RESEARCH

An Observational Study of Smoking Dialogue on Twitter: The Attitudes Behind the Choices

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Abstract

In the UK, smokers face more pressure than ever to quit, yet around one in six people still choose to smoke. In the face of the changing social climate, the reasons why people continue to smoke require new approaches to understanding. In this work, the Twitter microblogging site is utilized as a window on smoking culture, and a naturalistic source of opinionated and experiential content about smoking. Image associations emerge as critical in the decision to smoke or not to smoke among the Twitter-using population. Opinion is decisively against smoking, whilst motivations to smoke operate mainly at the experiential and emotional level. The strength of anti-smoking feeling suggests a level of polarization between smokers and non-smokers which may bring identity into the picture in a way that may limit people's capacity for change. Support is found for the relationship between smoking and coping strategies.

Keywords: smoking; qualitative; twitter; cessation

Background

Smoking remains the single biggest preventable cause of premature death in the UK, and other developed countries worldwide [39], and kills around 100,000 people in the UK each year [1]. One in six people smoke in the UK, and two thirds of smokers begin smoking before the age of 18 [1]. In the UK, legislation appears to have contributed to the decline in smoking prevalence [2], halving in forty years [1], but hasn't produced a step change. Smoking is now less socially acceptable than previously [3], and smokers now have less social and practical support due to legislation such as the 2007 workplace smoking ban. They are also are paying more than ever, the cost of smoking having quadrupled in two decades [4]. Smokers are reluctant to engage with cessation support, despite its effectiveness for those who do seek help, and despite the large number of smokers who say they would like to quit [1]. Amid a growing atmosphere of resentment and resistance, as smoking becomes marginalized and stigmatized [5], we need to think carefully about what we are doing to further promote cessation. Health education may have diminishing returns as a strategy, as research now suggests that thanks to educational interventions such as warnings on packets, smokers are well informed of the dangers [6], and even young people may be well-informed and intelligent on the subject, as in for example Lewis and Russell [7].

A rich and thoughtful literature exists regarding the reasons behind smoking, and raises a variety of relevant points on this increasingly sociologically loaded topic. As well as being more common among younger people, the habit is also

disproportionately prevalent among those of lower socioeconomic status [1], meaning that measures such as taxation may be seen as regressive. Authors such as Lewis and Russell [7] draw attention to issues of poverty, power, consumerism and legitimacy in the choice and ability to smoke. Poland [8] talks about the marginalization of smokers, and raises the point that those in power have the ability to define what is socially acceptable and may choose to reinforce their own position of superiority. Certainly there is an emerging recognition that whilst no-one can deny that smoking is bad for the health, there is more going on here on a sociological level than simply a desire to keep people alive despite themselves. **Polarization** shows itself in hostile and angry attitudes ("Get off our backs!" [9]), suspicion and non-cooperation, for example in the enthusiastic support for illicit cigarette trading, which seems to explain why money is not a greater obstacle to smoking among the economically disadvantaged [10, 11]. Confusion exists about whether the government really wants people to stop smoking or not (e.g. "if it's that bad for you, why isn't it illegal? [12]) as well as whether the government are regarded as friend or foe [10]. Increasing stigmatization is postulated as a hindrance to the cessation cause, for example via limiting access to cessation support [3].

Experiences of smoking commencement differ from those of more established smokers, for whom physical dependence is more of an issue [13]. Social aspects of the decision to smoke, and particularly to commence smoking, are of interest because this is something that might be changed through better understanding; as Jefferis *et al.* [14] note, patterns of smoking behaviour are established in adolescence. In adolescence, **identity** is a particular issue, as suggested in Erikson's psychosocial stages of development (see for example Kroger [15] for a review), and social acceptance can feel particularly important, so it is here we see most clearly the social motives for choosing or not choosing to smoke. Perhaps particularly telling is the result emerging from a 1997 Canadian study [16] in which exploratory factor analysis was used to derive the key dimensions at play in the construction of smoking-related identity. Lloyd *et al.* find that perceived independence is a significant construct but that both smokers and non-smokers claim it for themselves, raising the question of what one wishes to be independent of. In essence, each group feels themselves to be making their own decision about who they want to be and what they want to do with their bodies, but simply disagree about what that choice should be. On the other hand, both smokers and non-smokers agree that smoking allies itself better with a "fun-loving" orientation, and both agree that non-smoking allies itself better with a "sensible" orientation. Their judgement is defensible; smoking is pleasurable, but has negative long term consequences, so a sensible approach would be to abstain, whereas an individual more focused on pleasure ("fun") even at the expense of long-term outcomes might choose to smoke.

There are a number of interesting observations emerging from this. Firstly, the adolescent girls in the sample are selecting their preferred position on this continuum and choosing their smoking status, in part at least and with a degree of pride, to reflect and support it. Secondly, their choice in no way reflects being poorly informed or seeing themselves as forced or subjugated by circumstances. Thirdly, the importance of the concept of being independent implies the importance of a group or authority that one is resisting. Whilst this could be as simple as resisting

the pressure of the opposing group, these groups grow out of other forces at play in society. The non-smoking group's being perceived as having greater interest in schoolwork and the environment implies a greater allegiance with certain social institutions and groups, and lifts the issue up to the level of a broader one, with the interplay of identity in society as a whole being reflected in the decision of an adolescent girl to put a cigarette in her mouth. Note however that this study is small, and based on a group of Canadian adolescent girls, so should be generalized only with caution.

Another Canadian study [12] presents findings regarding nicotine dependence among adolescents, but reading between the lines, there's a strong suggestion that physical dependence isn't well established in these young people, being more imagined than real. For example, the young people when asked about when they experience craving tended to indicate times when they were *able* to smoke (free from parental observation for example). Wiltshire *et al.* [13] focuses on the transitional period between adolescence and adulthood, and is particularly illuminating regarding the process by which teen social- and identity-focused smoking transitions into an established, personally motivated habit. Adulthood brings greater freedom of choice and control over finances. Transitioning to the workplace raises social challenges and stressors, and where smoking is seen as aiding with this, it becomes a habit. Where smoking is discouraged, by a non-smoking workplace or colleagues, it may be dropped. Those who find themselves unemployed, however, may in particular turn to smoking for relief. **Emotional management** becomes increasingly a motivator to smoke as the habit is established [17]. Adult differences in attitude to smoking are illustrated, for example, in McKie *et al.*'s [9] note that whilst for young people, sharing a packet of cigarettes is an important motivator for buying your own, older smokers will resist sharing due to strong brand preferences. Note however that extensive literature fails to provide objective support for the strongly held notion among smokers that smoking makes them feel better [18], and recent evidence suggests that as a coping strategy, smoking is detrimental in the long term [19].

Having transitioned into established smokers, emerging issues relate to managing dependency and attitudes from others, and whilst present in younger smokers also, to a greater extent in adult smokers, cessation and health concerns are an issue. Identity issues emerge in stereotypes, and an "us and them" attitude. **Tensions between smokers and non-smokers** illustrate this focus, with health and consideration issues at the fore [20, 8] with an implied subtext of power and marginalization, but little in the way of identity pride. In essence, a polarization of identity remains evident in adult smoking, but changes character markedly, being, as Wiltshire *et al.* [13] note, "less about being bad and more about breaking up the day". There's little engagement with cessation support, as noted earlier, and a fair amount of resentment, e.g. [9], though cessation support does seem effective for those that do engage, for example [21]. Smoking appears as an emotional aid, being most compelling during tough times [13].

The existing body of research has illuminated the picture regarding the factors influencing decision-making in smoking, and the complexity, both at an individual and societal level, regarding this highly loaded choice. However, the increasing

polarization and resentment that is appearing, as smoking becomes less socially acceptable, and the low cooperation between smokers and those in authority or whose job it is to help suggests scope for more and deeper understanding. The appearance of the microblogging site Twitter as a mainstream medium for exchanging views and experiences offers such an opportunity, being a new and so far little utilized datasource with different characteristics.

Twitter and Health Research

Twitter is a new source of informational content that so far has not been highly leveraged in the health domain. However, it provides a fascinating complement to more traditional observational data gathering approaches, with content reflecting what people choose to present about themselves when left entirely free to decide for themselves. This creates a naturalistic opportunity to understand how people see themselves and motivate what they are doing, which this work makes use of in order to better understand the psychology behind smoking, and indeed non-smoking, and new ways to understand people's motivations.

Twitter is only eight years old, and its usage has evolved a lot in that time, meaning that it has only recently become an important source for health research. Early Twitter use tended to focus on daily activities and information sharing [22], themes still evident a few years later in 2010 [23], evolving to include more conversation and directed messages in recent times [24]. Increasing conversational use lends more credibility to Twitter as a source of more complex social content. User demographics are unavailable, but sources such as Pew [25] suggest it is popular with the young and slightly more favoured by males. There are no reliable data regarding the number of under eighteens on Twitter, but their presence in significant numbers is hinted at, for example by the fact that almost ten percent of registered Twitter users "follow" the singer Justin Bieber, who tends to attract a younger audience.

Researchers in epidemiology have taken a lot of interest in Twitter, for example to track pandemics [26]. The strength of Twitter is often perceived as being in the numbers; 500 million new tweets appear every day [27], and research tends to use automated techniques to consider a very great many of them, as we will see below. However, there is also scope for using Twitter as a datasource for naturalistic observational work. Such work has little precedent, and perhaps has more in common with Jorgenson and Lange's [28] work deriving political interest from toilet graffiti than many other more traditional sources of data, in that it focuses on content created naturalistically, with no expectation of being studied, and on content that people have chosen to present in a particular context rather than being elicited in any leading or designed way. Twitter content may be anonymous or may be signed, as may graffiti. Unlike graffiti, tweets are more likely to come to the attention of friends and followers, rather than being more generally targeted, like graffiti. Like graffiti, you can be sure that subject matter is influenced by factors determining what people consider appropriate or desirable to share in that context, but cannot be certain of what those factors are. Graffiti tends to have bodily and maybe political themes, and additionally Jorgenson and Lange found university graffiti tended to express the subject matter of the department in which it was located. Factors determining what people choose to present on Twitter and what they choose to

withhold are unclear. Like graffiti, tweets tend to be short and even cryptic. Jorgenson and Lange found political graffiti prevalence reflected events of the time; the 1976 US election and events pertaining to the Watergate scandal, lending some validity to it as a datasource for current preoccupations.

Twitter health research so far tends to the quantitative, for example Zhang *et al.*'s work on attitudes to physical activity [29] and De la Torre *et al.*'s [30] work on social media health support groups. On the subject of smoking, Prier *et al.* [31] use automated topic modelling to review the broad subject matter of smoking related tweets. The work is compelling in that statistically-based methods allow something akin to a qualitative analysis to be conducted whilst leaving human experimenters, with their own biases and preconceptions, completely out of the loop. However, the cost is in sensitivity to nuances of meaning. Prier *et al.*'s work finds five salient topics, three of which are loosely related to smoking cessation, one of which is around promotion of smoking and the other of which focuses on negative attitudes to smoking. Myslin *et al.* [32] use machine learning methods to examine Twitter for perceptions of smoking and emerging products, but focus mainly on methodology. Sanders-Jackson *et al.* [33] examine a Twitter sample focused around two smoking-related events in the USA to discover attitudes. Again, the methodology theme is prominent in the work, and the large sample size (several thousand tweets) necessitated automation in the analysis. Other work on the subject of smoking and new media focuses on social media as a forum for reaching people with cessation support and health information [34, 35].

Twitter offers both opportunities and challenges. Demographic data is not available for most Twitter users, which prevents drawing any inferences regarding key topics for different age and socioeconomic status (SES) groups, which would have been helpful given the narrative of identity evolution and motivation change apparent in the literature and the fact that smoking has strong SES associations. However, the Twitter demographic tends to be young, raising the potential for a particularly rich sample with regards to smoking commencement factors. As in other observational work, Twitter work involves using what people choose to share rather than being able to test hypotheses or direct the conversation, which limits the ability to resolve ambiguous observations. This issue is particularly pressing in Twitter, where the short nature of the items means that people tend to the cryptic. As a new source for observational research, there is little in the way of literature highlighting the ways in which caution should be exercised, though Kim et al [36] raise some important considerations, for example that systematic differences will be present in those who use Twitter and those who don't, so one should exercise caution in interpreting quantitative results, and that choice of search terms in sample selection may also bias data, affecting quantitative conclusions. Existing research has validated Twitter as a datasource for symptom tracking [37].

So far, no research the authors are aware of has leveraged the possibilities inherent in Twitter to deepen our understanding of identity as a factor in smoking, and how this relates to the emerging entrenchment in our society of opposing positions regarding smoking, and its subsequent consequences for the health of smokers. This research aims to explore this new slant, in the hope of producing new insights.

Methods

Several key themes that emerge from previous research regarding the choice to smoke have been presented; namely identity as a factor in commencement, the way smokers and non-smokers interact, social factors in commencement and establishment of a smoking habit, and emotional self-management as a factor in habit maintenance. In this work, Thematic Analysis (see for example Braun & Clarke [38]) is used to explore a sample of smoking-related tweets for themes relating to these considerations. The approach was used to good effect in material in this subject area by Uppal *et al.* [39] and Lewis and Russell [7], which whilst their material was more narrative in nature, was chosen for its flexibility. Thematic Analysis is is proposed here because its flexibility makes it possible to adapt it to the short nature of tweets, in which it may be hard to discover any deep narrative in the material emerging over a lengthier contribution from a single participant; however a number of subtle themes may be in evidence. With this in mind, the following tentative research foci are proposed, bearing in mind that work of this nature needs to be open to what emerges from the data, so research questions serve as guidelines only:

- Smoking and identity: how do issues of smoking-related identity and self-image emerge on Twitter? Do we see any evidence of a "fun" vs "sensible" polarity at the commencement stage?
- Smokers and non-smokers: how are interactions between the two groups discussed on Twitter? What feelings are expressed about those interactions? Is there animosity, and if so, what seems to be the basis for it?
- Social facilitation: what evidence do we see on Twitter for social benefits and constraints feeding into the decision to smoke? What themes underlie this?
- Smoking and emotional self-management: how do people talk about using smoking to regulate their emotions? Is there anything in Twitter data that might shed light on the disparity between smokers' subjective perceptions and objective data regarding the efficacy of smoking for emotional management?

Two samples of data were gathered from Twitter using the advanced search functionality. The samples span a two day period in mid-December, and a five day period spanning the new year and chosen for its likelihood of providing a rich sample around feelings about cessation and social aspects of smoking, as well as being a time period when many people aren't working, and therefore may vary from their usual routine. Different time durations were selected in order to ensure an adequate number of relevant tweets for analysis, a point further discussed below.

The following search string was used; `smoking OR smoke OR cigarette OR cig -marijuana -weed -hash -ganja -pot -cannabis -dope`. This search string aimed to exclude use of cannabis. However, sometimes it isn't clear from what someone tweeted whether they were referring to smoking tobacco or cannabis.

Only tweets from the UK were selected, meaning that those who don't give their location are excluded from the sample. Since only 5% of Twitter users volunteer their location, this means that the tweets gathered were far from being a full sample of all smoking-related tweets in the UK for the selected time period. There is potential for systematic bias in this, in that Twitter users who are happy to volunteer their location may express different points of view and be using Twitter for different reasons than those who aren't.

Note also that Twitter doesn't presently provide access to all past tweets, but a sample only, and this sample decreases over time. It is therefore not possible to recreate the search result as it was performed at a particular time. This factor also means that inferences can not be drawn based on the overall quantity of tweets gathered in the time period, because tweets disappear from availability in an unpredictable way. The mid-December sample was taken at the time, to span the preceding few days. The new year sample was taken in early February and is therefore missing more tweets. This is why the second time period is longer than the first; this was necessary in order to gather enough tweets.

A first step then involved removal of irrelevant tweets that the search string did not succeed in excluding. These include tweets not relevant to smoking at all, for example relating to the smoking of food, or referring to London as "the big smoke", and also tweets that the researchers' best judgement deemed to be referring to the smoking of other drugs. There is room for error on this latter point since it is often impossible to distinguish whether a tweet is talking about smoking tobacco or other substances instead/as well. The number of tweets relevant to this issue are small; however where error occurred it is likely to be in the direction of occasionally including tweets that relate to the smoking of other drugs.

Broad themes are initially used to provide a descriptive quantitative analysis. This allows the reader to gain an objective impression regarding the prevalence of certain themes of interest. More detailed coding then explores subtler qualitative themes. All tweets given in the article have been anonymized and inconsequentially altered to protect the privacy of the tweet author. The full, anonymized but otherwise unaltered dataset is conditionally available on request.

Results and Discussion

As noted earlier, tweets were first filtered to remove tweets that aren't about smoking at all, then tweets that whilst mentioning smoking say nothing in particular about it in the way of an opinion or experience or some way in which smoking is impacting on their life were also removed. Such tweets may simply mention smoking in passing, rather than being in any way *about* smoking. An example might be "Going for a cigarette", which is too neutral to infer very much from, as opposed to "Want to go for a cigarette", which contains an expression of volition. Table 1 presents the remaining counts.

Table 2 shows broadly speaking the topics under discussion in the two different time periods, and indicates a shift toward cessation as a theme, at the expense of more general opinion and experience. The percentage of the sample comprising people talking about quitting smoking in the new year sample is substantially higher; 29% as opposed to 12%. In the new year sample, a large additional number of people are planning a quit attempt or have begun one.

Tweets focused on cessation attempts are predominantly by people talking about having begun a quit attempt, and tend to include the duration of time for which the tweet author has been cigarette-free. These include among numerous others, 166, "Three weeks since my last cig", and 301, "8 days without a cigarette. Hopefully this time I've cracked it". Relapse admissions don't tend to note the cause, and there is a sense that the reasons are taken to be so obvious they don't warrant mentioning.

The widespread interest in cessation reinforces established findings, e.g. [1], noting that a large number of smokers are interested in quitting.

In the remainder of the section, the four research questions are examined in more detail under the two headings of opinionated and experiential content. Each of these two sections begins with a quantitative overview, in order to ground the analysis in an understanding of prevalence in absolute terms, though note the caution earlier about drawing any firm quantitative conclusions from Twitter data.

Opinion Regarding Smoking

Among opinionated comments, main topics for discussion include the following (see figure 1:

- **Attractive**–expressing opinions around whether smoking is attractive;
- **Celebrity**–commenting on news articles regarding a celebrity smoking;
- **Health**–comment relating to health impacts of smoking;
- **Safety**–relates to safety concerns around smoking *other* than health;
- **Legislation**–contains discussion around legislation that affects smoking;
- **Smoking Ad**–relates to the new year anti-smoking advertising campaign;
- **Dislike Smokers**–contains a range of negative comments about smoking and smokers;
- **Young People**–comments on young smokers;
- **Smokers Inconvenience Me**–comments describing feeling inconvenienced by others' smoking habit;
- **Misc. Comments**–could not be easily categorized.

There are differences in how people talk about smoking in the December and new year periods. Notably the expression of negative attitudes toward smokers and smoking lessens in the new year period. Legislation was a key topic in December. In the new year period, the legislation focus seems to switch to the smoking cessation advertising campaign that was newly on air at the time, though overall the legislation interest is lower. The inconvenience of smokers to non-smokers also becomes less of a focus in the new year period. In summary, there is a broad shift away from complaining about smokers in the new year period, in favour of less easily categorized social comments that will be explored further using qualitative approaches.

None of the tweets relating smoking to health, 45 in total, in any way dispute the fact that smoking is harmful for the health. These tweets contain a substantial representation of tweets by smokers talking about their own health, e.g. tweet 27, "Had a lung x-ray done when I was smoking heavily, can do a before and after from a few years of these ecig things." Tweets discussing young people smoking express (mild) outrage. Safety comments discuss for example smoking whilst driving.

Smoking and Identity: The way in which smoking is perceived is a key factor in the decision to commence smoking, and themes regarding smoking and identity emerge from the subtext in tweets about self-image, personal style and smoking. Whilst more common to criticise the perception that smoking is "cool", "hard" or in any other way attractive, the repeated references to it indicate that the jury is very much out on the subject for many people. Whilst tweet 95 baldly states "I find smoking attractive", feeling the need to say it perhaps indicates a recognition that

this may be inflammatory. Others express some embarrassment; tweet 1837 says "Is it bad that I find smoking attractive on some people?" Five celebrities are admired for their attractiveness whilst smoking; for example, tweet 1578 "A young leonardo dicaprio smoking is every girl's dream".

Pictorial representation of smoking emerges as a theme, with six tweets focusing on attractive images of smoking, for example tweet 1520; "'@PictureArchive: Tippi Hedren having her cigarette lit by a crow on the set of The Birds ' yes", and additionally, as subtext in the six tweets presented in table 3, dissuading photographers from an inclination to share self-portraits taken whilst smoking. The beauty of the smoking experience is noted as an appeal for adolescents in previous research [12], perhaps contributing to a penchant for photographic representation. One suspects this is the age group most given to smoking "selfies".

The opposing perspective, that smoking is not clever and not attractive, is expressed directly in the far greater total of 47 tweets, pairing smoking with adjectives such as "gross", "vile" and "minging". Smokers are called "silly", "muppets" and "pratts". Smoking as a "turn off" also appears, e.g. in tweet 181, "Can't express how much of a turn-off I find smoking". As with the "smoking selfies", the feeling that smoking is attractive and a source of self-esteem is primarily evident in the vociferousness with which the counter-opinion is expressed, and in more indirect acknowledgements such as those in table 4. The absence of overt defence of the position that smoking *is* cool leaves us with little to go on in trying to understand why this point of view is so influential, but the appearance of smoking seems to be an important factor.

Smokers and Non-Smokers: The way in which smokers and non-smokers talk about being affected by each other can help us to understand how identity issues solidify as habits become established. Non-smokers frequently complain about the impact smokers have on them in this sample. This centres around the nuisance of cigarette smoke in their personal space, for example tweet 603 says "Fucking hell, don't smoke beside me". A further eighteen tweets focus on this issue, with cigarette litter being another common gripe. Table 5 presents six tweets complaining about having to wait whilst a bus driver has a cigarette break. Unfairness of smoking colleagues taking more breaks also comes up; 377, "I'm honestly thinking of taking up smoking just to get the 15 min breaks every hour like everyone else".

One can't help but feel sorry for the neighbours of the authors of tweet 1441; "My next door neighbour probably finds random cig ends in his garden which is quite joke. I hope I see it happen some day", and 1552; "The amount of cig and roach I throw in next door's garden is unreal". Certainly a level of animosity evident in some tweets by non-smokers about smokers suggests strong ill-feeling, that manners may lie at the root of. The large number of anti-smoking tweets, 55 in total, covers a spectrum from mild disapprobation through to what must surely be considered hate speech (two tweets), one commenting on pregnant women smoking and the other on smokers' entitlement to NHS health care.

The reverse feeling, of negative stereotyping and attitudes toward non-smokers, is much milder; 1458 is one of very few examples; "Don't drink, don't smoke, what do you do?". Complaints may include an acknowledgement that not smoking is the superior choice; tweet 1983 protests, "Yeah okay, don't drink, don't smoke, that's

cool. Just don't be a pretentious prick about it.". Similarly, in the tweets in table 10, smoking is grouped with such overtly negative attributes, however humourously intended, as being a "cow", "sod" etc. Smokers' comments about being on the receiving end of disapprobation often focus on being excluded from public houses or similar, and be unacrimonious in tone. The emerging picture seems to be that smokers don't feel they have a case to argue.

Attitudes toward quitting illuminate mixed perspectives on switching camps, at once regarded as trivially easy and improbably difficult to accomplish. 1721 states "Sick of all this "New Year, new me" bollocks without substance. If you want quit smoking, stop buying cigs. Choose your path and walk it." Similarly dismissive of the difficulties faced in quitting by those who are addicted; 350, "I don't see how people find smoking hard to give up". Conversely, cessation attempts may be regarded as insincere or implausible; 1876, "New Year's resolutions. Gotta be the biggest MYTH in the world. Gonna lose weight, give up smoking/drinking/gambling. Fuck off". Parents generally appear as a source of pressure to quit. Strategies may include bribery, as shown in a total of three tweets in table 11. Parents aren't the only authority figure to take an interest; tweet 1406 comments "Was offered a 25p pay rise to stop smoking what even is my my boss".

Continuing the theme of smoking and authority, government attempts to promote or failure to promote cessation may be regarded with suspicion; 501 says "@Friend123 @Friend456 Rightly so, but my point was, the government don't care about smoking related deaths because it's a good earner." 516 shares "This would save lives: Are vested interests blocking plain cigarette packaging as election approaches? http://theconversation.com/plain-cigarette-packaging-is-the-government-stalling-as-election-approaches-35438". 29 tweets express a range of opinions toward government intervention, mostly in favour, with an additional 34 commenting on the new year anti-smoking campaign, which included a hard-hitting television advertisement. Responses to this campaign mostly suggest that it puts people off smoking. Some resent being exposed to disturbing images by the "nanny state"; 834, "Really not liking those anti-smoking adverts. They are disgusting. Surely we should treat people like adults & let them make their own choices!" Tweet 1610 addresses the NHS; "@nhssmokefree I don't smoke and I really don't appreciate being subjected to such disgusting material whilst relaxing. People know the risks." The humourous response suggests that it "makes you want a fag" (e.g. 1420). A selection of pro-legislation tweets are given in table 12, and often expressing opinions forcefully, with anti-legislation tweets being smaller in number and taking a more plaintive tone; 1999, "@Friend789 doesn't matter who you vote for, your freedoms will slowly be taken away. I still miss sitting in the warm while having a smoke!" There is certainly evidence here for antagonism around the issue of smoking cessation, supporting previous research.

Experiences of Smoking (Non-Opinionated Content)
Figure 2 presents, in quantitative terms, tweets relating to experiences of smoking, that is to say, talking in simple terms about how some aspect of smoking affects them rather than giving an opinion. The following themes are represented:
- **Smoking Area**–refers to events occurring in the smoking area at an entertainment establishment;

- **Social Bonding**–these tweets implicate smoking as a friendship tool;
- **Can't Smoke**–tweets about wanting to smoke and not being able to;
- **Disapprobation**–tweets about receiving negative reactions as a result of smoking;
- **Financial**–comments on how smoking is an expensive habit;
- **Enjoy Smoking**–tweets suggesting that smoking is experienced as pleasurable;
- **Psychological**–psychological motivations to smoke are mentioned;
- **Hard on Throat**–smoking is mentioned as causing uncomfortable throat symptoms;
- **Smells Bad**–the smell of smoke is mentioned negatively;
- **Inconvenient**–the inconvenience of maintaining a smoking habit is mentioned (financial inconvenience not included in this category).

Tweets, show a shift in the new year away from the more routine-focused comments that dominated in the December sample, namely anticipation of smoking, wanting to smoke but being unable to and the psychological benefits conferred, perhaps less needed when people are likely to be on holiday, and toward aspects that tend to arise when people are smoking in social environments. Freed from routine during the holiday, for example, a person might be less likely to tweet about how they are going to smoke, and more likely to simply go ahead and do it. However comments pertaining to the smoking area are up, presumably in line with a greater likelihood of being in a smoking area at an entertainment venue, and social bonding, perhaps resulting from spending time with friends and family. The inconvenience and smell of smoking increases in the new year period, as people perhaps spend more time in entertainment venues where they must smoke outside, and may take on an odour.

The dominant theme in the corpus is that smoking is enjoyable and regarded by those partaking with pleasant anticipation. For example, six tweets pair a cigarette with coffee, indicating a particular enjoyment of this combination. Tweet 842, for example, states "just blasting (names music group) with coffee and a cig". The hazards of addiction in the form of craving is also a dominant experiential theme, for example tweet 400, "Dying for a cigarette". Analysis will now focus in more depth on the subtler psychological aspects of social bonding and psychological relief and support.

Social Facilitation: Particularly in the early days of developing a habit, social concerns can be important. A substantial proportion of the tweets are related to social cohesion aspects of smoking, with over 30 explicitly mentioning smoking as a facilitator of social bonding, a further 24 referring to events taking place in the smoking area and numerous others more tangentially referring to social bonding ensuing from a shared habit. Five tweets highlight how a non-smoker may feel excluded or inconvenienced if their friendship group are predominantly smokers, indicating perhaps a pressure to conform. For example, tweet 1852 states "When everyone leaves you because they smoke". Certainly the literature presents evidence that smoking is an important part of fitting in, especially among young people [7].

Within the smoking community, manners are an important issue, often centring around the appropriateness and implications of asking for a cigarette, and how

the opportunity to smoke is obtained by those lacking the means; a representative selection of eight such tweets is given in table 6. Note that McKie et al [9] found issues around sharing cigarettes to be more pertinent among young smokers, and that the pressure may be strong. One of their participants says that he transitioned from occasional social smoking to buying his own cigarettes because having accepted cigarettes from others in order to fit in, he felt the need to offer cigarettes in return. In our sample, we see a concern with the etiquette of cigarette sharing, supporting earlier research on this point.

As noted in the discussion regarding smoking and identity, in-groups and out-groups are implicit in the decision of how to ally oneself, and of particular interest perhaps is the way in which parents are involved in the decision. Where parents identify themselves as outsiders, they may strongly model smoking, and be accepting or even encouraging of their children smoking; for example Lewis and Russell [7] mention working class solidarity as a factor in their study based in a deprived area in the north-east of England, and give examples of familial facilitation of children's smoking ("always an open packet on top of the TV"). Alternatively, smoking may be a way to cope with parental pressure or rebel against it [40]. Of course, the decision may be neither of these things, but telling parents that one is a smoker is often regarded as an important step. As noted above, parents mostly appear in tweets as a source of pressure to quit or as a preventative factor. However, tweet 1505 comments "I told mum that I smoke when I drink, so she's gone and got me a cigarette tin, a lighter and some papers, encouraging me or what", and social bonding with parents through smoking or quitting also appears, such as in 1779 "Smoking with the father", and 1373, "Me, my mum and my dad are giving up smoking so it's all very tense in the (gives family name) household"

Perhaps most poignant among the opportunities for social connectedness afforded by smoking are those with people from different walks of life. In table 7, the experiences shared with the most enjoyment are those of sharing cigarettes with society's outsiders and those in unfortunate positions, such as homeless people and "patients". Note also a sense of pride in being able to be generous in these tweets, that is reminiscent of Klein's [41] reference to "tokens of a soldier's generosity" in a context of war (p. 137). In enabling another to smoke, a person gives not only a cigarette but also emotional comfort. This experience of giving and receiving can be a real high point, and there's a sense that this is why the tweeter chose to share it (in tweet 574's words, "high of the evening"). There is perhaps also a sense that the common ground created by sharing a smoke is all the more compelling when it spans social diversity.

Smoking and Emotional Self-Management: Numerous references appear to the psychological relief afforded by smoking under trying circumstances, with 32 tweets explicitly linking smoking with mood, particularly interesting in light of research failing to objectively substantiate positive emotional effects. In particular, in our sample, smoking is used for stress relief, and withdrawal results in tension, meaning that emotional motives to smoke for established smokers are two-fold. 821 notes stress as a particular challenge to an otherwise successful cessation attempt; "A man can go 10 years in his life and not put a cigarette to his lips and a situation arises and he can pick one up for relief .. Help?" 417 finds relief in a cigarette in

the face of feelings of panic; "When I saw @Acquaintance123 @Acquaintance456 I had to get outside after set and nearly had anxiety attack, got out the building had a cig & calmed down". Seven tweets talk about tending to eat more if they don't smoke, illustrating that in the mind of some, there is an explicit tradeoff between not smoking and maintaining a healthy weight, and perhaps explained by increased comfort eating. In conjunction with the fact, reinforced quantitatively in our sample, that smoking is perceived as a very pleasurable activity, there are strong reasons why smoking feels good in the short term, and a large component of this is psychological.

This brings to mind our finding in the literature of adolescent smoking commencement that smoking is associated with a short term pleasure orientation ("fun loving") where non-smoking is associated with being less interested in pleasure and more long-term focused ("sensible") [16]. There is some evidence of this in our sample. Table 8 presents a selection of tweets themed around the phrase "just wanna", which seems emblematic of the way in which smoking is seen as a way of switching off from any more challenging concerns. In terms of how we engage with our experience, the "just wanna" theme implies escapism, however temporary. So far our findings back up established research findings.

A subtle theme in the sample is the use of cigarettes to manage engagement with emotional experience. The theme in the literature around managing transitions using cigarettes, such as from school to employment, is echoed in the sample on a much smaller scale (sleep to waking, work to home). For example, 614, "Just got in from work and all I'm interested in is food and something to smoke". In fact, tweeting may be serving a similar purpose to smoking here–transitions can perhaps leave one feeling rather adrift. Cigarettes also appear in the context of boredom, particularly in previous interview-based research, for example [9]. There's also a suggestion that having become accustomed to this emotional prop, it's harder to relinquish it ("What do you do with your hands?") Why do cigarettes have such an unique appeal in those moments? The "just wanna" theme suggests they primarily offer distraction; the effect of nicotine is rapidly felt, and may meet a need for instantaneous relief, but there may be more to it than that. It may be that the relief afforded by smoking is simply in the choice, however temporary, to prioritize pleasure and disregard other concerns. Klein [41], however, might argue for a more existential interpretation, suggesting that flirting with death is part of the appeal (he coins his title term "sublime" for this), and McKie et al find some suggestion that smokers are more accepting of mortality [9]. Might this be part of the benefit? Certainly an awareness of mortality can help to get things in proportion, and a cigarette is a regular reminder of mortality.

Several references appear to the cultural association of smoking with the post-coital period. The tweets in table 9 seem to imply an association between smoking and digesting experience, insofar as "powerful" and "good" sexual experiences or situations metaphorically associated with them seem more in need of marking with a cigarette. Tweet 343 also associates smoking with the opportunity for reflection, a psychologically healthy behaviour that some may find anxiety-provoking and in need of facilitation; "Standing outside university library, tweeting, smoking and reflecting on life is a known past time of mine".

In summary, whilst there seems to be an association between smoking and evading difficult feelings, a finding backed up by quantitative research such as McGee et al's [19], who make a compelling case that use of smoking has a detrimental effect on the development of helpful coping strategies, a more subtle undercurrent suggests that smoking may be used to facilitate emotional processing, a finding that brings to mind Vollrath's [17] finding that smokers tend to have well-developed positive emotionally-focused coping strategies, such as positive reinterpretation and acceptance; a point that may be overlooked against a backdrop of extensive literature extolling the virtues of active problem-solving.

Conclusions

Thematic analysis of smoking-related tweets provides an opportunity to discover how people are using this medium to talk about smoking, and learn something about them, about smoking and about society's attitude to smoking. In addition to widespread support for existing research, several notable findings emerge:

- A very large amount of anti-smoking opinion is expressed;
- There is a disparity in the way that pro-smoking identity is conveyed as opposed to anti-smoking identity;
- Smoker/non-smoker relationships show a degree of antagonism that supports the hypothesis of potentially damaging polarization and stigma;
- Positive experiences of social bonding facilitated by smoking are illustrated in ways that show their depth and subtlety;
- Smoking as a potential support for positive emotionally-focused coping is raised as an area for further investigation.

Opinionated dialogue on Twitter is very much slanted toward the strong expression of negative views regarding smoking, to such an extent that some explanation seems required. In qualitative terms, regarding the reasons for the non-smoking bias toward (negative) opinion and the smoker tendency to focus on experience, the explanation most likely lies in why people choose to tweet about smoking. For a non-smoker to feel motivated to comment on smoking on Twitter, they most likely feel a strong opinion. This would explain the level of anti-smoking *opinion* in the sample–there's little obvious reason to praise smoking as a non-smoker. Smokers, on the other hand, are simply talking naturally about their lives, so for the most part describe experience rather than giving opinion. We shouldn't forget that this isn't really "dialogue". The smokers and the non-smokers aren't in fact talking to each other and are most likely unaware of each other's tweets. In quantitative terms, however, it is interesting that in our sample, the balance between smokers and non-smokers seemed fairly equal. This is rather a large number of non-smokers who feel motivated to comment on a habit they don't subscribe to. We propose that an increasing polarization is emerging as smoking becomes more stigmatized. Poland [8] raises pertinent issues regarding who captures the mainstream voice and who is marginalized, and notes that a characteristic of modern western culture is the increasing devolution of responsibility to the individual, perhaps resulting in non-smokers policing the anti-smoking campaign. Lewis and Russell note with concern that the young smokers they interviewed [7] associate abstention from smoking with "being a better person," a finding reminiscent of table 10, in which continuing to smoke is paired with a variety of disparaging comments aimed at the self.

Identity formation themes are frequent in the data presented here, perhaps because Twitter users tend to be younger, and identity concerns and smoking commencement associate themselves with this age group. It's interesting to note that smokers' identity-focused reasons to smoke don't express themselves in the form of opinion, but are evident in themes such as pictorial representation, and a willingness to comment on positive experiential aspects of smoking such as enjoyment and social bonding. Non-smokers will use words such as "silly" to talk about smokers, thus indicating their perceived reasons for making a different choice. At the commencement stage, therefore, this sample may offer a hint that not smoking is to a greater extent felt to be a reasoned decision, whereas smoking may be more emotionally driven, a finding backed up by previous research. From a polarization point of view, this raises concerns that smoking may be part of an identity formation process that entrenches a person in a particular coping style, denying them the benefits of a more holistic approach. Whilst evidence suggests that smokers become more limited in their access to active problem solving, it might be interesting to investigate whether the more vehement anti-smokers tend to neglect positive emotionally-focused coping strategies.

Whilst this research doesn't have access to information about the age of the tweeters and their level of establishment in their smoking habit, a certain shift of themes seems likely to associate itself with older, more established smokers, and this shows itself in regard to relations between smokers and non-smokers. In particular, a large number of (apparent) non-smokers talk about being inconvenienced by smokers, for example by cigarette smoke or having to wait for someone to have a cigarette break. It's interesting that these gripes and grumbles are considered interesting enough to share on social media in such numbers. The interest in anti-smoking legislation and the occasional appearance of pronounced hostility toward smokers supports the suggestion of polarization, though note also that there are explanations for a strongly negative attitude toward smokers *in some cases*; for example, where passive smoking is believed by a person to have resulted in ill-effects for a loved one. Without being able to ask a person concerned to explain their opinion in more detail, we cannot know the reasons for it and should be wary of deducing a broader theme.

The social focus at the commencement stage that emerges from the literature is supported in this research, in particular with an interest in the etiquette of cigarette sharing and frequent references to smoking in a social context, who one chooses to smoke with and similar. This work offered opportunities to explore the theme more deeply, and found that social bonding opportunities offered by smoking, particularly to connect with people under shared trying circumstances or to be generous, may be very compelling, and regarded with strong positive feelings. This social bonding aspect should be considered as a factor in habit maintenance, offering opportunities to give and receive support and feel connected, and may also affect polarization, in that it may strengthen the shared smoking identity.

With regards to emotional self-management, again, this work reinforces previous findings regarding the use of smoking to escape from difficult feelings ("just wanna"). However, "escaping" and "managing" are quite different things, and evidence here that smoking is used at times of emotional difficulty by no means indicates that smoking, as an emotional strategy (ignoring for the time being the

physical ill-effects of smoking), is universally a bad one. Whilst the broad finding is that smoking is used for emotionally-focused coping, a subtler theme emerges around smoking and positive emotionally-focused coping, which we suggest warrants further recognition. Perhaps it is in this that the potential lies for a better understanding of smokers' loyalty to a habit that, for them, may facilitate positive emotionally-focused coping, and a mutual commitment to a balanced approach.

Limitations in this work mainly centre around the difficulty obtaining broad demographics for the participant group and specific demographics that would enable comparison between groups, in particular younger and older participants and people in different stages of establishing a habit. Furthermore the short, context-free nature of tweets places limitations on qualitative researchers' ability to gain a deeper understanding of the perspectives expressed. Quantitative findings are also tentative only since the sample selection process was conducted using Twitter Advanced Search, which is subject to a non-deterministic random sampling procedure.

Future work suggested by findings here focuses on how identity conceptualizations relate to coping styles, and why people make the choices they do, for example in beginning to smoke, often at a very young age. In what ways does smoking reinforce the narrowing of the repertoire of coping styles, which ultimately becomes entrenched and limiting? How do individual self-perceptions relate to the broader picture of how smokers are perceived by society, and how might the dialogue be advanced in such a way as to better accommodate and affirm smokers in their own, self-driven cessation process?

Competing interests
None declared.

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Figure 1 Distribution of Social Comment Tweets Tweets comprising opinion about smoking are categorized into themes.

Figure 2 Distribution of Smoking Experience Tweets Tweets describing experiences of smoking, as opposed to opinionated remarks, are categorized into themes.

Tables

Table 1 Corpus Statistics. Corpus statistics indicate, of the tweets gathered using the search string for each of the two time periods, how many of the tweets remained after discarding those that didn't refer to tobacco smoking, and of those, how many say something about smoking that is relevant to analyze.

	Tweets for Analysis	Uninformative Tweets
December 17-19	339	275
Dec 29-Jan 5	710	416

Table 2 Overview of Subject Matter. Tweets that say something interesting about smoking are divided into three broad categories here for each of the two time periods considered; tweets about cessation, tweets giving opinions about smoking and tweets indicating something about the experience of smoking.

	Cessation	Opinion	Experience	Total
December 17-19	40 (12%)	160 (47%)	139 (41%)	339
Dec 29-Jan 5	205 (29%)	270 (38%)	235 (33%)	710
Total	245 (23%)	430 (40%)	374 (36%)	1049

Table 3 Smoking Selfies Aren't Appreciated. A themed selection of tweets expresses the opinion that it is becoming tedious that people like to post pictures of themselves smoking on social media.

621	Opening someone's snapchat story and it's them smoking."
422	You excited smokers need to stop blowing smoke at the camera everyday on snapchat, I've had enough now.
604	Watching people get lean on snapchat is really really offputting. They like, stare straight at you when they smoke it's just creepy.
1471	What is it with girls thinking they're all tumblr on Instagram, having 5 photos, each of them either smoking or of scenery?
1634	yes we know you smoke now, you don't have to keep posting it on snapchat so we remember.
1815	I don't understand why people feel the need to post pictures of themselves smoking a fag or with a joint in their hand.

Table 4 Smoking Isn't Cool. A themed selection of tweets expresses distancing from the idea that it's cool to smoke, or expresses ambivalence.

304	It's where all the hard gangsta's come to smoke and look hard. (at @McDonaldsUk in Burgess Hill, West Sussex)
214	Getting a false sense of being cool even though it's a fucking E-cig
1581	Freshmen Tip #1: Don't try to act like you drink and smoke to be "cool".
1902	I also apologise if it seems I was trying to big myself up because I smoke. That was not my intention
1942	Weirdos in this town who have to make it aware to the entire country that they smoke get away from me please
2000	Can someone please tell wee fuds that wearing Ellesse/Fila zippers and smoking a fag doesn't make you hard.
1401	@Friend23 @Friend45 to quit smoking? Yes you should. Filthy (cool) habit.
252	Why do people go out of their way to make it obvious that they smoke like plS it's embarrassing
1399	@Friend23 @Friend45 oh hush silly. Smoking made me think I was cool. All it did was give me a cough. Gave it up.

Table 5 Bus Driver Needs a Cigarette Break. A themed selection of tweets expresses annoyance when bus journeys are delayed by drivers taking a cigarette break.

40	When the bus driver stops for a cig when your on your way to work _
195	@FirstManchester does the driver really need to get off at a stop to have a cigarette?! Not like some of us have work to get to. Joke.
612	The @on_lothianbuses 0901 no.8 turns up at 0902. What does the driver do? Gets off the bus and had a cigarette!
12	@TranslinkMetro I'm on the 30 bus and the driver decides he's going to have a quick smoke at the door of the bus!
816	Pretty sure the bus driver is getting off at every stop on the way to Limerick to smoke a fag!
1374	@Dalesdistrict Why's the driver of your 72 stood smoking when the bus is supposed to have left?

Table 6 Asking for a Cigarette. A themed selection of tweets discusses the social acceptability of asking for a cigarette.

1700	Dont you dare ask me for a cig if you've met me once
1706	2 hours and 50 mins into the year and been called a cunt by a stranger already for not giving him a cig! Happy new year!!
1707	When a randomer asks to borrow a cig... Are you going to track me down and return it or just take it? Also... More important, I don't smoke!
1838	Nowt's more annoying than people who claim they smoke but they never buy their own cigs and just constantly try and scrounge off everyone else

Table 7 Connecting with Otherness. A themed selection of tweets describes incidents of unexpected social connection and solidarity shared through smoking.

539	I gave a homeless man a cig and £1 and he said my kindness will bring me luck, he was proper lovely
574	Had a cigarette with a homeless man on a wall last night, that was the high of the evening
594	I offered an old man a cigarette because he was struggling to roll a roll up in the wind... good deed of the day done
6	Last night, after Ethan pushed me over, me and some guy sat on the floor and shared a cig. He told me I was gonna go far in life.
470	Jus having twos ona cig with a taxi driver (I'm having first twos)
1553	Going out for a cigarette with other patients at 4:15am, class

Table 8 Just Wanna. A selection of tweets themed on the phrase "just wanna".

66	I just want to smoke cigarettes & fuck the pain away
80	I just want to get drunk and smoke
131	@Friend13 trust me, mouth hygiene is important, that's what I said too but you know, when shit gets stressful you just wanna smoke
439	I just wanna smoke, chill, go home nothing else sorry bye
1527	She just wanna smoke and fuck, I said girl, that's all that we do.
1917	@Friend14 I just wanna smoke & drink & have fun, it's so difficult to find the right place

Table 9 Smoking and Sex. A selection of tweets expressing the cultural association between tweets and the post-coital time period.

956	@Friend15 Oh wow, seems like one powerful spiritual experience... I may need a cigarette afterwards.
395	"The sex was so good, even the neighbours had a cigarette."
1643	This referee'll need a cigarette after this good fucking he's giving us. #lcfc #LfcvLcfc

Table 10 No to New Years' Resolutions

1717	New year. Same me. Still the same weight, still the same height, still smoking, still drinking, still a cow, nothing changes
1746	New start & all that shit, no change for me, 2015 will start with a massive hangover, so a fry up and hair of the dog followed by a smoke.
1810	My new year's resolution is to drink more, smoke more and continue being a grumpy sod.
1813	I'll still drink, smoke, be a cunt, etc etc in 2015.

Table 11 Parents Resort to Bribery

839	My dad's offering my sister driving lessons and a car if she stops smoking. I'm going to start smoking and see what I get offered haha
802	Mum's gonna buy me an electric cigarette, and if I quit smoking she'll pay for me to go Amsterdam...
938	Mum said I can only go on holiday with (friend's name) if I give up smoking.

Table 12 Government Should Legislate

188	All of these potential laws about smoking in your house & in a car with children are quite right #smokingkills
406	Why isn't it illegal to smoke at bus stops?
510	Smoking whilst driving should be made 100% illegal
2017	Quit smoking campaign targets roll-up #cigarettes. There is no safe level of #smoking & we must do more to reduce it.