Original research article

Understanding the social norms of cooling in Chinese offices: Predominance, professionalism, and peer respect

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A B S T R A C T

Challenging the international spread of highly energy-consuming air-conditioning technologies, this research explores how cooling demand is supported by the local emergence of relevant social norms. This paper presents the results of an interview study focused on the cooling norms currently found inside corporate offices in two large cities in southern China. Building on existing, mostly quantitative, studies of office cooling in areas of China with hot summers, and with a focus on how social norms shape everyday actions, the accounts of 17 financial sector workers are examined through a thematic analysis. Three themes are discussed: how air conditioning was perceived to dominate, how expectations concerning professional self-image were negotiated, and how respect for colleagues at different levels influenced personal cooling in the workplace. Together they point to the potential of novel strategies for promoting more sustainable office cooling in China and suggest the value of further research on dynamic cooling norms.

1. Introduction

"*Rather than figuring out more efficient ways of maintaining 21–23 °C in the face of global warming, society should be embarking on a much more searching debate about the meaning of comfort and the ways of life associated with it.*"

[1]

As the effects of global climate change become increasingly apparent, radical actions to mitigate the impact of different sectors are urgently needed. Buildings use a massive amount of energy, accounting for 22 % of total energy use in China in 2018, for example [2]. Space cooling demand is also soaring with hotter summers in many world regions creating a vicious cycle of energy-intensive climate adaptation [3]. Booming economic development in parts of the Global South further exacerbates this problem by encouraging some countries to emulate certain energy-intensive cooling strategies that are common elsewhere in the world [4]. This partly explains why China's space-cooling energy demand skyrocketed from 6.6 TWh in 1990 to 450 TWh in 2016 when it represented over 9 % of the total building energy use [5].

In response to these developments, the Chinese government set out

the *Green and High-Efficiency Cooling Action Plan*, calling in 2019 for more advanced technological solutions and improved efficiency standards [6]. However, apart from the high upfront costs of installing more energy-efficient air conditioners, one problem with such innovation-focused policies is that they run the risk of legitimising high levels of air-conditioning use that may have only been recently institutionalised in particular contexts [7]. Building on the above suggestion from Chappells and Shove [1], it may therefore be better to explore opportunities for influencing the local "ways of life" that have been developing around air conditioning (AC) instead of striving to meet international ambient temperature "standards" that ignore other heat adaptations.

Given that non-residential buildings are responsible for approximately half of China's space-cooling energy consumption [3], this paper focuses on the "ways of life" currently found inside financial offices in Southern China. In China, AC was incorporated into office life around the early 1950s when basic centralised air conditioners were installed in offices and factories [8]. Since then, with rapid urbanisation across Asia and the influx of foreign investment, it has become normalised in many offices, hotels, and shopping malls that emulate Western building forms and position it as a symbol of progress [9]. While we acknowledge the many contextual factors that shape local practices of cooling [10], this

paper starts by noting that research on Chinese "office life with AC" has not yet explored how relevant groups of workers are currently negotiating the social norms involved. Developing a theoretical interest in how social norms shape everyday actions, this paper discusses three themes from a thematic analysis of interviews with 17 financial sector workers in Guangdong province, contextualised with respondent photographs: how current AC regimes were perceived to dominate, how expectations concerning professional self-image were negotiated, and how respect for colleagues at different levels influenced personal cooling actions in the workplace. Together they suggest opportunities for promoting more sustainable office cooling in China and point to the potential of further research on dynamic cooling norms.

1.1. Cooling options in offices and the Chinese case

The present project began with the acknowledgement that AC is one of many possible ways of responding to hot local climates in offices [11]. Behavioural adaptation is generally believed to be the "most effective" means of achieving thermal comfort [12] with the potential of clothing adjustment and personal cooling devices (PCDs) particularly highlighted in studies on adaptive comfort. By removing jackets or ties, for instance, the temperature setpoints of air conditioners can go up in summer, as this helps workers to tolerate elevated indoor temperatures [13–15]. A well-known example of an attempt to realise the energy-saving potential of this strategy is the Japanese Cool Biz programme. Here the government was estimated to have avoided 1.14 million tons of CO_2 emissions by promoting more relaxed dress codes involving lighter clothing so that temperature setpoints could be raised to over 28 °C [16]. However, such practices are often lacking in offices elsewhere, partly due to a suggested resistance from corporate culture and social norms [17,18]. PCDs, especially fans, are also receiving increased academic attention because both lab and field experiments indicate they save energy, provide comfort and reduce health risks during heatwaves [19–22]. By creating personal microclimates within shared spaces, they can also help reduce overall energy use in combination with raised AC setpoints [23]. However, although PCDs are commonplace in industries where workers face extreme conditions like firefighting [24], their potential in offices is largely ignored.

A small number of field studies provide some sense of how office workers experience cooling in parts of China with hot summers. In a building with central AC in Guangzhou's central business district, a 2016–2017 survey shows most respondents felt slightly cool in summer and tended to prefer behavioural adaptation through clothing [25]. A questionnaire study on occupants in prefabricated construction site offices in Guangzhou from 2018 to 2019 suggests the range of comfortable summer temperatures is 24.5–27.7 °C, slightly higher than might have been expected based on the commonly used standard effective temperature model, which often disregards thermal adaptations [26]. In Changsha, a study using longitudinal survey data between 2010 and 2011 shows the ability of local office occupants to adapt to outdoor temperature changes more quickly than Europeans [27]. Using the same Changsha data, Liu et al. [28] show that adjustment of windows, curtains, and doors was observed most frequently for thermal adaptation in offices, while the use of these controls and AC increases with higher outdoor temperatures. Another survey of 34 cities across China in 2016 [29] highlights that most Chinese offices use AC more intermittently than is often assumed by international standards while acknowledging AC as the main method to achieve thermal comfort in hot-summer areas. Taken together, these studies imply certain distinctive cooling preferences and adaptation practices in the hotter areas of China where we would expect the most AC demand. However, the quantitative approach that predominates in this field currently provides less sense of the lived experience, with the few qualitative studies of AC in China tending to focus on domestic life. In this context, Murtagh et al. [30] report that AC is often seen as indispensable and "an accepted social norm" embedded in everyday life in Chongqing, a city with hot summers. Given this

suggested dependence in domestic settings and the exponential growth of AC in Chinese offices, there is still much to learn about the social normative context that governs the cooling practices of office occupants in this part of the world.

1.2. Social norms

As demonstrated in the Cool Biz programme, social norms can have a powerful influence on office cooling practices [31,32]. With that in mind, the present paper draws on the social psychology of norms, as situated within the broad scholarship on social norms. We argue that the individualistic focus of psychological approaches can highlight the intersections of different norms expressed through individual behaviours, complementing the studies that focus on the influence of cultural and material arrangements [1]. Social norms can be defined as "rules and standards understood by members of a group, and that guide and/or constrain social behaviour without the force of laws" and originate from social interactions [33]. They are routinely categorised into descriptive and injunctive norms, the former offering value-neutral information on what most people do and the latter implying external obligations sustained by the social approval of certain behaviours and the collective condemnation of others [34,35]. A social norm can also be both descriptive and injunctive [36] and sometimes can become internalised as a personal norm [37]. Different norms can be studied by looking for their distinct characteristics, also called "empirical signatures" [38]. Descriptive norms are, for example, seen in beliefs about how common certain actions are, while injunctive norms can be studied by examining expectations about others, how one's private preferences contrast with others', and how others enforce social approval or punishment [38]. Seen as part of "ongoing group processes", dynamic social norms can, in these ways, be formed, adopted, weakened, or moralised and internalised [35,39]. In this regard, social norms could be influential in office cooling in China, where social conformity and the maintenance of harmonious human relations are traditionally often prioritised over individual preferences [40,41]. To explore how these processes shaped local office life with AC, semi-structured interviews were conducted with financial professionals working in offices in urban Guangdong.

2. Methods

2.1. Semi-structured interviews with photo elicitation

Though comparatively uncommon in AC research where occupant behaviour surveys predominate, qualitative methods, such as interviewing, have the power to reveal how different groups have incorporated this technology into their lives and to identify what responses should prove most effective in particular places [42]. With this in mind, participants were asked to bring anonymised photos of their usual work outfits and personal cooling devices, adding more context to the interviews [43]. An interview guide was developed to explore their thoughts on a range of workplace cooling options with a particular focus on social norms, by referring to relevant literature [44,45]. Participants were asked about their experiences with and views on office cooling, company dress codes and lighter clothing choices, PCDs, and the views on these matters that they thought were most common among their peers. These audio-call interviews lasted between 43 and 76 min and were conducted by the lead author from June to July 2021. The study also followed recommendations about how to overcome the challenges of speaking about banal workplace practices that may have become relatively unthinking, by noting how respondents reacted to particular topics such as verbal expressions and changes in tones and presenting hypothetical scenarios such as the removal of the requirement for wearing suits [46].

2.2. Participants and recruitment

Participants were recruited from a population of financial professionals in two cities in Guangdong Province, Guangzhou and Shenzhen (See Fig. 1). Both have a subtropical climate characterised by hot and humid weather (Köppen Cfa/Cwa, see Fig. 2) with summer humidity levels reaching around 85 % and average July temperatures of around 28 °C. Both cities also boast a leading position in the Chinese financial sector [47] and were thus taken to be likely to have comparatively developed office cultures. Both are part of the Guangdong-Hong Kong-Macau Greater Bay Area, where the booming financial industry has received strategic policy support [48]. The traditional image of a financial professional in a dark formal suit suggests a requirement for AC in such climates [49]. It was, therefore, reasoned that this social group might be at the forefront of AC demand spreading across China – they are working in a hot climate and a flourishing sector that can afford it and for which certain professional norms may make these workers feel that they need AC more than most. Hence the urgent need to understand and potentially influence these norms before they become deeply entrenched and other sectors and areas follow suit.

The lead author began by approaching known financial professionals. They were then asked to recommend other potential participants. Care was taken to ensure equal representation of both sexes, both cities and varied occupations among the participant group (See Table 1). All in good health, the participants were mostly junior employees, with two in more senior positions. All participants shared offices with others except one who had a private office. They all had central AC and only nine had operable windows.

2.3. Data analysis

The interviews were transcribed and translated into English and NVivo software was used for a reflexive thematic analysis of their recorded perspectives on different forms of cooling and workplace norms. This approach aims to develop key themes as the researcher identifies and interprets patterns in the qualitative data and links those to the literature [51]. 202 initial codes were generated and then examined across the data set. Links between the themes were identified. To ensure the credibility of conclusions, the presented results were sent to the participants for "member checking", and to ensure they felt they were being fairly represented in this study [52].

3. Results

The paper now elaborates on three key themes developed in this analysis based on the "empirical signatures" of different social norms [38].

3.1. AC predominance

For all interviewees, AC was seen as a "normal" feature of the modern office environment. This was sometimes justified in terms of
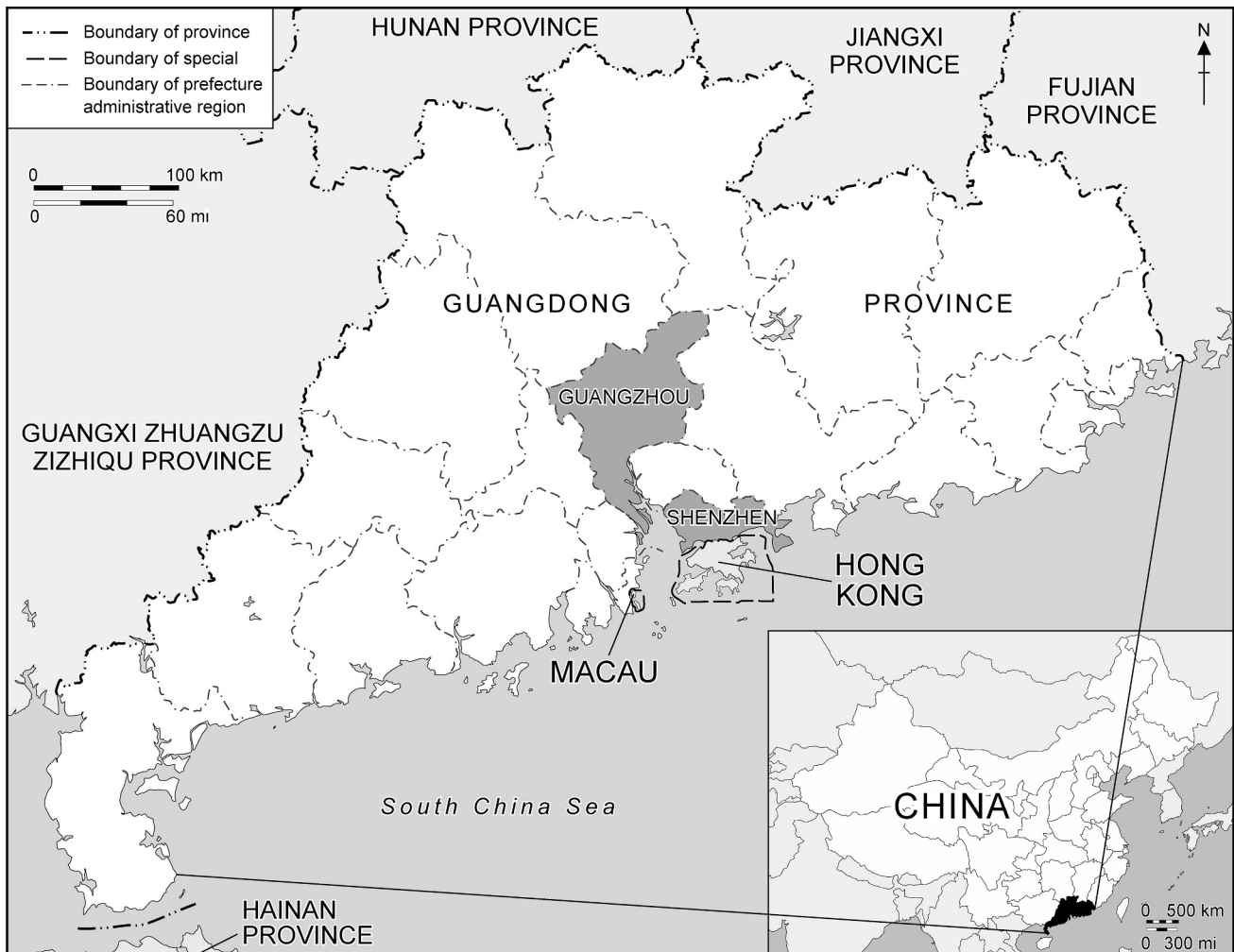

Fig. 1. Map of Guangdong Province in China, highlighting the two cities on which this study focused.
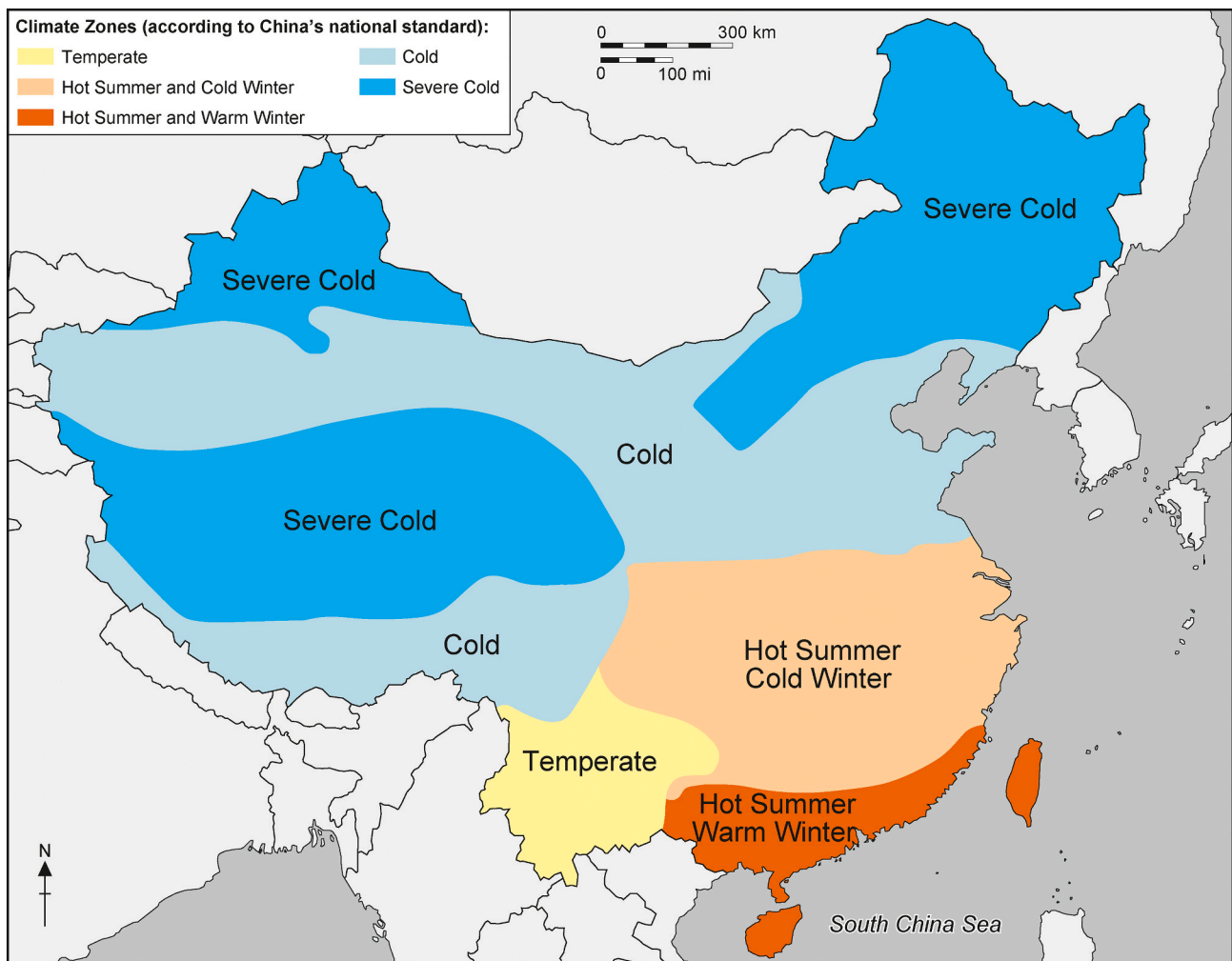
Fig. 2. Five climate zones according to China's standard [50].

Table 1
A summary of participant information.

No.	Gender	City	Occupation	Company type	Years in current company	Availability of direct AC control
1	F	SZ	Channel manager	Insurance company	1	No
2	F	GZ	Trader	Bank (financial market division)	10 months	Yes
3	F	SZ	Equity investment manager	Investment division	9 months	Yes
4	F	GZ	Insurance agent (junior)	Insurance company	<2 months	Yes
5	M	GZ	Insurance agent (manager)	Insurance company	≈4	Yes
6	F	SZ	Account manager	Bank (sub-branch)	≈4	Yes
7	F	SZ	Account manager	Securities company	1	Yes
8	M	GZ	General teller	Bank (sub-branch)	1	No
9	M	SZ	Model developer	Bank (head office)	2	Yes
10	M	SZ	Crypto sales and trader	Crypto trading start-up	≈2	Yes
11	M	SZ	Analyst (vice president)	Investment bank	≈1	Yes
12	M	SZ	Public account manager	Bank (back-end)	>1	Yes
13	F	SZ	Position manager and trader	Bank (head office)	2	Yes
14	F	SZ	Wealth manager	Bank (head office)	≈3	Yes
15	M	GZ	VC manager (supervisor)	Venture capital company	2	Yes
16	M	GZ	Fund channel manager	Public offering fund	≈8 months	No
17	M	GZ	Credit card account manager	Bank (branch)	>2	Yes

Note: F = female, M = male, SZ = Shenzhen, GZ = Guangzhou.

Guangdong's hot and humid weather and sometimes in terms of building characteristics such as inoperable windows. Though many indicated that they could switch it off or ask security guards or cleaning personnel to do so, few could recall the air conditioner ever being off except during power blackouts, technical breakdowns, or maintenance checks. Some were even annoyed by this suggestion and deemed it impossible. Others indicated that, while working in an AC environment was a basic requirement, it could still be seen as an enjoyable treat. As Interviewee 8 (male, bank general teller) puts it, "*everyone is very happy to enjoy this central AC*". Many respondents believed it could guarantee comfort, prevent sweating, and thus enhance their productivity. In an extreme case where AC was once forbidden because of worries about circulating

air during the COVID-19 pandemic, the absence of AC was felt to significantly impact productivity, even when electric desk fans were in use:

"*When we were working, still wearing the uniform, and also a mask...this did affect the entire comfort level at work. I mean our efficiency was also affected.*"

(Interviewee 6, female, bank account manager)

Although the office temperature setpoints reported by interviewees varied from 18 °C to 28 °C, on being asked about different cooling strategies, all interviewees emphasised AC as the main approach. As a result, personal cooling was of little concern to them. Instead, coping with the over-supply of cold air was more of a challenge. Female interviewees, for example, were more likely to complain about what they felt were unnecessarily low temperatures and were bemused by the lack of action (from both themselves and their peers) in response to this perceived overcooling:

"*For us 10 to over 30 people, everyone is wearing thick clothes, and just sit there, no one would suggest adjusting the temperature.*"

(Interviewee 4, female, junior insurance agent)

The effects of the AC made personal cooling devices a complementary choice. 15 of the 17 interviewees indicated that PCDs seemed to have sprung up in many places in their region in recent years, whether they were used by others or the interviewees themselves, in the office or on the street. However, only a few interviewees reported using any of these gadgets inside the offices. According to Interviewee 4 (female, junior insurance agent), "*the AC in our office is particularly cold, which means we don't have to get something else for ourselves.*" The selection of photos provided by the interviewees in Fig. 3 reveals little diversity in the types of PCDs used in offices. Electric fans that can sit on the desk, be handheld, or both were those that most readily sprang to mind for the interviewees at the first mention of PCDs. One interviewee used a folding fan (see Fig. 3a) and one complained about his useless cooling cushion (see Fig. 3d). For those who provided photos, PCDs were used only occasionally and most of the time sat idle. Some in the photos were used by their colleagues, whereas the interviewees reported no use behaviour themselves mainly because the AC sufficed. In general, the interviewees have limited experience with these devices and shared doubts about their cooling potential.

Given the AC indoors, some believed PCDs were more suitable for outdoor settings such as during commutes. The only occasions when they thought they would use PCDs in the office were when the AC was not functioning at its top performance, particularly in the morning, when people arrived at the office and the AC had only just been turned on, or when the AC was not available at all, especially during power blackouts. Even when PCDs were used, AC still served as the main cooling source in the office. This is evidenced by the habit of Interviewee 3 (female, equity investment manager), who arrived 15 min before her usual start time to cool herself with a non-electric fan while she waited for the air conditioner to kick in.

"*If it is hot at first, I may turn on the air conditioner and use my personal cooling device together, and when the room temperature has reached a temperature that I feel comfortable, I will put down the cooling device and keep the AC.*"

Despite the "chilly" environment that sometimes resulted, AC was taken for granted in the workplace and all participants agreed to its irreplaceability. When we discussed whether AC use could be reduced by adopting other measures, a few participants explicitly expressed no interest in the issue because they had never thought about it before and found the current situation to be quite satisfactory, considering that warming themselves seemed easier than cooling without AC. Still, many acknowledged the possibility, but often highlighted the building structure, the property management teams, or the leaders of the department or the company. This was not considered within the power of individual employees to change.

In terms of norms, these interviews revealed how the main descriptive norm positioned AC as ubiquitous in offices. Occupants conformed to this norm by turning it on whenever possible in a way that sustained unthinking beliefs about how summer office environments "should be". This strength of this norm positioned the use of personal cooling devices as complementary only – commonplace elsewhere in their lives, but not usually found in offices. That also helped to explain why more than half had developed personal warming strategies at work during summer instead of thinking to challenge the office cold, since this was not a matter for them to deliberate.

3.2. Professional self-presentation

Though one way of avoiding excessive use of AC at work would be to wear lighter clothes, financial workers are often expected to dress in heavier "professional" clothes for occasions such as those involving interactions with clients. We now turn to these descriptive and injunctive norms of professional image that were influenced by colleagues, leaders, HR departments, and the financial industry as norm drivers.

These 17 participants were all aware of how in the financial industry a suit was synonymous with professionalism and respect for clients and how it served as a powerful symbol of the profession. As Interviewee 16 (male, fund channel manager) described, "*speaking of the financial industry, people certainly think of wearing suits, like when we visit clients, everyone is wearing unified uniforms, especially the banks.*" Even among those who did not feel subject to a strict dress code at work, when asked about their and colleagues' views of suits, a suit was still regarded as closely representative of their industry. This was the case for Interviewee 2 (female, junior trader) whose company did not specify a dress code, but she felt that suits could "*make people feel that you are taking this seriously*" on certain occasions.

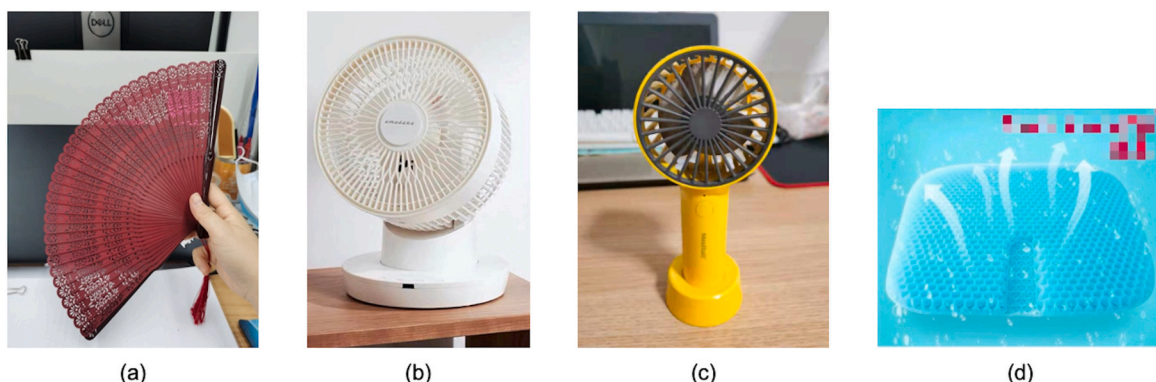(a)   (b)   (c)   (d)

Fig. 3. Personal cooling devices in use (elicited from the interviewees).

This norm of professional dress was often reinforced during initial interactions with colleagues and "orientation" or external training at work, as mentioned by several interviewees when the discussion turned to the suggestion of heat adaptation through amended clothing choices. Interviewee 7 (female, securities account manager) emphasised how she became aware of what clothes should not be worn to the office by observing colleagues when she first entered the company. Interviewee 5 (male, insurance agent manager) even recounted his experience in an external training session for insurance managers where some trainees forgot to wear suits for that event:

> "*The lecturers would ask you to leave the classroom, and let you listen to the lecture there* […] *they also gave some punishments. Males would have to do push-ups or something. They would give you a lesson and say you have to remember this.*"

The idea of doing push-ups was to keep things light, but the point was still serious. Interviewee 6 (female, bank account manager) spoke of "being domesticated" by the monotonous dress code such that she felt it entirely normal to work in the standard suit in summer, while envying her clients' freedom to dress otherwise. Despite private resentment about

suit-wearing and occasional grumbles about the discomfort and dullness of suits among Interviewee 8 (general bank teller) and his colleagues, 15 of the 17 interviewees still believed the requirement to wear suits for formal occasions in their industry would continue. Only Interviewee 1 (female, insurance channel manager) thought that lifting the suit requirement was possible, depending on the company's culture and purpose.

On the other hand, expectations were flexible in that there was often only an unwritten dress code of "business casual" or even no dress code. In such situations, employees were rarely required to wear formal suits in summer and seldom wore the jacket if a suit was required. When asked about their view on wearing a full suit at work, Interviewee 5 remarked, "*it's too hot now, and we basically don't wear a jacket. A shirt with a tie and a pair of pants are all you need to meet a client.*" Fig. 4 displays the pictures shared by the interviewees of the typical summer work clothes in line with the respective clothing requirements in their companies. There is considerable variety here, closely related to the diverse landscape of professions in the financial industry, as well as facilitated by the company culture. Only one female (Interviewee 6, bank account manager) said they would always wear a full suit on weekdays. Rather they
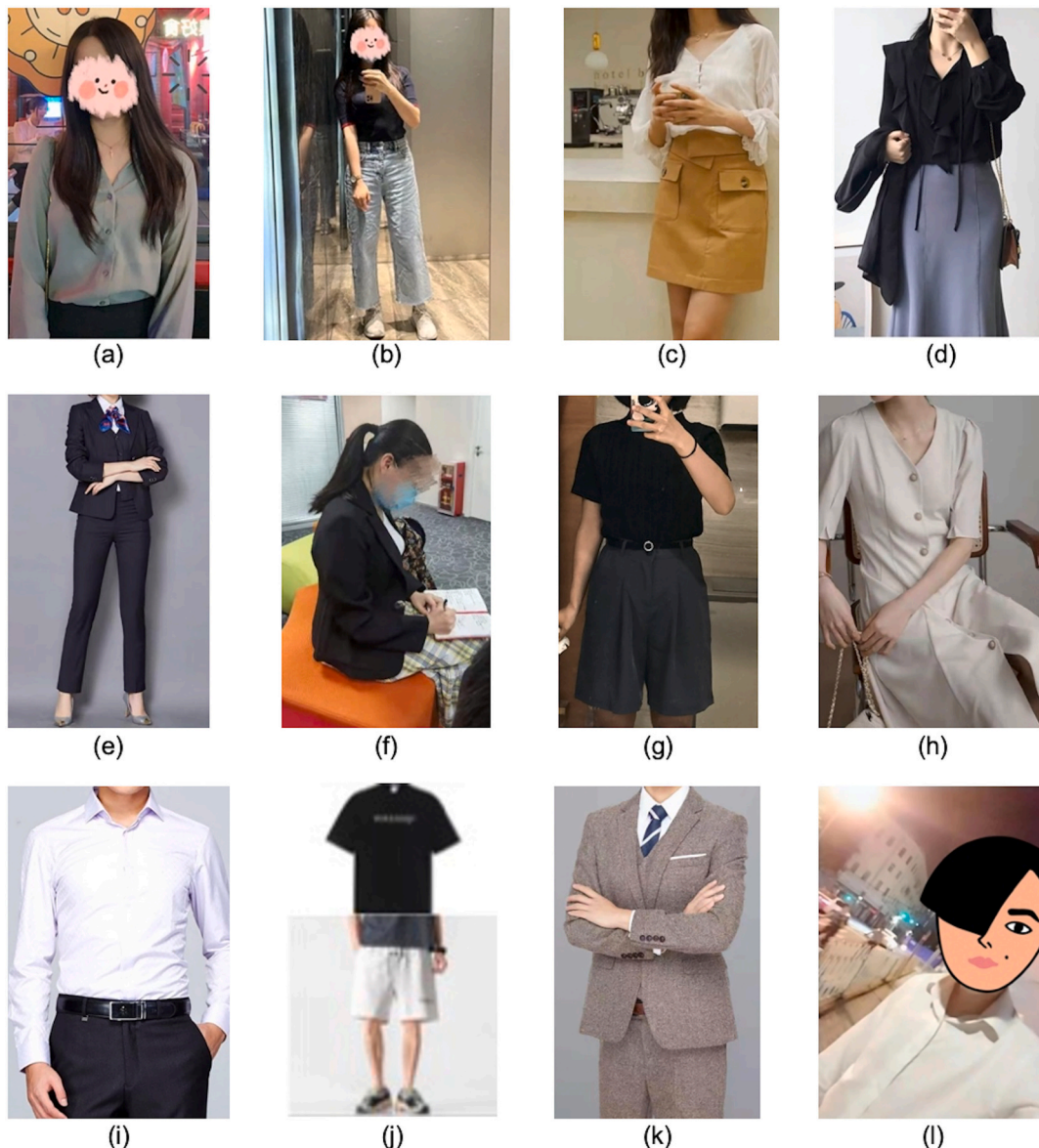

Fig. 4. Typical work clothes in summer (elicited from the interviewees).

reproduced ideas of "business casual" clothing through full dresses, relatively loose blouses, and shorts or skirts with a draping texture. For the males, despite having fewer clothing options, a shirt and a pair of suit pants were often the "go-to options" though, for some, T-shirts and casual shorts were allowed. Unusually, Interviewee 10 (male, crypto sales and trader) said that pyjamas and flip-flops were possible, though he was worried that their practice was under invasion by the suit tradition as more traditional investors entered his profession.

Such flexibility was also connected with, and constrained by, daily work schedules that could involve client meetings, reports to leaders, and conferences. Many interviewees said they were not required to wear suits every day or week, which was particularly the case for those who spent a long time in the office and rarely had formal client meetings. This meant that suits, especially the jackets, could be kept in the office and only worn when necessary. As Interviewee 14 (female, bank employee, head office) summarised, "*when I do report with the leaders, I definitely will put on a suit jacket* [...] *if I just walk around the office, I am not wearing the jacket.*"

Variation in dress norms also occurred across departments, with different jobs implying different degrees of formality. There was some mention of this variation with, for instance, differences between those working in client-facing offices and those in back offices being noted. As explained by Interviewee 14 regarding dress code relaxation, "*it is possible for us working in the middle and back offices, maybe in the future we can wear T-shirts every day. But it is definitely not possible in the bank outlets.*" She acknowledged variation based on the level of direct client engagement but did not want to lose the overall style of formality. Similarly, Interviewee 9 (male, bank model developer) emphasised how, for some employees, the dress code could be relaxed:

"*For 20 % of the employees in the company, if you don't need to meet with clients, and your leaders' preference is not a strict requirement, then I think the dress code can actually be relaxed a little.*"

This flexibility culminated in "Casual Fridays" in some companies, with the last working weekday bringing an informal, unofficially sanctioned, loosening of expectations. Here, on the last day of the working week, employees were given the freedom to choose their preferred work dress, on the condition that the minimum requirements were met. Only five interviewees, who were seldom required to meet clients, reported Casual Friday initiatives. For them, Fridays meant T-shirts, and jeans were possible at work. In some cases, it was set out by the HR department as a company rule. In other cases, it was an implicit practice. For example, Interviewee 3 (female, equity investment manager) dismissed the idea of an official Casual Friday in her company but enjoyed the way that "*people feel like on Friday it is almost the weekend, so we will dress casually and order bubble tea, and we even go out to eat at noon.*" Likewise, Interviewee 9 (male, bank model developer) identified a currently tacit agreement on being able to wear T-shirts and casual trousers on Fridays. Having said that, many interviewees reported that, despite the absence of official company dress codes – there were always certain items that they and their colleagues would never wear.

To return to norms, suit-wearing and other implicit clothing requirements became both descriptive and injunctive social norms on professional self-presentation for certain work occasions. The interviewees believed the often informal and unwritten dress code, whether flexible or not, was what they "should do" such that there would be sanctions in the case of violation. The results present the evolving characteristics of these dress norms: they were usually adopted via initial observation of how others were commonly dressed (descriptive) or emphasised in orientation training (injunctive) and maintained through interactions with colleagues thereafter (descriptive and injunctive). They were also strengthened or weakened through enforcement by the actions of company leaders or their HR department and influence from the industry. They were also internalised by some employees, as they believed it was what they themselves "should do". That said, the dress norms for formality and professionalism were not

always enforced: not all the financial companies required suits; rather, they accepted business casual more flexibly, depending on the nature and place of work and whether there is Casual Friday, although such freedom was bounded.

3.3. Peer respect

In adopting particular cooling strategies, participants also responded to relevant normative expectations in which they paid special attention to others around them. Senior leaders were a particularly important reference point in this regard, as they could set and then signal the cooling norms that were to be adhered to in specific organisational contexts. When the leaders were present, discussions about adjusting the temperature setpoints were less likely because interviewees felt they should not question the status quo. Responding to the idea of working alongside a leader in a cold office, Interviewee 11 (male, investment bank analyst) responded:

"*If it is a relatively high-level leader, maybe I would tolerate that or say I would first sit somewhere else. If he is an ordinary colleague, I may discuss with him, saying there is quite a lot of airflow, and it makes me a little cold.*"

Interviewee 9 (male, bank model developer) similarly stated that the leaders had greater control of the AC levels: "*when you have a meeting,* [...] *basically you have to first look at the opinion of the highest-level leader, and then go to adjust the temperature.*" The adjustment did not, therefore, happen until the leaders gave the go-ahead, either through eye contact or verbal instruction. In this sense, leaders were given top priority regarding the management of AC, and this made clothing self-adaptation an important strategy in the absence of other options, so that the lower-ranking interviewees could maintain a good impression by not appearing excessively demanding or seeming to be stirring up trouble.

Another channel where the leaders influenced cooling norms related to how they set the rules for dress codes. When asked about the prospect of raising the temperature and wearing lighter clothing, Interviewee 12 (male, public account manager) emphasised this was possible only if his leader assented to it: "*I can accept it as long as the boss can accept it.*" Interviewee 13 (female, bank position manager and trader) spoke of the relaxing office atmosphere pioneered by her leaders. "*Some leaders are leading the way,* (*laughter*) *the vice president used to walk around in slippers directly in the office* [...] *in fact, it may not be allowed very much* [...] *but we all are dressing like this every day.*" Although slippers were uncommon, her situation accentuates the potential of leaders in directing the office norm on acceptability. Conversely, leaders could also ensure dress codes were implemented. Interviewee 7 (female, securities account manager) saw an embarrassing "name-and-shame" occasion when a female colleague in a relatively informal dress got caught by a leader who verbally "*pointed that out*" and "*advised her to change to more professional clothes.*" Such public scenes sent an effective warning to the rest. Likewise, for Interviewee 14 (female, wealth manager) working in the head office of a bank, it was necessary to consider particular leaders' preferences when it came to work clothes. Even though the HR department specified a relaxed Friday dress requirement – her resigned laugh at the end suggested she was not hopeful that her leaders would consent:

"(*Casual Friday*) *should be a regulation by the HR, but sometimes the leaders may not quite agree to following it.*"

(*Hollow Laughter*)

However, "seniority" was about more than a position in the organisational hierarchy and also related to the length of employment. This is illustrated by Interviewee 13 (female, bank position manager and trader) who had to often follow the AC preference of a "senior" colleague with whom she shared the same office. This way, she hoped to ensure minimum conflicts and more harmonious collaboration with this senior.

Much of the discussion involved in this study also focused on the interplay between specific individuals and the wider office, with

respondents often being highly aware of, and inclined to prioritise, the cooling preferences of colleagues.

> "*If I see someone put on a jacket, I know he is cold, and then I will silently go to turn it up a few degrees.*"
>
> (Interviewee 3, female, equity investment manager)

> "*I have to take into account the feelings of the majority of people.*"
>
> (Interviewee 9, male, bank model developer)

Prompted by such other-regarding preferences [53], the normative expectation of negotiation before changing the setpoints was mentioned by almost all interviewees. That could happen both when the temperature was perceived to be too high and too low. These respondents could recall few instances where some employees strongly opposed the setting once an agreement had been reached. For instance, in the case of Interviewee 11 (male, investment banking analyst), reaching a majority vote was usually necessary, which also highlights the regard for others' needs and his limited personal power. "*When several people feel it is hot, when we all have the same idea, maybe this time we will say since we all feel this way, we can adjust it*". An exception is Interviewee 15 (male, venture capital manager) who reported having a strong personal character and would immediately lower the temperature whenever he desired:

> "*I have a strong personality, so I can usually adjust it as much as I want […] Purely because my personality is stronger, and no one will…generally when they feel too cold, they may wear more clothes.*"

However, such negotiation required time and effort – two things that these employees felt were in short supply for them. This also often resulted in interviewees adapting to the status quo. Regarding how others' perception of AC use affected their own cooling, Interviewee 2 (female, financial market trader) said "*it's just mutual co-adaptation. If it is cold, maybe I am more inclined to not adjust [the temperature] and I will add a piece of clothing. Anyway, I will usually accommodate the need of the majority.*" Meanwhile, Interviewee 5 (male, insurance agent manager) saw the workplace as a public space that should not be adjusted solely for any individual employee – "*it is supposed to be a public area. You can't do whatever you like…*". Even though he insisted that temperature would never affect his team's productivity, he seemed agitated by the idea of alteration for only one colleague. Furthermore, according to Interviewee 12 (male, public account manager), who valued the idea of being part of a harmonious working collective, "*you should certainly consider everyone. If everyone thinks it's too cold, or if everyone thinks it's too hot, you just adjust yourself.*"

However, not all offices allowed occupants to adjust the AC. This was restricted by building types and other characteristics. In these cases, adjustments could only be made by building managers or those granted access to the controls. The setting of Interviewee 17 (male, credit card account manager) is a unique case: the adjustment panels were all available in his office, but the occupants did not seem to know which panel corresponds to which air outlet and did not bother to elicit help in this regard. Thus, as temperature adjustment was futile without resorting to technicians, the usual practice in his office was to set the same temperature of 27–28 °C on all panels and only use the panels to turn the AC on and off. When more control did not seem to be easily achieved, self-adaptation seemed to be more common, as the financial employees were generally too busy with work to bother and seeking technical help was troublesome. According to Interviewee 17 who did not use PCDs himself,

> "*If it's too hot, we use the fan. When the AC temperature is too low, or I feel very cold, I will put on my clothes, and I will go out of my office for a walk around to warm up, and then go back to sit down and continue to work.*"

Returning once again to the social norms at play here, the third theme highlights the normative tendency of respecting others in cooling shared space and touches upon how much say individuals have in space

cooling in these offices, confined by the availability of control. These social norms of respect are both injunctive and descriptive. The injunctive element was indicated in the socially imposed expectations of respecting others in the case of sharing AC and dress code, by prioritising what the interviewees perceive as the preferences of senior leaders. Violating the injunctive norm would bring about social disapproval and sanctions such as public shaming. The descriptive element was expressed in the commonly adopted strategies of setpoint negotiation and personal adjustment instead of changing AC setpoints.

4. Discussion

The paper now considers the implications of these findings in pursuit of reduced energy consumption in areas of China with hot summers and explains how these results connect to those produced by comparable studies.

4.1. Predominance

The constant presence of AC and the firm belief that it was essential in offices represent a descriptive norm, which reduces the demand for personal cooling but increases that for personal warming in this study. This demand is consistent with the literature where AC is seen to serve as a major method to control thermal comfort in offices in the Hot-Summer-Warm-Winter Zone in China [29]. Similar omnipresent expectations of AC have also been identified in the public sphere in Singapore [54]. Besides, our participants noted the growing use of PCDs outdoors. However, the chill instilled by office AC resulted in very few feeling the need for them in the office but many (especially women) using personal *warming* strategies to cope with overcooling [55]. In this regard, PCD use is still a minority norm [56], with currently limited uptake among financial employees. This echoes findings from a study [20] on personal cooling in offices in Hunan, China, in which participants were less willing to use PCDs when AC was available and was already entrenched in their work practice.

Many interviewees highlighted the need for warming instead of cooling, going beyond the suggestion of office workers in Guangzhou feeling slightly cool found in survey work [25]. Despite the practice of wearing extra blankets and jackets in the office to cope, no interviewees reported any attempts to influence the AC. To some extent, this can be understood as a case of "pluralistic ignorance" where the majority of people cling to a norm even when there is widespread private discontent about its effects [57]. Ambient cooling was seldom a discussion topic in these financial offices such that, although many occupants put on extra clothes to fend off the cold, they still often assumed that others accepted and supported the situation. The ironic contrast around the AC between the provision of comfort from cooling and of discomfort from overcooling was also reflected in the literature [30,42]. However, the widespread use, in our sample, of personal warming strategies, and the growing acceptance of the use of PCDs outdoors, suggest that the overcooling norm in offices could be altered with higher AC default temperatures.

4.2. Professionalism

This theme captures the injunctive and descriptive norms regarding dress codes and work outfits for financial professionals in China where research on this topic is scarce. Work clothing can affect employees' demand for cooling in offices, as a full suit would require lower AC temperatures to stay comfortable. According to the interviewees, the dress code was often not written, which is a phenomenon termed "informality" in a study on financial professionals [49]. This theme on the one hand confirms the unyielding position of suits in this sector along with the need to appear formal for certain occasions as a product of Western influence and linked to China's recent economic development. This norm of professional dress, whose power of social

sanctioning mainly stems from the financial industry and the companies, is linked to the dominant AC regime. This is because such expectations of a Westernised professional image entailing the wearing of suits and other formal wear drives demand for a cool environment for productivity and less sweat and odour [58]. All participants felt that suits represented the financial industry, and many said the idea of appropriate formal wear was reinforced during various interactions with colleagues, implying the adoption of the descriptive norm through observations of how others were dressed. Even though, quoting the interviews, "domestication" into this monotonous and sometimes uncomfortable dress code was regretted by some interviewees, it was overwhelmingly seen as inevitable and none of our participants challenged this norm.

Despite this apparent conformity to a formal dressing norm, social expectations about sufficiently professional appearance still varied. Most interviewees reported being required to wear only "business casual" and some financial professions even welcomed casual wear. This is in line with wider studies that witness and encourage a global transition away from strict requirements for traditional business attire to greater workplace clothing flexibility [59,60]. Moreover, the less an employee was outward- or upward-facing, the less formal dress was required. Many interviewees reported only donning a jacket to meet clients or leaders. This is consistent with the "stratified homogeneity" of financial organisational dress that has been examined in previous studies [49]. This flexibility was also manifested temporally in the practice of Casual Fridays, which was gaining traction in the offices of many of our interviewees. However, the enforcement power and idiosyncrasy of each department or leader, as the key sources of the injunctive norms, can constrain this flexibility.

4.3. Peer respect

Prioritising others' thermal needs was a common descriptive and injunctive norm influencing the interviewees, with the power of enforcement stemming from influential members of the company. Three key sub-themes were discovered: 1) leaders and senior employees have a considerably larger say in controlling the office environment, 2) it is advisable to negotiate with colleagues before adjustment of temperatures in shared open-plan offices, and 3) personal adjustment is a key coping strategy. As paternalistic leadership still prevails in Chinese organizations [61], failing to follow the authority may incur such sanctions as disfavour by leaders and dislike by colleagues who usually strive to ingratiate themselves with the senior and powerful.

The first two sub-themes highlight the limited power of individual employees faced with strong collective normative expectations in the Chinese financial offices. Comparison with existing literature reveals interesting cultural similarities and differences in the normative tendencies of respect for "authority", colleagues or those in need, in group decision-making on thermal comfort. In a study on human-building interaction in Italy [62], the first person expressing discomfort usually has the most say in adjusting the environment of academic offices, group discussion is considered a second choice, and the most infrequent option is to accept the pre-set status by highest-rank persons or energy managers. In China, the setting preferences of senior personnel were prioritised by the interviewees. A similar finding to ours however is that changing the environmental setting without group discussion is relatively uncommon [62]. The deference to bosses' preference for colder temperatures by enduring the cold was also briefly hinted at in a study in Qatar [63].

How the norm of being respectful discourages people from changing AC setpoints also resonates with previous literature. For instance, echoing a similar study of air-conditioned lives in Doha, the negotiation on temperature setting could "disappear", partly because of consideration for others and partly because these topics could be sensitive such that personal adaptation became the easiest option [42]. The self-adaptation solution is also found in the reported tendency towards

adaptation through clothing amendment in a high-rise office in Guangzhou with central AC, where doing so was considered convenient and economic [25]. The rationale for adjusting clothing slightly differs from this research, in that this field survey only mentioned the lack of environmental control [25]. In comparison, these interviews add a more socially-driven reason – the injunctive and descriptive expectations to respect colleagues, equal or senior to them, which were considered to preserve harmony and hierarchy at work.

5. Conclusion

This paper responds to the suggestion that the problem of unsustainable AC demand should be seen as a matter of evolving norms more than energy efficiency. Drawing on 17 interviews with financial workers in two Chinese cities with a humid subtropical climate and growing cooling demand [3], it has examined how three social norms are currently shaping the cooling preferences and practices found in corporate offices there: 1) the dominant AC regime that rendered personal cooling unnecessary and encouraged personal warming; 2) expectations of professional dress that were flexible and signalled the potential for lighter summer clothing and less AC; and 3) the respect for seniority and others that reduced the likelihood of cooling negotiations taking place at work and currently supported personal adjustments to cold offices.

Building on the details in the Discussion, and to conclude, the essential implications for policy and research in this field are as follows.

5.1. Policy implications

Firstly, regarding the "pluralistic ignorance" towards office overcooling, breaking the norm requires alerting people to how others think about the ironic warming demand in summer offices. Initiatives to spark conversations on the local experience of AC among office workers could be a start [42]. Meanwhile, according to the emerging literature on the potential of minority norms to change the majority's norm perception [64], the current ownership and availability of PCDs should be communicated to the target population. Secondly, the existing "wriggle room" evident in the injunctive and descriptive norm of professional self-presentation in these offices implies a stratified strategy to implement lighter clothing by flexibly engaging with dress codes across departments and professional functions: a relaxed injunctive norm could allow lighter clothing for those with less need to meet clients; for those who have the need, formal clothes made of lighter materials should become acceptable. Across time, Casual Fridays are a promising gateway to steer the companies towards energy-saving dress norms. Thirdly, although we found an expectation of AC in financial offices, our findings also reveal the normative signals from Chinese business leaders and more experienced colleagues in determining office thermal environmental conditions. Currently, AC is used to cool the environment to the extent that many employees use personal warming strategies while very few feel the need for personal cooling. Were senior figures to allow warmer summer office temperatures, reducing AC use and the need for personal warming in overcooled offices, they are unlikely to receive any pushback from colleagues. Rather, employees are likely to personally adapt by using personal cooling strategies and devices. Many of these strategies are similar to those that have already been seen to work in the Cool Biz programme [65], in another country that leveraged such powerful social norms – Japan.

5.2. Research limitations and implications

To begin with, we did not collect data on building characteristics, which also influence the potential flexibility of cooling strategies; this could be addressed by site visits in future studies. Likewise, researchers could address in more detail other ventilation options such as window adjustment, which were missing in our interview design. As our study

centred on younger workers who held junior to middle positions, further research with more senior figures could ascertain *their* views of office and personal cooling. Particularly, researchers could examine whether they see themselves as determining the thermal office environment and whether they are willing to innovate for higher summer office temperatures. A related theme is the role of building managers and building service engineers. This study focused on the financial sector; further research into other sectors may find slightly different cooling norms. Given that local climates and cultural contexts are evidently varied, we encourage further studies exploring the extent to which office cooling is sustained by local norms. Moreover, we speculate that cooling norms operate differently under different styles of corporate authority and government, as illustrated in the different value placed on the preferences of highest-rank persons in Italian offices compared to our findings [62]. Furthermore, social norms are just one of many factors impacting cooling comfort behaviours, including gender dynamics and the built environment [10]. Finally, quantitative research such as randomised controlled experiments could help to estimate the likely success of the strategies suggested by the present study.

With all that said, we believe that this study has harnessed the power of qualitative research to identify routes towards reduced AC in offices. More specifically, it has done so by exploring the nuances of how social norms are featured in the Chinese context in what we believe to be the first attempt to leverage insights from the social-psychological approach to social norms in an interview study of cooling comfort. These concepts of social norms helped in illuminating the subtleties of how and why these office occupants live with AC in the ways that they currently do and in identifying how these apparent "ways" may be influenced. Therefore, we conclude that dynamic cooling norms represent a promising focus for further research in this field.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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