).

Interviews were held with one member of each household. Informed consent was obtained prior to each interview. Ethical approval was provided by the UCL Research Ethics Committee (0498/001).

2.3. Study sample and recruitment

Data included in the present study were collected from respondents surveyed between February 2014 and April 2021 (the period that social smoking identity was assessed). Respondents were included in the analyses if they reported smoking either every day or occasionally in the past year and were aged 18 or over.

2.4. Measures

2.4.1. Smoking status and social smoking identity

Smoking status was assessed with the question: 'Which of the following best applies to you? Please note we are referring to cigarettes and other kinds of tobacco that you set light to and NOT electronic or 'heat-not-burn' cigarettes'; and answer options: (a) I smoke cigarettes (including hand-rolled) every day; (b) I smoke cigarettes (including hand-rolled), but not every day; (c) I do not smoke cigarettes at all, but I do smoke tobacco of some kind (e.g. pipe, cigar or shisha); (d) I have stopped smoking completely in the last year; (e) I stopped smoking completely more than a year ago; (f) I have never smoked (i.e. smoked for a year or more)'. Those who responded a-c were considered adults who currently smoked, and those who responded a-d were considered adults who currently smoked or had quit in the past year. Those who responded e-f were excluded from the analytic sample.

Social smoker identity was measured among *past-year smokers* with the question 'Do (/did) you think of yourself as a social smoker?'. Responses were coded 0 for those who responded 'no' and 'don't know' and 1 for those who responded 'yes'. We also report % and 95% Confidence Intervals (CI) for those who replied 'no', 'don't know' and 'yes'.

2.4.2. Outcome measures

Smoking in social situations was measured among *adults who currently smoked or had quit in the past year* with the question 'How much of your smoking, if any, occurs (/occurred) when you were in social situations and other people around you were smoking?'. The response options were none of it (coded 0), not very much of it (1), some of it (2), most of it (3), almost all of it (4), all of it (5), don't know (excluded). This variable was treated ordinally.

Cigarette dependence was measured among *adults who currently smoked or had quit in the past year* by self-reported ratings of the strength of urges to smoke over the last 24 hours (not at all (coded 0), slight (1), moderate (2), strong (3), very strong (4), extremely strong (5); (Fidler et al., 2011). The variable was treated as continuous.

Motivation to stop smoking was measured among *adults who currently smoked* by the Motivation to Stop Scale (MTTS; (Kotz et al., 2013), which asks: 'Which of the following best describes you?'. The response options were: I don't want to stop smoking (coded 1), I think I should stop smoking but don't really want to (2), I want to stop smoking but haven't thought about when (3), I really want to stop smoking but I don't know when I will (4), I want to stop smoking and hope to soon (5), I really want to stop smoking and intend to in the next 3 months (6), I really want to stop smoking and intend to in the next month (7). This variable was treated ordinally.

Quit attempts were measured among *adults who currently smoked or had quit in the past year* by asking: 'How many serious attempts to stop smoking have you made in the past 12 months? By serious I mean you decided that you would try to make sure you never smoked again'. This item was coded 0 for those who responded that they had not made a quit attempt, and 1 for those who reported one or more quit attempts.

Quit success was measured among *adults who currently smoked or had quit in the past year* who made at least one quit attempt in the past 12 months and was coded 1 for those who reported 'still not smoking' to the question 'how long your most recent serious quit attempt lasted?' and 0 for those who reported 'less than a day', 'less than a week', 'more than 1 week and up to a month', 'more than 1 month and up to 2 months', 'more than 2 months and up to 3 months', 'more than 3 months and up to 6 months', 'more than 6 month and up to a year' 'don't know'.

2.4.3. Covariates

Sociodemographic characteristics included age, sex and occupational social grade (ABC1=managerial/ professional/intermediate, C2DE=small employers/lower supervisory/technical/semi-routine/ routine/never workers/long-term unemployed).

Use of support for smoking cessation in the most recent quit attempt among *adults who currently smoked or had quit in the past year* who reported making at least one quit attempt in the past-year was assessed with the question 'Which, if any, of the following did you try to help you stop smoking during the most recent serious quit attempt?'. We dichotomised the variable into use of evidence-based support (use any of face-to-face behavioural support, prescription medication (varenicline, bupropion or NRT), e-cigarettes, or NRT obtained over the counter) versus all other (including none).

Time since the most recent quit attempt began among *adults who currently smoked or had quit in the past year* who reported making at least one quit attempt in the past-year was assessed with the question 'How long ago did your most recent serious quit attempt start?'. Answer options: in the last week (coded 1), more than a week and up to a month (2), more than 1 month and up to 2 months (3), more than 2 months and up to 3 months (4), more than 3 months and up to 6 months (5), more than 6 months and up to a year (6), don't know (excluded). The variable was treated as a nominal categorical variable.

2.5. Statistical analysis

Data were analysed using R v.4.2.2. Missing cases were excluded on a per-analysis basis. Descriptive statistics were calculated to characterise the sample. For all analyses data were weighted to match the population in England on the dimensions of age, social grade, region, housing tenure, ethnicity, and working status within sex. This profile is determined each month on the basis of data from the 2011 and 2021 UK Census, the Office for National Statistics mid-year estimates, and the annual National Readership Survey (Fidler et al., 2011).

Trends in social smoking identity over the study period were analysed using logistic regression with social smoking identity as the outcome and survey month modelled using restricted cubic splines with five knots. This allowed for flexible and non-linear changes over time, while avoiding categorisation.

Ordinal logistic regression was used to assess the association of social smoking identity with (i) smoking in social situations among *adults who currently smoked or had quit in the past year* and (ii) motivation to stop smoking among *adults who currently smoked*, with and without adjustment for age, sex, occupational social grade and survey year.

Among *adults who currently smoked*, linear regression was used to assess the association of social smoking identity with cigarette dependence, with and without adjustment for age, sex, occupational social grade and survey year.

Among *adults who currently smoked or had quit in the past year*, binary logistic regression was used to assess the association of social smoking identity with quit attempts, with and without adjustment for age, sex, occupational social grade, motivation to quit and survey year.

Among *adults who currently smoked or had quit in the past year* who made a quit attempt, binary logistic regression was used to assess the association of social smoking identity with quit success, with and without adjustment for age, sex, occupational social grade, interaction between time since the most recent quit attempt began and level of cigarette dependence, use of evidence-based cessation aids and survey year. This analysis was repeated, stratified by use of evidence-based cessation aids.

2.6. Sensitivity analysis

To address potential Covid-19 effects, we run a sensitivity analysis that included only data prior to Covid-19 social distancing measures in UK (February 2020). We also compared smoking-related characteristics between 2014 and 2021 among participants who identify as having a social smoking identity to investigate whether there has been any change to their smoking-related profile over time.

3. Results

A total of 26,774 (weighted n=27,459) adults who currently smoked or had quit in the past year were surveyed between February 2014 and April 2021, of whom 24,791 (weighted n=25,339; 92.3%) were adults who currently smoked. Sociodemographic characteristics of the sample are summarised in Table 1. There were no missing data on the social smoking identity variable.

Across the study period, 34.0% (95% CI=33.5–34.6) of adults who currently smoked or had quit in the past year identified as having a social smoking identity, 65.8% (95% CI=65.1–66.3) did not identify as having a social smoking identity, and 0.2% (95%=CI 0.1–0.3) responded 'don't know'. On average, those who identified as having a social smoking identity were younger and from more advantaged occupational social grades than those who did not (Table 1).

Fig. 1 shows modelled time trends in the prevalence of social smoking. Between February 2014 and April 2021, there was a near linear increase in the proportion of adults who currently smoked or had quit in the past year who identified as having a social smoking identity, from 31.9% (95% CI=29.7–34.2) to 36.5% (95% CI=34.1–38.9).

Table 2 describes the smoking-related characteristics of the sample. Among adults who currently smoked or had quit in the past year, 32.6% reported smoking mainly in social situations (i.e. either 'most of it', 'almost all of it', or 'all of it'); this proportion was much higher among those who identified as having a social smoking identity than those who did not (60.9% vs. 17.9%, p<0.001). Additionally, a higher proportion of those identifying as having a social smoking identity made at least one serious quit attempt in the past year. Among adults who currently smoked or had quit in the past year who had made an attempt to stop in the past year, those who identified as having a social smoking identity, compared with those who did not, reported that their quit attempt had begun more recently and was less likely to involve the use of evidence-based support. Among adults who currently smoked, those who identified as having a social smoking identity were more motivated to quit and had lower cigarette dependence than those who did not.

Table 3 summarises associations between social smoking identity and smoking in social situations, cigarette dependence, and quitting activity. After adjusting for covariates, adults who currently smoked or had quit in the past year with a social smoking identity were more likely to report that their smoking occurred in social situations (adjusted odds ratio [aOR]=6.45, 95%CI 6.13–6.80) and that they had attempted to quit in the past year (aOR=1.22, 95%CI 1.14–1.30). Adults who currently smoked and with a social smoking identity were less cigarette dependent (adjusted B=0.34, 95%CI 0.31–0.37) and more motivated to stop smoking (aOR=1.20, 95%CI 1.15–1.26). However, social smoking identity was not associated with quit success among those adults who currently smoked or had quit in the past year and who had attempted to quit (aOR=0.90, 95%CI 0.79–1.02). Given reduced cigarette dependence among those with a social smoking identity, this similarity in quit success rates was unexpected. To explore whether this related to the lower use of evidence based-support among those with a social smoking identity, an exploratory analysis investigated the association between quit success and social smoking identity among adults who currently smoked or had quit in the past year and who made at least one quit attempt in the past 12 months, stratified by use of evidence-based support. Among those who did not use evidence-based support, those with a social smoking identity were less likely to quit successfully adjusting for other factors (aOR=0.76, 95%CI 0.63–0.93, p=0.017), while this somewhat reversed among those who used evidence-based support, with no difference by social smoking identity (aOR=1.01, 95%CI 0.85–1.20, p=0.934).

Table 1
Weighted demographic characteristics of adults who currently smoked or had quit in the past year.

Characteristic	Overall N=27,459	No social smoking identity N=18,114	Social smoking identity N=9345	p-value *
Age (years)				
18–24	16.7% (4599)	13.9% (2513)	22.3% (2086)	<0.001
25–34	23.7% (6508)	21.5% (3890)	28.0% (2618)	
35–44	18.3% (5031)	18.3% (3309)	18.4% (1722)	
45–54	17.7% (4871)	19.0% (3435)	15.4% (1436)	
55–64	12.4% (3415)	14.1% (2555)	9.2% (860)	
65+	11.1% (3035)	13.3% (2412)	6.7% (623)	
Sex				
Men	53.5% (14,667)	53.1% (9606)	54.3% (5061)	0.069
Women	46.5% (12,755)	46.9% (8487)	45.7% (4268)	
Occupational social grade				
ABC1 (more advantage)	39.5% (10,833)	38.1% (6904)	42.0% (3929)	<0.001
C2DE (less advantages)	60.5% (16,626)	61.9% (11,210)	58.0% (5416)	
Smoking status				
Current smoking	92.3% (25,339)	92.9% (16,827)	91.1% (8512)	<0.001
Quit in the past year	7.7% (2120)	7.1% (1287)	8.9% (833)	

Note: There were some missing data for sex ($n_{overall}$ =37).
* p-value for comparison of social smokingr identity group with no social smokingr identity group.

3.1. Sensitivity analyses

Analyses including only data prior to Covid-19 social distancing measures in UK, showed similar results and are reported in supplementary material (supplementary tables 1, 2 and 3).

Comparison of smoking-related characteristics among participants who had a social smoking identity in 2014 and 2021 showed that in 2021 more reported that none or not very much of their smoking occurred in social situations, they were less cigarette dependent, and they had lower motivation to quit than in 2014 (supplementary table 4).

4. Discussion

In England, between February 2014 and April 2021, the proportion of adults who currently smoked or had quit in the past year who identified as having a social smoking identity was 34.0%. There was a near-linear increase in this proportion over time, from 31.9% in February 2014 to 36.5% in April 2021. Adults who currently smoked or had quit in the past year who identified as having a social smoking identity reported more of their smoking occurring in social situations and had higher odds of having attempted to quit in the past year than those who did not identify as having a social smokering identity, after adjustment for socio-demographic and smoking factors. Adults who currently smoked who identified as having a social smoking identity were also less cigarette dependent and more motivated to stop smoking than those who did not, after adjustment. However, there was no association between social smoking identity and quit success among adults who currently smoked or had quit in the past year who had attempted to quit.

Our findings suggest that a social smoking identity was positively and very strongly associated with smoking in social situations, with people identifying as having a social smokering identity being about six times more likely to report smoking in social situations, confirming its definition as smoking predominantly or exclusively in the presence of others, who are smoking (ADDICTO:0001168 (AddictO, 2020). However, it should be noted that a substantial minority (~10%) of adults

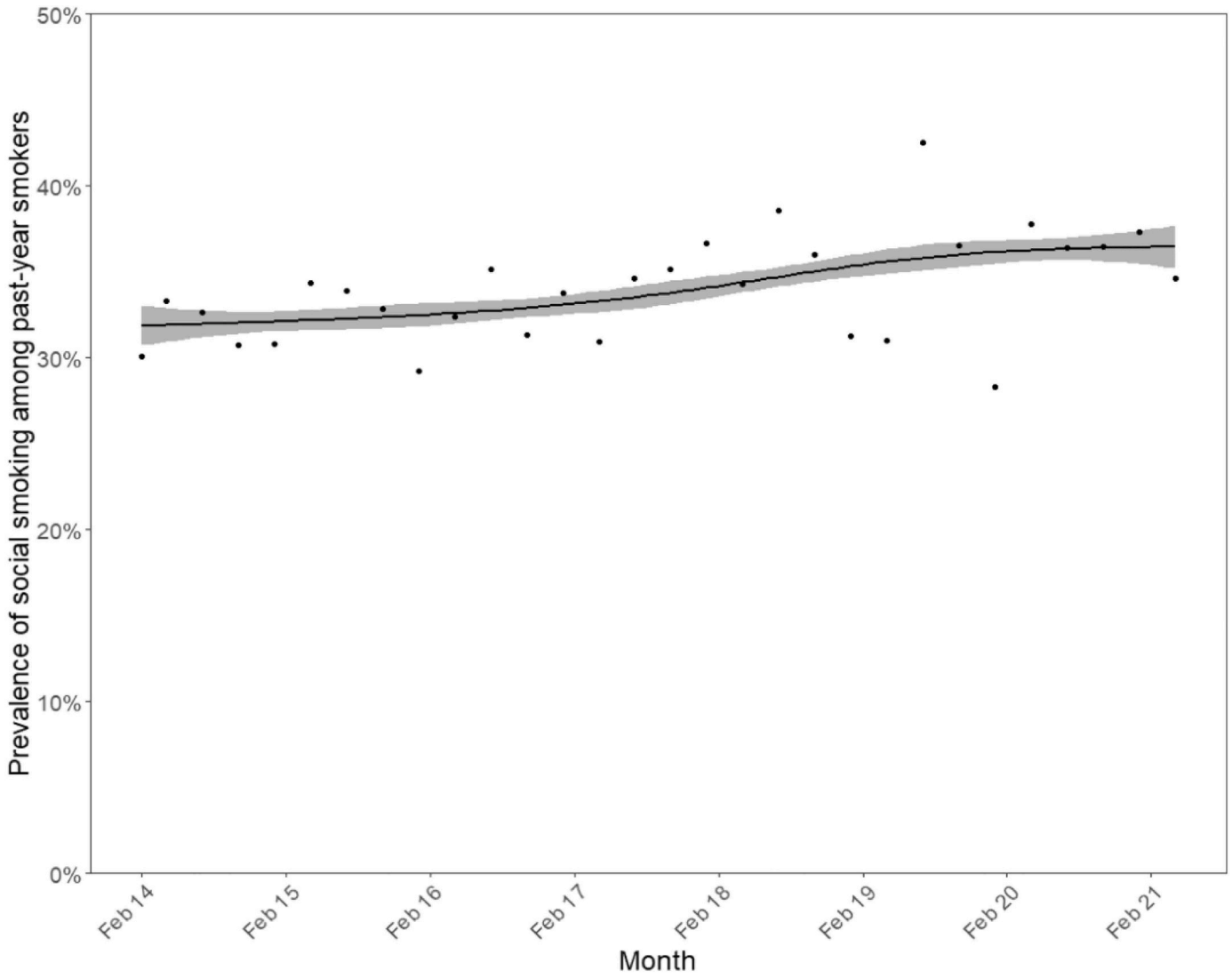

Fig. 1. Trends in social smoking identity over the study period. Line represents modelled weighted prevalence by monthly survey wave, modelled non-linearly using restricted cubic splines (three knots). Shaded bands represent standard errors. Dots represent quarters, where month is the mid-point for each quarter.

who currently smoked or had quit in the past year who identified as having a social smoking identity reported that none or not very much of their smoking occurred when they were in social situations and other people around them were smoking compared with nearly half of those not identifying as having a social smoking identitys. It is possible that these people may smoke in social situations (e.g., when going out for drinks/dinner), but not specifically around other people who smoke, or there may be environmental and other constrains that may mean that people who smoke who identify as having a social smoking identity may not be able to enact their preferred behaviour (i.e., during the Covid-19 pandemic people who smoke were not able to socialise to smoke). It may be also a disconnect between self-identity and behaviour.

Previous research suggests that people who smoke who identify as having a social smoking identity have low nicotine dependence as they primarily smoke in social situations to satisfy the need for better social interaction rather than satisfying nicotine cravings and withdrawal symptoms (Berg and Lin, 2019; Hastings et al., 2020). Consistent with this, our results indicate that social smoking identity is associated with lower nicotine dependence than non-social smoking identity. Additionally, our findings suggest that people who smoke who identify as having a social smokeing identity are more motivated to quit, which may imply that they do not perceive their smoking habits only as a social activity but also as an issue, though it is unclear whether this is due to health effects, costs, or other reasons. Future research could investigate reasons for motivation to quit among people who smoke who identify as having a social smoking identity. We also found that those who identified as having a social smoking identity had higher odds of making a quit attempt than those who did not, contradicting previous research which found a negative association with social smoking and quit attempts (Moran et al., 2004). Such discrepancy may be accounted for by methodological differences on how quit attempt was assessed. We measured serious quit attempts in the past year, while previous research measured past-year quit attempts that were successful for 24 hours (Moran et al., 2004), which might be associated with differential forgetting.

The increasing proportion of those who identify as having a social smoking identity goes against the idea of a hardening hypothesis, where over time it is expected that more dependent people who smoke remain in the population (Warner and Burns, 2003). Though, it should be noted that STS data shows that e-cigarette use in England increased from 5.1% to 6.7% across the same study period (Buss et al., 2023). It may be that more dependent people who smoke switched to e-cigarette use or to dual use (of both cigarettes and e-cigarettes) with smoking dependence being offset by e-cigarette use/dependence. Future research could explore this with trend analyses to assess if changes in e-cigarette use are associated with changes in social smoking identity across time. Additionally, perceptions regarding smoking have changed over time and it has become

Table 2
Weighted smoking-related characteristics of adults who currently smoked or had quit in the past year.

Characteristic	Overall N=27,459	No social smoking identity N=18,114	Social smoking identity N=9345	p-value *
Smoking in social situations				
None of it	17.1% (4666)	23.9% (4290)	4.0% (376)	<0.001
Not very much of it	18.3% (4996)	24.0% (4320)	7.3% (676)	
Some of it	32.0% (8734)	34.2% (6148)	27.8% (2586)	
Most of it	17.2% (4685)	11.3% (2034)	28.5% (2651)	
Almost all of it	7.7% (2095)	3.8% (677)	15.2% (1418)	
All of it	7.7% (2106)	2.8% (500)	17.2% (1606)	
Cigarette dependence as measured by strength of urges				
Not at all	18.4% (4996)	14.5% (2600)	25.8% (2396)	<0.001
Slight	17.2% (4681)	15.8% (2826)	20.0% (1855)	
Moderate	42.4% (11,545)	44.7% (8020)	38.0% (3525)	
Strong	15.5% (4218)	17.5% (3130)	11.7% (1088)	
Very strong	4.7% (1273)	5.4% (967)	3.3% (306)	
Extremely strong	1.8% (498)	2.2% (386)	1.2% (112)	
Quit attempts in past year				
Yes	33.1% (8796)	30.6% (5380)	37.8% (3416)	<0.001
Motivation to quit smoking*				
I don't want to stop smoking	30.0% (7539)	31.5% (5262)	27.0% (2277)	<0.001
I think I should stop smoking but don't really want to	16.7% (4205)	17.4% (2907)	15.4% (1298)	
I want to stop but haven't thought about when	9.4% (2361)	9.3% (1551)	9.6% (810)	
I really want to stop smoking, but I don't know when I will	12.7% (3204)	13.1% (2194)	12.0% (1010)	
I want to stop and hope to soon	16.2% (4072)	15.0% (2510)	18.5% (1562)	
I really want to stop smoking and intend to in the next 3 months	7.8% (1964)	7.4% (1231)	8.7% (733)	
I really want to stop smoking and intend to in the next month	7.3% (1826)	6.4% (1073)	8.9% (753)	
Quit success**				
Yes	18.3% (1594)	18.6% (985)	18.0% (609)	0.488
Use of evidence-based support **				
Yes	40.0% (3479)	42.1% (2235)	36.7% (1244)	<0.001
Time since quit attempt began **				
In the last week	5.6% (488)	5.0% (265)	6.6% (223)	<0.001
More than a week and up to a month	10.7% (928)	10.5% (554)	11.1% (374)	
More than 1 month and up to 2 months	11.2% (973)	10.8% (570)	11.9% (403)	
More than 2 months and up to 3 months	12.5% (1080)	11.4% (602)	14.1% (478)	
More than 3 months and up to 6 months	21.7% (1880)	22.4% (1185)	20.6% (695)	
More than 6 months and up to a year	38.2% (3311)	39.8% (2103)	35.7% (1208)	

Note: There were some missing data for smoking in social situations ($n_{overall}$=177), strength of urges ($n_{overall}$=248), quit attempts ($n_{overall}$=846), motivation to quit smoking ($n_{overall}$=170), length of abstinence ($n_{overall}$=31).

* Among adults who currently smoked; Overall N=25,339, No social smokingr identity N=16,827, Social smokingr identity N=8512.

** Among adults who currently smoked or had quit in the past year and who report making at least one quit attempt in the last year: Overall N=8691, No social smokingr identity N=5304, Social smokingr identity N=3387.

Table 3
Association between social smoking identity and smoking in social situations, cigarette dependence and quitting activity.

	OR [95%CI]	*p*	aOR [95% CI]	*p*
Smoking in social situations*	7.25 [6.85–7.63]	<0.001	6.45[a] [6.13–6.80]	<0.001
Quit attempts*	1.38 [1.31–1.46]	<0.001	1.22[b] [1.14–1.30]	<0.001
Quit success**	0.96 [0.86–1.08]	0.488	0.90[c] [0.79–1.02]	0.108
Motivation to stop***	1.27 [1.21–1.33]	<0.001	1.20[a] [1.15–1.26]	<0.001
	B [95%CI]	***p***	**Adjusted B [95% CI]**	***p***
Cigarette dependence***	0.40 [0.37–0.42]	<0.001	0.34[a] [0.31–0.37]	<0.001

OR=Odds ratio. aOR=adjusted odds ratio. CI=Confidence Intervals.
Covariates included in the analysis: [a] age, sex, occupational social grade, survey year; [b] age, sex, occupational social grade, motivation to quit smoking, survey year; [c] age, sex, occupational social grade, interaction between time since the most recent quit attempt and level of cigarette dependence, use of evidence-based cessation aids, survey year.

* Among adults who currently smoked or had quit in the past year, N=27,459.

** Among adults who currently smoked or had quit in the past year and who report making at least one quit attempt in the past year, N=8691.

*** Among adults who currently smoked, N=25,339.

less socially acceptable to be someone who smoke (Hoek et al., 2022). Thus, it might be that in 2014 it was more socially acceptable to self-identify as a 'regular' smoker and that by 2021 people would be more inclined to self-identify as a having a social smoking identity. Indeed, our sensitivity analyses suggest that in 2021 more adults who currently smoked or had quit in the past year who identify as having a social smoking identity reported that none or not very much of their smoking occurred in social situations than in 2014. Future research could investigate any relationship between social acceptability of smoking and social smoking identity.

A number of recent studies also highlight the large proportion of young adult who smoke who now identify as having a social smoking identity (Guillory et al., 2016; Villanti et al., 2017), and social smoking is often seen as a behaviour of the young as they are learning to smoke (Hassmiller et al., 2003; Yang and Bissell, 2017). Indeed, the prevalence of social smoking identity was more pronounced in younger adults in our sample. Identifying as a having a social smoking identity may allow young people to dissociate their smoking behaviour from the known harms of smoking and thus facilitate their escalation to smoking. It has been suggested that identifying as having a social smoking identity may also influence cessation behaviour, with people who smoke socially finding it harder to remain smoke-free, especially in social situations (Song and Ling, 2011; Shiffman et al., 2014, 2015). Our results provide some support for this. Given that people who smoke who identify as having a social smoking identity in our study appeared to have lower dependence, which has been associated with quit success (Vangeli et al., 2011; Kale et al., 2015), it was somewhat unexpected that they were not more likely to be successful in their attempt to quit than people who smoke not identifying as having a social smoking identity. One explanation could be that people who identify as having a social smoking identity were less likely to use evidence-based support during their quit attempt (36.7% compared with 42.1%), as they perceive themselves as less addicted to cigarettes despite benefitting from this support, which reduces their chances to quit successfully. Indeed, our unplanned

exploratory analysis on patterns of quit success among adults who currently smoked or had quit in the past year who did not use any evidence-based support suggests that those with a social smoking identity were less likely to report quit success adjusting for other confounders, with no differences seen when looking at those using evidence-based support. This would be consistent with self-selection into unsuccessful quit attempts by people who have a social smoking identity who seem more likely to shun additional smoking cessation aids.

4.1. Strengths and limitations

Key strengths of this study include the large, representative sample and the repeat cross-sectional design. However, the study also has several limitations. First, a single 'yes' or 'no' question was used as an indicator of having or not a social smoking identity, which may not capture the complexity of this construct. However, to our best knowledge, there is no established or validated measure of social smoking identity, and previous research have used a similar binary construct to measure social smoking identity (i.e., Levinson et al., 2007; Lisha et al., 2015; Moran et al., 2004). Second, the survey relied on self-reported smoking cessation data, and variables relating to quit attempts relied on recall of the past year. Third, the findings may not be generalisable to populations outside of England. Fourth, it should be also noted that part of data was collected during the Covid-19 pandemic, where different measures of social distancing were in place, which may have affected the prevalence of social smoking identity and the level of smoking in social situations of participants.

5. Conclusions

In conclusion, an increasing proportion, around a third in 2021, of past-year adults who currently smoked or had quit in the past year in England identify as having a social smokeing identity. Those identifying as having a social smoking identity exhibited higher levels of smoking in social situations. After adjustment for a range of socio-demographic and smoking factors, adults who currently smoked identifying as having a social smoking identity were less cigarette dependent and more motivated to stop than those not identifying as having a social smoking identity, and adults who currently smoked or had quit in the past year identifying as having a social smoking identity were more likely to make a quit attempt compared with those not identifying as having a social smokering identity. However, despite lower dependence and higher motivation to quit, adults who currently smoked or had quit in the past year identifying as having a social smoking identity were no more likely to succeed in their quit attempts than adults who currently smoked or had quit in the past year who did not identify as having a social smoking identity, which may reflect their lower use of behavioural support during a quit attempt.

Ethics approval

Ethical approval for the STS was granted originally by the UCL Ethics Committee (ID 0498/001). The data are not collected by UCL and are anonymized when received by UCL.

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CRediT authorship contribution statement

Claire Garnett: Writing – review & editing, Conceptualization. **Lion Shahab:** Writing – review & editing, Funding acquisition, Conceptualization. **Sarah Jackson:** Writing – review & editing, Formal analysis. **Jamie Brown:** Writing – review & editing, Funding acquisition, Conceptualization. **Dimitra Kale:** Writing – original draft, Formal analysis, Conceptualization.

Declaration of Competing Interest

JB has received unrestricted research funding from Pfizer and J&J, who manufacture smoking cessation medications. LS has received honoraria for talks, unrestricted research grants and travel expenses to attend meetings and workshops from manufactures of smoking cessation medications (Pfizer; J&J) and has acted as paid reviewer for grant awarding bodies and as a paid consultant for health care companies. All authors declare no financial links with tobacco companies, e-cigarette manufacturers, or their representatives.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.drugalcdep.2024.111345.

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