Human Arenas
https://doi.org/10.1007/s42087-024-00434-1

RESEARCH

Social Smoking – an Observational Study

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Received: 24 August 2023 / Revised: 30 July 2024 / Accepted: 1 August 2024

Abstract
The importance of social factors is well established in research on initiation and maintenance of smoking. The increased likelihood to smoke in social contexts or to mainly smoke in the presence of others is even defined in a technical term known as "social smoking". However, numerous studies about this phenomenon are based on surveys, experiments, or indirect measures on social media. Observational studies of actual smoking behavior in the real world are rare. We observed real-world smoking behavior at the workplace and hypothesized that social smoking is more prevalent than smoking alone and that social smoking is seen more in women than in men. In a passive field observation over a two-week period, we observed a total of 73 adults (24 women, 49 men) during their smoking break at the entrance to their workplace. The categories for observation were predefined and documented on an observation sheet. Descriptively, we could confirm both hypotheses. In particular, the smoking break of social smokers lasted significantly longer than those of single smokers; despite this, all social smokers only smoked one cigarette during their break. Furthermore, 48.9% in our sample smoked first before talking. Within single smokers we observed increased phone use compared to social smokers. Further research is required to comprehend the link between social environments and smoking behavior, particularly for social smokers taking gender differences into account, and to counteract the strategies the tobacco industry has used to market smoking as a social activity.

Keywords Smoking · Social smoking · Gender · Observation · Real world

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Published online: 06 September 2024

Introduction

According to the World Health Organization, more than eight million people die due to smoking each year across the globe (WHO, 2021). Out of those deaths, more than seven million are attributable to direct tobacco consumption, the remainder to second-hand smoking. This high mortality rate results from the fact that smoking increases the risk of various diseases including chronic obstructive pulmonary disease (COPD), coronary heart disease, different types of cancers, as well as potential life-endangering health conditions such as strokes (American Lung Association, 2021). Despite the risk to their health, individuals still choose to smoke. Important questions for health research therefore are why people fall victim to this harmful behavior in the first place and which factors play a role in maintaining the addiction. Within the present study, the influence of the social environment on smoking behavior, the perception of smoking as a social activity and its importance to smokers is further explored. Previous studies have shown that social factors are more impactful than expected and therefore should not be neglected in prevention of addiction (e.g., Dimoff & Sayette, 2017; McDermott et al., 2006). In the following, we will start by outlining the role of the social environment as a potential motivator in starting and maintaining smoking behavior. We then describe the role of modelling in the real world before turning to the reinforcement of smoking behavior in the virtual world, and existing gender differences.

Social Smoking and Socially Motivated Behavior

The existence of the technical term "social smoking" shows the extent to which smoking has already become established as a social activity. While there is no consistent definition across studies of what makes someone a social smoker, they are usually defined as individuals who mainly smoke with others or who are more likely to smoke in social contexts, e.g., when going out to clubs and parties (Song & Ling, 2011). Due to their usually lower smoking frequency and intensity, they generally believe not to be addicted and may not realize that their less frequent smoking behavior still poses an increased risk for smoking-related diseases (Moran et al., 2004). Moran et al. (2004) state that this, in turn, may lead to a lower intention to quit smoking because of social smokers' missing perception of the need to do so. Furthermore, due to their denial of recognizing themselves as smokers and denial of their addiction, they will also underestimate the health risk associated with tobacco use (Schane et al., 2009a).

However, social factors do not solely apply to this sub-group but also to smokers in general, inferring the role of wider social environment. The term social smoking thus not only refers to the contexts in which some people mainly smoke (parties or other social gatherings) but also implies which motivational factors play a major role in the initiation and maintenance of smoking behavior. In the US, 90% of daily adult smokers had their first experience smoking by the age of 18 (Centers for Disease Control & Prevention, 2021). When asked, young smokers frequently describe smoking as a social activity and state that it facilitates the access to peer groups and helps them to fit in (Clark et al., 2002; Haustein & Groneberg, 2010; Hurrelmann, 1998; Oh et al., 2010). The perceived social benefits of smoking lead to adolescents readily picking up this habit even though smoking itself only becomes pleasant after one or two years for some adolescents (Haustein & Groneberg, 2010). That is to say, the social benefits gained from smoking may outweigh the activity

itself, at least in the beginning. Due to these perceived benefits of achieving social belonging and having a higher sense of inclusion in a group, some might maintain their smoking behavior over a longer period of time to not lose their group affiliation (Dimoff & Sayette, 2017). Adolescents, for example, state "not losing friends" as a reason why they refuse to quit smoking (Morgenstern et al., 2007). Social factors are thus in part responsible for smoking initiation and maintenance.

The importance of social acceptance as a dominant motivation for the initiation of smoking, does not only apply to adolescents but also to young adults. Although the prevalence of socially initiated smoking might be higher in a younger cohort, Shiffman et al. (2015) have shown that social smoking occurs in adult smokers as well. In a study by Lennon et al. (2005), young adult women described smoking together as a bonding activity. They indicated that smoking was still used as a means to meet new people and to fit in. Smoking had less to do with actual peer pressure being applied but more to do with the type of social venues they frequented where smoking was a common activity and their own expectation of how smoking would help them fit in better (Lennon et al., 2005). In fact, smoking as a facilitator for the socialization with others has been identified as one of the most frequent reasons leading to the maintenance of smoking (Boudrez & de Bacquer, 2012). In another study, the social aspect of smoking was named as one of the most influential factors that led to smoking initiation for young adults during the time when they had left their parental homes and had not yet started their own family (McDermott et al., 2006).

Smokers see advantages from their smoking behavior not only in their personal life in that they feel that they fit in and belong, but also in a professional setting. When workplaces have more lenient smoking policies and allow their employees to take smoking breaks, those mention that these breaks can be useful to connect with their fellow work colleagues (Delaney et al., 2018), something that is also noticed by their non-smoking work colleagues (Lennon et al., 2005). In an interview study by Delaney et al. (2018), one person even acknowledged purposely buying a cigarette pack so that they could join their colleagues who smoked. Moreover, in an interview study by McDermott et al. (2006), non-smokers stated to having noticed how the social bonding during smoking breaks were advantageous for smokers since they established relationships which proved to be helpful at work. Irrespective of whether some smoke to bond with their colleagues or to gain advantages in their job, Borland et al. (1997) have found that these social smoking breaks promote smoking behavior.

Observed Behavior – Modelling in the Real World

While some deliberately start smoking in the hope of being accepted by their peers and/or work colleagues, findings suggest that simply observing smoking behavior in the immediate social environment might unconsciously lead to the adoption of this same behavior. For example, adolescent smokers live more often in households where one or even both parents smoke than their non-smoking peers (Morgenstern et al., 2007). It is assumed that this is due to the process of modeling which influences the adolescents' own smoking behavior and attitudes towards it, as well as to the perception that their parents would approve of smoking since they themselves smoke (Turner et al., 2004). Adolescents are also more likely to be smokers if their close friends smoke or if they perceive that most of their peers are smokers (Botvin et al., 1992; Clark et al., 2002; Morgenstern et al., 2007; Turner et al., 2004). Although there are several mechanisms that potentially underlie this imitation

process, ranging from modeling to perceived smoking prevalence, it is quite apparent that the smoking behavior of family and friends can be seen as cues that subtly lead some to imitate this behavior (Oh et al., 2010).

Observed Behavior – Modelling in the Virtual World

Being around friends and family members who smoke is not the only way the social environment influences someone's decision to smoke. Being confronted with the smoking behavior of others on social media is also thought to have an impact on the smoking behavior of social media users. Cortese et al. (2018) postulate that the positive portrayal of substance use, as in smoking but also alcohol consumption, may lead social media users to believe that the use of substances is much more prevalent among their peers – the observed substance use is then normalized and possibly imitated. Furthermore, social media might increase someone's perception on substance use being an adequate way to create bonds and socialize. Egan and Moreno (2011) analyzed the content of Facebook profiles of male college students, focusing on the number of references made about alcohol consumption in the form of written status updates or also pictures (e.g., depicting oneself holding an alcoholic beverage). They found a significant positive correlation between the number of references to alcohol consumption on the college students' profiles and the number of Facebook friends they had. We can assume, that some users see a causal relationship between the substance use shown on a person's profile and their number of Facebook friends, although such a relationship might not even exist. This in turn could lead some social media users to also engage in substance use with the aim to bond with others since they perceive this to be a successful tactic. Besides the aspect of social bonding, studies have found that receiving positive smoking messages on social media is significantly associated with more approving attitudes toward smoking and smoking intention as well as with the prediction of future smoking tendencies (Depue et al., 2015; Yoo et al., 2016).

While it is not fully determined whether social media might influence someone's decision to smoke by normalizing and trivializing smoking or by depicting it as a social activity to bond with others, it seems plausible that social media provides its users with cues to smoke by simply confronting them with the smoking behavior of others (Dimoff & Sayette, 2017). Outside the virtual world of social media, seeing others smoking in our presence has been linked to a higher smoking rate, as already mentioned above (Shiffman & Rathbun, 2011; Shiffman et al., 1996). Furthermore, this seems to be not only the case when observing those with whom we share a social bond with but also when seeing strangers smoking (Shiffman et al., 2002). Other studies have found similar results in an experimental context. As an example, Conklin et al. (2013) pointed out an increase in participants' craving to smoke when looking at pictures of others smoking. Therefore, if the smoking rate increased when exposed to pictures of smokers and also to movie scenes which involve smoking (Lochbuehler et al., 2010; Shmueli et al., 2010), it does not seem far-fetched to infer that social media (e.g., Instagram posts depicting someone holding a cigarette) might influence someone's smoking behavior in a similar fashion. What seems to be quite certain is that the social environment represents an influential cue that can encourage someone's smoking behavior.

Gender Differences in Smoking Behavior

As shown above, findings suggest that our social environment and in particular people surrounding us and their smoking behavior influence whether we decide to start smoking and if we continue to smoke beyond adolescence. However, social factors, such as the smoking behavior of family and work colleagues or the depiction of smoking in the media, might impact some people more than others. Branstetter et al. (2012), for example, found that female adolescents stated more often than male counterparts that their parents, siblings, or romantic partners smoke. Furthermore, women were more likely to acknowledge that they smoke due to the presence of other smokers in their family than men (Reid et al., 2009). Another study, which investigated the reasons underlying participants' urge to smoke, found that women smoked more in social situations (Berlin et al., 2003). The higher probability of social smoking in women and smoking for social motives has also been observed by other authors (Boudrez & de Bacquer, 2012; de Souza et al., 2009a; Niezabitowska & Poprawa, 2020).

The Current Study

Existing research on initiation and maintenance of smoking points to the importance of social factors – as noted above, "social smoking" is even established as a technical term. Yet, the current state of the art research on smoking is largely based on survey studies (e.g., Clark et al., 2002; McDermott et al., 2006; Oh et al., 2010; Reid et al., 2009), experimental studies (Conklin et al., 2013; Lochbuehler et al., 2010; Shmueli et al., 2010), as well as social media research (e.g., Depue et al., 2015; Yoo et al., 2016). These studies assess smoking behavior indirectly. With our field study we observe smoking behavior as it happens in the real world. We observe adult smokers in a dedicated outside smoking area at their workplace as the context of work has not yet been extensively explored.

Based on previous findings, we established two hypotheses. First, we aim to contribute to the growing research concerning the general impact of social smoking by assessing whether people smoke in groups or alone. We hypothesize (1) that, in our sample, smoking is more commonly practiced as a social activity with other people and less as an individual experience. Second, we wanted to investigate the possibility that women were more likely to be smoking in groups than men, since studies have pointed out that women might be more heavily influenced by their social environment when it comes to their own smoking behavior. Hence, we expect (2) that smoking as social activity is used more by women than by men. We think that an observational field study can make a meaningful contribution to the continuing effort to understand the impact of social factors on smoking behavior. Our exact procedure is described next.

Methodology

Sample and Observation Location

We observed adults, mainly university staff,[1] during their smoking break at the entrance to their workplace, the humanities faculty building (MSH) at the University

[1] This is an assumption. We did not ask if they are actually employees of MSH. However, we only recorded the people who got out of this building and then went back in again.

of Luxembourg. We wanted to observe employees, in particular, as "socializing" during smoking breaks in the workplace promotes smoking behavior according to Borland et al. (1997). Therefore, work colleagues as a source of influence in the social environment of a person should not be neglected. We chose the location for two reasons: As observers we could place ourselves inside the building, watching the smokers through the windows – we had a clear vision of the field without being noticed. Furthermore, the location is busy but not too crowded. It was therefore possible to implement our observation plan which will be outlined next.

Design

Great priority was given to maintaining natural conditions in capturing the phenomenon of "social smoking". Therefore, this observation was a passive field observation, whereby observed and observer were clearly distinguished. In order to avoid the Hawthorne effect, reactivity and a possible social desirability, the observation location was chosen as described above.

To derive a precise operationalization, we defined the following indicators before the field phase: Social smokers are found in groups, which is why it is important to note group membership, size, and formation – have they already come in groups or did groups form during the observation? The gender composition is relevant to answer the second hypothesis. We assume that the social interaction of social smokers, e.g., talking, consequently extends the smoking break in terms of duration as well as the number of cigarettes smoked during the break. Finally, we wanted to observe the actual social behavior: do they smoke or talk first or even share a cigarette or a lighter? Are other activities involved like making phone calls, looking at their phone, or drinking coffee? These indicators were based on our understanding on how the construct “social smoking” can be operationalized for an observation study; making this, as far as we know, the first study to do so.

Measuring Instrument

We constructed an observation sheet (see appendix) containing all relevant indicators. This allowed not only a fast and standardized collection of observation data, but also facilitated the digitization and thus the subsequent analysis of the data. Information was collected approximately every five to ten seconds, depending on the number of groups, and was entered into these predetermined response categories or in a free text field. One observation sheet was used for each group/individual. If several groups and/or individuals were present during one observation slot, we divided them evenly between the two observers.

The place and time of our observation as well as the observation sheet were tested in a pilot study. Based on the test session, we optimized the observation sheet and adjusted the implementation of our observation sessions.

The time and duration of the smoking breaks were recorded using stopwatches on smartphones. As soon as the (first) person lit a cigarette we started the time and stopped when the observed groups or single smokers opened the MSH front door to go back inside.

Quality criteria for the observational study are fulfilled. Reliability is ensured in developing a measuring instrument (observation sheet) with clearly defined observation units. The clarity was tested in a pilot study. We developed a standardized setting with several

observation times (10 in total). Validity is also given, as we are measuring the social smoking behavior of employees.

Implementation

The observations were held every morning for two weeks from Monday to Friday, always for half an hour from 10:55am to 11:25am. While there were always two observers per session, each focused on their assigned groups or individuals, recording the observations on separate observation sheets.

Thus, over a two-week period, a total of $N=73$ adults were observed, of whom 24 (32.9%) were female[2] and 49 (67.1%) were male. Forty-five (61.6%) of the observed belonged to groups and 28 (38.4%) could be observed smoking alone. All in all, there were 20 groups – 15 groups of two and five groups of three – and 28 single smokers over the entire observation period.

Individuals or groups who started smoking before the specified observation period, as well as people who started smoking at the MSH but then left, were not counted. People who came from other buildings, and only stood at the entrance of the MSH to use the ashtray or the trash can, were not recorded either. We only observed persons who came from inside the MSH building, took a smoking break, and then returned back into the building. Moreover, we did not exclude anyone based on their smoking preference (e.g., e-cigarettes, classic cigarettes) because it is not known to affect the social smoking behavior differently.

Method of Analysis

We have received the following data:

Sociodemographic info about the observed

- Gender
- Staff working in the MSH building

Type & quality of behaviors

- Belonging to a group (group membership)
- Group formation (none, formation, already formed beforehand)
- Social behaviors and other actions

Measurement data

- Duration of smoking break in minutes
- Group size
- Number of smoked cigarettes

The observation sheets were digitized as soon as possible, usually immediately after the observation, and while doing so, attention was paid to possible errors. We define the various important indicators in the statistical software *IBM SPSS Statistics Version 25*, in which we can also carry out frequency and further analyses.

[2] Note: We assigned gender based on apparent visual criteria – which may not correspond to the self-identification of individuals.

To confirm our hypotheses, different correlations can be calculated: on the one hand Pearson's r e.g., for the two interval-scaled variables "group size" and "duration of smoking break in minutes" or point-biserial correlations between the dichotomous variable "gender" and the interval-scaled variable "duration of smoking break" or gender and group size. In addition, a phi coefficient between two nominal variables can also be calculated, e.g., to determine the correlation between gender and group membership.

Results

Hypothesis 1

"Smoking is more commonly practiced as social activity with other people and less as an individual experience."

We observed a total of $N=73$ smokers. Of these, 28 were single and 45 were group smokers. Thus, within the observational period more people smoked in groups than alone. Eleven of the 20 groups (25 people involved in total) either had potentially arranged to meet beforehand or met in the building by chance, and 9 groups (20 people involved in total) formed during observation (Fig. 1).

We tested whether the observed group smokers take on average a longer break than single smokers. The result of a point-biserial correlation analysis shows that the group membership is related to the duration of the smoking break, $r.bis=0.445$. This mean positive correlation is statistically highly significant ($p<0.01$).

The mean Pearson correlation $r=0.45$ with a $p<0.01$ confirms the relationship between group size and the duration of the smoking break. These results suggest that a larger group correlates with a longer smoking break; however, due to the limited range of group sizes, one must exercise caution when interpreting these results. The average group size was 2.25 ($SD=0.44$), with 15 of the 20 groups consisted of 2 persons, and 5 groups of 3 persons.

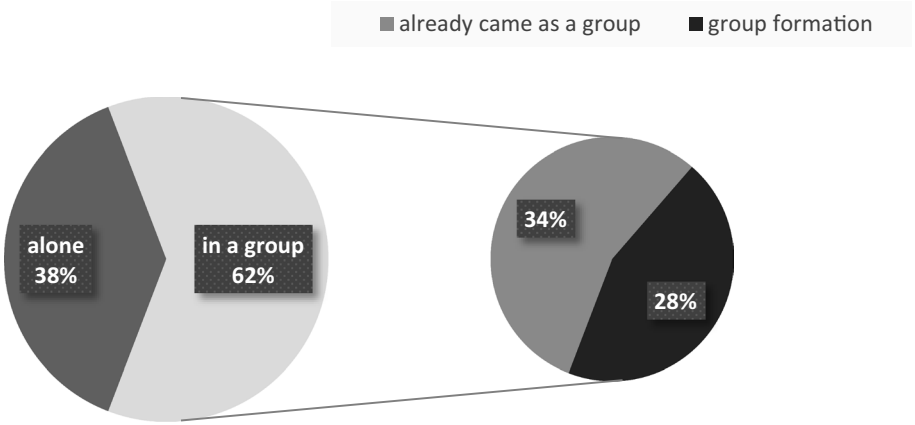

Fig. 1 Group distribution of the sample and group composition

Hypothesis 2

"Smoking as social activity is used more by women than by men."

The least observed group were female only groups (4 groups, 20%). In contrast, 50% of all groups were male only (10 groups). The remaining 6 groups (30%) were gender-mixed. However, one must emphasize at this point that male smokers were clearly over-represented with 67.1%.

Looking at the total sample, we see that 70.8% of all female smokers (17 women) belonged to a group and only 7 women (29.2%) smoked alone. By comparison, regarding male smokers based on our sample, 28 (57.1%) smoked in the group and 21 (42.9%) smoked alone (Fig. 2). In terms of descriptive statistics, we observed that women tend to socialize more. However, the error probability of the correlation of these two variables is at $p > 0.05$, which means that the already weak phi coefficient = 0.132 is not significant.

Additional Findings

We only observed 2 people (2.7%) of our entire sample who smoked more than one cigarette during their break – and these were single smokers. Our data suggests that smoking in groups extends the smoking break in terms of time – but does not increase the number of cigarettes being smoked. Thus, the initial idea that smokers in groups not only smoke longer but also smoke more cannot be confirmed. Therefore, a statistical analysis is not needed here.

On average, single smokers not only smoke more but their phone has also a more prominent role. A phi coefficient of 0.724 ($p < 0.05$) indicates that there is a strong correlation between group membership and phone use. None of the group members pulled out their cell phones, but two single smokers made a phone call during their break and ten single smokers looked at their phone whilst smoking.

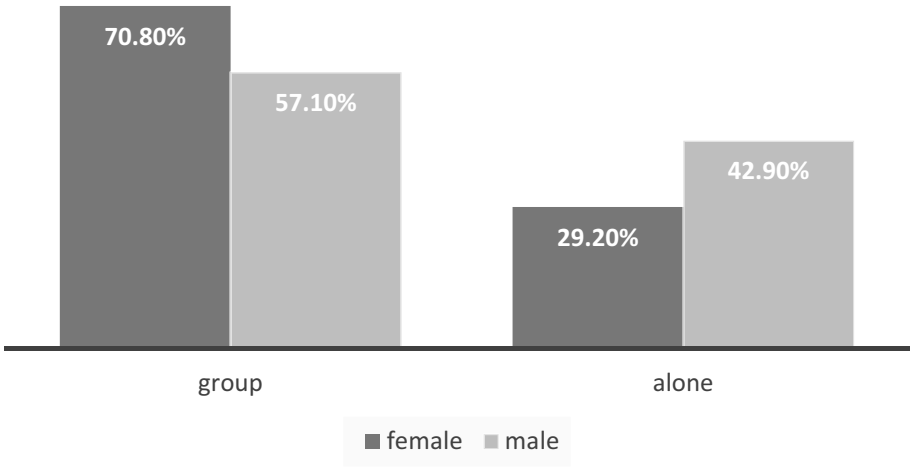

Fig. 2 Percentage gender distribution relative to group membership

Moreover, we noticed that another activity single smokers pursue is walking back and forth. This was operationalized by a scale, on which 0 was defined as "not walking" and 4 as "remarkably busy". The point-biserial correlation is a strong correlation of 0.521, $p < 0.01$, confirming the relationship between the two variables.

Interestingly, we observed that smokers in groups do not necessarily speak first. In our sample, 22 people (48.9%) of the 45 group members first lit the cigarette before talking to their group members. Furthermore, only 2 people (2.7%) shared their cigarette with a group member.

Discussion and Reflection

The aim of the study was to observe smoking behavior at the workplace to shed light on social smoking in a real-life setting. Our study confirms the hypotheses (1) that smokers more commonly practice smoking as social activity with other people and less as an individual experience and (2) that women smoke socially more than men. These results give further insights on the impact of social factors on smoking behavior.

Results

Smoking in Groups versus Alone

Based on our observation results, we can draw the conclusion that group smokers take more extended breaks than single smokers. Since this study was purely observational and participants were not interviewed, we cannot explain if groups were established before or formed spontaneously during the actual smoking break. We cannot ascertain if the social smokers observed generally prefer to smoke in groups and seek out other smokers to spend their smoking breaks with or if they consciously or unconsciously smoke due to their belief that they will be accepted more easily by their fellow smoking coworkers. To determine the underlying reason for the group formation, interviews with those observed would need to be conducted. Despite this missing information, some of our findings point towards the possibility that smoking is socially motivated. For instance, group membership had an impact on smoking behavior with smokers in groups smoking longer than single smokers. The duration was also dependent on the group size. The larger the group, the longer the smoking break – even though the number of smoked cigarettes did not increase. This might be explained by the imitation of smoking behavior of others in the group: Harakeh et al. (2007) showed that lighting up the first cigarette was not only affected by the personal urge to smoke, but also by the smoking behavior of others. Therefore, social smokers did not light up subsequent cigarettes since other group members did not do it either. Group smokers took longer breaks than single smokers, suggesting that the social aspect, the exchange with the others, plays an important role. This is consistent with findings from the literature that have already highlighted the importance of "socializing" while smoking on the job (Borland et al., 1997).

Gender Differences

In percentage terms, more women belonged to groups than men. This is in accordance with our hypothesis that smoking is used more as a social activity by women than by men and corresponds to the findings of other studies (e.g., Berlin et al., 2003; Boudrez & de Bacquer, 2012; de Souza et al., 2009b). Based on our findings and those of other studies, women seem to gravitate more towards social smoking than men. However, the underlying reason for this behavior has yet to be determined.

When it comes to smoking behavior in general, gender differences have been attributed to stress, self-image, the impact of other sensory effects, and avoidance goals: Women tend to report stress-related reasons for smoking more frequently than men (Boudrez & de Bacquer, 2012; Fidler & West, 2009), suggesting a discrepancy in how smoking is perceived and indicating that nicotine might have a more pronounced impact on the cortisol response to stress (Back et al., 2008; Fidler & West, 2009). Furthermore, smoking selfies are predominantly made by women, underlining the relevance of self-image (Cortese et al., 2018). Additionally, it has been observed that female smokers experience less advantages from nicotine replacement therapies (Berlin et al., 2003; Perkins, 2001) and have lower proficiency in distinguishing between various nicotine doses, implying that women's smoking behavior may be less motivated by nicotine reinforcement and more by other sensory effects of smoking (Shiffman & Paton, 1999). The goal approach might offer another explanation. Is the intention to attain a positive state or avoid a negative state? Worth et al. (2005) showed that women have significantly more avoidance goals than men, whereas men have more approach goals than women. Smokers benefit when they are motivated to move away from a current negative state (e.g., "I want to get rid of a chronic cough"), leading to the assumption that smoking cessation is avoidance-oriented (Gibbons & Eggleston, 1996; Worth et al., 2005). Our data supports this assumption because a lot fewer women, who are according to Worth et al. (2005) avoidance-oriented, were smoking than men.

However, none of these explanations have been linked to social smoking, meaning there is no evidence known yet, that could explain the gender differences in social smoking, for example, whether the stress-reducing effect of smoking is enhanced by the social aspect of smoking in groups. We could assume that female smokers use the social aspect to legitimize smoking, more so than men. However, the gender differences in social smoking could also be explained by evolutionary motives. Schwender et al. (2018) draw lines from prehistoric gatherers to modern role models: The female gatherer was obligated to take on social tasks, such as taking care of their immediate social environment, whereas the man acted as a hunter and was responsible for protecting and providing for the group. This could indicate why women predominantly are interested in people – more than men (Schwender et al., 2018).

Ritualization

Furthermore, we have also observed some sort of ritualization among half of the social smokers in our sample (48.9%): The social smokers first lit their cigarette, took a puff, and only then started talking to their group members. Social smokers usually deny their addiction and tend not to show signs of nicotine dependence (e.g., Moran et al., 2004; Schane

et al., 2009a, 2009b). However, our results suggest the importance of the drug nicotine before any social interactions. Just over half (51.1%) of the social smokers in our sample prioritized the social aspect, i.e., talking, first and then lighting their cigarettes. Social smokers in our observation study only lit one cigarette, even though the breaks lasted longer than those of single smokers.

Phone Use

Individual smokers used their cell phones more than smokers in groups. Group members never used their cell phones. The question arises whether single smokers use their mobile phones for social activities. However, this is difficult to determine in a purely observational study. Although two single smokers made a call, it could be both a personal conversation as well as just an appointment request, for example. Those who have just looked at the phone may have talked to friends on social media or sent text messages. These would be a form of social activity. Another aspect to explore might be the urge for a "technological smoke break", i.e., a break during work for employees to satisfy their technology addiction (use of smartphones for personal reasons, e.g., social media), like smokers taking breaks to satisfy their nicotine addiction. Madlock and Hessling (2020) stated that the "technological smoke break has now replaced the traditional smoke break of the past" (Madlock & Hessling, 2020, p. 2) and found significant differences in job satisfaction and organizational commitment depending on the work policies allowing or not-allowing access to their smartphones while at work. Employees working in organizations forbidding the personal use of smartphones might use the allowed smoke break to satisfy their technology addiction. Digital communication and its influence as a social activity on smoking behavior must be further investigated in studies.

Limitations

Limitations relate primarily to our sample size and sample composition. Over two-thirds of the smokers were male – and the distribution of small (15 × 2 persons) and larger groups (5 × 3 persons) was uneven. Furthermore, the larger groups consisted only of three persons. It is also possible that we have assessed the same group or person on different days, meaning that these single or social smokers were counted in our sample more than once. However, recognizing people from a distance wearing different clothes is highly subjective and nearly impossible for a hidden observation. This also touches on the limitations of the observational method in general. Whilst we pre-determined the observational categories, developed an observation guide, and tested the usability in a pilot study, it is not a fully standardized procedure, and the attention span of human observers is potentially limited. We restricted the observation periods to 30 minutes and clearly defined the categories to be observed and standardized the method of recording. However, with the number of variables to be observed, an adaptation period was needed so that the observer would not be overwhelmed by the mass of observations (Murdock, 2018). Even though natural observation is permitted as implemented here, some ethical concerns remain, as explicit consent cannot be given. Additionally, as a qualitative observational study, we cannot provide detailed data on smokers' characteristics such as age of smoking onset, daily cigarette consumption,

nicotine dependence, use of other substances, mental health status, or socioeconomic factors, which would have been very insightful.

The population studied constitutes a small cohort that is not representative of the general population, placing restrictions on interpretation and limiting generalization. This qualitative study aimed at discovering and discussing salient features of smoking in a real life setting and giving input for further research.

The definition of "smoking outside" might also be only a temporary aggregation of people for a smoking purpose. Shiffman et al. (2015) have emphasized the impact of smoke restrictions at the workplace on social smoking either by forcing to smoke with others (e.g., in areas in which smoking is allowed) or by inhibiting smoking when others are present (e.g., in workplaces or cafeterias). However, we have observed several single smokers, smoking at the same time who do not socialize and mainly seem to satisfy their urge to smoke. Furthermore, 55% of the groups in our sample already came as a group, suggesting the importance of the social aspect.

Research Outlook and Practical Implications

Social bonds are crucial for human happiness and well-being. Social connections help to satisfy fundamental human needs (Baumeister & Leary, 1995). When people feel connected to others, they are more likely to feel positive emotions, experience less stress, and have better overall health. As outlined by Valsiner (2014), throughout history, smoking has played a complex role in fulfilling the human need for social connection. In many indigenous cultures, particularly among Native American tribes, tobacco held a sacred place and is used in rituals as well as for promoting health and protection. Tobacco also played a role in negotiating tribal relations and in teaching tribal wisdom. After Europeans arrived in America, tobacco became integral to social and intellectual gatherings in Europe, such as the "Tabakskollegium" held by Prussian King Friedrich Wilhelm I, and in Britain, where young men were even taught how to smoke in a gentlemanly manner. However, growing health concerns gradually overshadowed tobacco's social role. Today, smoking is viewed mainly through the lens of health risks and societal harm. Anti-smoking campaigns aim to reduce its prevalence, and smokers face strict regulations, often being marginalized. The evolution of tobacco's social representation from a revered ritual substance to a regulated health hazard reflects broader societal changes and scientific understanding (Valsiner, 2014). This duality continues to shape the discourse around tobacco, balancing its historical significance with contemporary health concerns.

The tobacco industry has been aware of the impact of the social environment on smoking behavior and has capitalized on this knowledge by developing marketing strategies that show smoking as an activity that enhances peer relationships (Moran et al., 2004; Schane et al., 2009b). Marketing smoking as a "social" activity might lower the threshold to start smoking and, most importantly, perpetuate the myth that "one-cigarette" smoking within a group setting does not mean one is addicted. Another strategy addressed smoker's qualms about smoking in the presence of non-smokers. The tobacco industry found a solution by developing cigarettes that produce less smoke. The apparent removal of this downside to smoking in the presence of non-smokers, encourages smoking in their presence and exposes more non-smokers to smoking behavior and might motivate them to smoke

as well. Targeting women, for example, the misogynistic perception of women who smoke being "dirty", "unfeminine" and "promiscuous" was replaced by advertising female smokers as successful and emancipated women who fight for gender equality, rather than concentrating on the social aspect of female smoking (Branstetter et al., 2012; Elkind, 1985; Sieverding, 2000).

More research is needed about the mechanism within the social environments influencing someone's smoking behavior so that more effective measures and actions can be created and implemented to increase smoking cessation, decrease smoking initiation, and thus reduce the number of people affected by life-threatening diseases due to tobacco consumption (WHO, 2021). This observational study is one step in this direction. It could be repeated in other contexts and importantly, the reasons for smoking could be followed up with smokers through established questionnaires or interviews. Our study also showed that "lone" smokers tended to use their mobile phones whilst smoking. However, we could not observe how the telephone was used (work, news/ entertainment or social interactions). If they were interacting with other persons – this could also be perceived as "social" smoking as social connections are maintained during the break, albeit not in person.

The recent COVID-19 pandemic could also be perceived as a "natural laboratory" – as the pandemic forced many persons into social isolation. This change in external circumstances could produce new insights into motivations for smoking. Jackson et al. (2021) found that due to the disruption of former daily routines caused by COVID-19 restrictions that heavily reduced social contacts, the odds of quitting smoking or at least attempting to quit smoking were higher than before. These results may be explained by the possibility that the restrictions reduced or even eliminated smoking cues that people usually encountered before the pandemic. In home office, with no exposure to smoking colleagues – the reason to smoke may be eliminated – unless pleasure is derived from smoking itself. However, another study showed different results: While some reduced or quit smoking due to changes in the working and socializing environments, others' smoking consumption actually increased (Grogan et al., 2020). The authors argued that for some smoking was a coping mechanism to deal with negative consequences associated with the imposed restrictions on socializing. Nevertheless, also in this study smoking was, for a lot of people, a habit associated with social stimuli. If these cues are reduced or completely eliminated due to changing environments, smoking behavior can change.

While the results of our study and those of others have indicated that women seem to be more heavily influenced by their social environment also in relation to smoking than men, it has yet to be determined why this is the case. To our knowledge, no study has investigated the potential underlying psychological, biological, or even evolutionary reasons that might lead women to be more impacted by the smoking behavior of their environment and to seek out social contexts where they can smoke with others.

By better understanding socially motivated smoking, its underlying processes, and its varying impact on both genders, practical implications could be derived that might reduce smoking prevalence. The finding that women smoke more socially could indicate the necessity for differentially targeted interventions depending on the gender of the smoker

(Berlin et al., 2003). For example, some existing interventions such as nicotine patches do not work as well in women as in men (Perkins, 2001). The reason for these gender differences is not known, but the authors postulate that smoking behavior in women is less maintained due to the dependence on nicotine itself, but more so by non-nicotine factors like smoking cues.

Furthermore, interventions might need to target groups of people or networks instead of individuals. Several studies have found that the social environment can be responsible for the emergence and maintenance of tobacco consumption, but also for making people quit smoking (Christakis & Fowler, 2008). The likelihood of smoking is heavily reduced when the spouse, a sibling, a friend, or even a coworker quit smoking. Christakis and Fowler analyzed the social environment of people and found that within a "network" of people who are related, friends, or somewhat "connected", single individuals do not stop smoking. Instead, whole "clusters" or bigger groups stop smoking together. Reasons could be direct or indirect "collective pressure" felt by those who are still smoking, leading them to consider and try quitting themselves. Being exposed to non-smokers and environments that discourage smoking can actually repress someone's urge and craving to smoke (Conklin et al., 2013; Schane et al., 2009b; Shiffman & Rathbun, 2011; Shiffman et al., 1996). Given that the social environment can function as an inhibitory smoking cue, it would be worth to continuously change environments so that people are more exposed to these cues than to cues promoting smoking behavior (Haustein & Groneberg, 2010). This could be implemented through smoking bans in environments such as places of work since relationships with work colleagues can be significantly entangled with smoking behavior (Delaney et al., 2018; Georges et al., 2019; Sargent & Hanewinkel, 2015). Another strategy is to change warnings on cigarette packs. Currently, these warnings inform smokers of the health risks, but studies have shown that warnings like "smoking makes unpopular" (Glock et al., 2012) are more effective. Health consequences are often not immediately noticeable, only after many years of smoking, while socially related consequences can be felt or experienced in the present moment.

In conclusion, we can state that further investigation is needed to understand the complex relationship between social environments and smoking behavior, particularly for social smokers who mainly smoke in social situations or those whose smoking behavior is motivated by social factors. The tobacco industry has used this knowledge to market smoking as a social activity, an aspect that has been neglected by initiatives that want to promote smoking cessation to reduce smoking-related health concerns. To better understand the social role of smoking, research should focus on exploring how the social environment impacts smoking behavior by conducting observational studies and interviews to determine the primary motives for smoking. Studies conducted during the COVID-19 pandemic could provide vital information on this topic. By understanding socially motivated smoking and its underlying processes, interventions could be developed that target larger groups of people, taking gender differences into account, with the ultimate goal of reducing smoking prevalence and saving lives.

Appendix

Observation Sheet

Observation Sheet

Date: ___ /___ / 2018

Observation week 1☐ 2☐	Observation day 1☐ 2☐ 3☐ 4☐ 5☐	Observer: Group code:

Starting time: Ending time:

Number *before* eventual group formation		☐
Number *after* eventual group formation		☐
Gender composition	Only men	☐
	Only women	☐
	Mixed group (M: ___, F: ___)	☐
First activity	Smoking	☐
	Talking	☐
	Sharing	☐
Other activities	Calling	☐
	Looking at the phone	☐
	Drinking & eating	☐
Stay	Only for the length of the cigarette	☐
	Length: ___ cigarettes	☐
	Total: ___ min	☐

Other remarks

Examples of Filled Observation Sheets[3]

Observation Sheet Date: 14 / 11 / 2018

Observation week	Observation day	Observer: M
1 ☐ 2 ■	1 ☐ 2 ☐ 3 ■ 4 ☐ 5 ☐	Group code: 026

Starting time: 10:59 am Ending time: 11:05 am

Number *before* eventual group formation		1
Number *after* eventual group formation		2
Gender composition	Only men	
	Only women	
	Mixed group (M: ___, F: ___)	X
First activity	Smoking	X
	Talking	X
	Sharing	
Other activities	Calling	
	Looking at the phone	
	Drinking & eating	
Stay	Only for the length of the cigarette	X
	Length: ___ cigarettes	
	Total: ___ min	

Other remarks

Man alone at first

After 1:41min woman joined (came out from MSH)

Both laugh and talk a lot

Man gestures a lot with hands

After 5:40min man threw away the cigarette but waits for woman and talks with her

After 6:20min both go into MSH together after woman threw away her cigarette

[3] Not original versions, only English translations.

Observation Sheet

Date: 16 / 11 / 2018

Observation week	Observation day	Observer: M
1 ☐ 2 ■	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ■	Group code: 037

Starting time: 11:21 am

Ending time: 11:26 am

Number *before* eventual group formation		1
Number *after* eventual group formation		1
Gender composition	Only men	X
	Only women	
	Mixed group (M: ___, F: ___)	
First activity	Smoking	X
	Talking	
	Sharing	
Other activities	Calling	
	Looking at the phone	
	Drinking & eating	X
Stay	Only for the length of the cigarette	X
	Length: ___ cigarettes	
	Total: ___ min	

Other remarks

Placed coffee mug on trash can

Looks a lot on his phone

After 1:31min he walks to the other side of the entrance

After 3:21min he walks to the ashtray near the Foodlab → throws away cigarette

After 3:29min he walks to the Brasserie

After 4:35min he comes out

After 5:09min he goes into MSH, bread in one hand, empty coffee mug in the other hand

Author's Contribution ML and RPP conducted the observational study under guidance of EM. The manuscript was written by ML and RPP with structural and editorial support provided by EM.

Funding This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability The data that support the findings of this study are available from the first author on request.

Declarations

Human Ethics and Consent to Participate Declarations Not applicable, as the study design is a hidden observation.

Competing Interests The authors declare no competing interests.

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