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ORIGINAL RESEARCH ARTICLE

Effect of Wuhan's anti-COVID-19 lockdown on its pace of life and metaphorical temporal perspective

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Abstract

The pace of life, as an indispensable aspect of microscopic culture, has been largely ignored by the academia for a long time. This study proposes that the emergent outbreak of COVID-19 in Wuhan put people there into a fight against time, leading to a speeding up of their pace of life. This might have affected their temporal perspective, regardless of the macroscopic regulation of Chinese culture. To this end, we designed an online questionnaire to gather data about Wuhan people's pace of life and temporal perspective, both during its lockdown and seven months after the lockdown. The results showed that people in while-lockdown Wuhan displayed a much faster pace of life and also a much higher tendency to choose the Moving Time perspective than people in Wuhan seven months after the lockdown. This suggests that the pace of life is not only regulated by specific culture macroscopically, but also by certain pressing events microscopically, and one's temporal perspective is affected by the changed pace of life.

Keywords Pace of life · Temporal perspective · Chinese culture · Pressing event

Introduction

Across languages, people usually adopt spatial metaphors to talk about time (Boroditsky, 2001; Lakoff & Johnson, 2003; Yu, 2012; Wang & Sun, 2021). Various types of spatial metaphors for time include deictic metaphors, sequential metaphors, and extrinsic metaphors (Duffy, 2015). Among them, deictic space–time

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metaphors create two temporal perspectives: the Moving Time perspective and the Moving Ego perspective. Previous studies found that people's temporal perspective is influenced by their pace of life (Brislin & Kim, 2003; Garhammer, 2002; Richmond et al., 2012), which varies among different countries and regions (Bornstein & Bornstein, 1976; Levin, 1997; Levine & Bartlett, 1984). Generally speaking, bigger, more-developed countries and cities have a faster pace of life than smaller, less-developed countries and cities. This difference in pace of life could lead to a difference in people's perception of time. To be specific, people with a slow pace of life would probably take a Moving Ego temporal perspective, while people with a fast pace of life would take a Moving Time temporal perspective. However, "the assumption of tightly limited time to work" would cause workers to have a faster working speed (Brodsky & Amabile, 2018, p. 6), which is a major indicator of their pace of life (Levine, 1997, p. 20). To put it another way, limited time pressure may cause a fast pace of life. Taken together, people's temporal perspective is affected by their pace of life, which varies by region and time pressure. Nevertheless, pace of life, as one indispensable sector of microscopic culture and a new "bottom-up" perspective to explore culture, has been largely ignored by the academia for a long time (Su, 2020, p. 64).

Previous studies found that Chinese culture generally advocates a slow and leisurely pace of life (Levin, 1997, p. 25). Even though the pace of life in some big Chinese cities has sped up in recent years, Chinese culture still holds a much slower pace of life compared with western culture (Han & Qian, 2006, p. 17; Fan, 2014) and attends more to the past (Ji et al., 2009, p. 766), which is associated with a Moving Ego perspective (Yu, 2012, p. 1352; Loermans & Milfont, 2018). According to a national survey in China, Wuhan ranks 24th among 35 major cities in the aspects of pace of life and convenience (City Life Quality Research Center of Experimental Research Institute of Chinese Economy, 2015), which implies a relatively slow pace of life there.

However, we assumed that during the emergent anti-COVID-19 lockdown in Wuhan, people there who were engaged in the battle against COVID-19 had numerous and extremely emergent tasks to do, and high time pressure in which to do them. Therefore, they almost certainly had a faster work speed and pace of life. As a result of this change in their pace of life, it is likely that they would display a much higher tendency to take a Moving Time perspective rather than the Moving Ego perspective, which is more typical of Chinese culture (Yu, 2012), for the reason that Chinese largely do not notice the passage of time, and deem it so indispensably valuable (Fan, 2014, p. 93). In other words, we hypothesized that the pace of life of people in while-lockdown Wuhan would be faster than that in its normal state, which would result in an increasing tendency in while-lockdown Wuhan to adopt the Moving Time perspective. To this end, we designed an online questionnaire to gather data about Wuhan people's pace of life and temporal perspective during this special period, as well as seven months after its lockdown. The results show that people in while-lockdown Wuhan displayed a much faster pace of life and also higher tendency to choose the Moving Time perspective than people in Wuhan seven months after the lockdown. This suggests that pace of life is not only regulated by a specific culture in a macroscopic sense, but also by a certain pressing event microscopically,

and one's temporal perspective would accordingly change along with the pace of life. This finding corroborates the neuroscientific view that humans are evolved, social creatures in a changing world (Davies, 2016, p. 2). It also furthers the effect of pace of life on temporal perspective in a changing emergent setting in addition to a natural static setting.

Related studies

The most influential definition of *culture* was put forward by Tylor, as a complex whole comprising all knowledge, beliefs, arts, morality, laws, customs, and other capabilities and habits grasped and accepted by a social member (Tylor, 1992, p. 1). In this study, we adopted a narrower definition of *culture* as the "beliefs and behavioral scripts that are shared by a group of individuals and constitute social environments" (Han & Ma, 2015, p. 666), which underpins people's behavior and cognition (Prentice et al., 2020, p. 2). To be specific, culture creates the rhythm and pace of life, which then influences people's temporal perspective (Zhou, 2005, p. 124). Therefore, one's concept of time is an essential issue in understanding a culture (Zhang, 2012, p. 267).

Time is a fundamental concept in our daily life, and people usually adopt spatial metaphors to talk about time across languages (Boroditsky, 2001; Lakoff & Johnson, 2003; Yu, 2012). For instance, both English and Chinese speakers use certain deictic space–time metaphors to talk about time, like "*The exam is approaching us*", or "*We're approaching an exam*". The first expression talks about time "moving toward or away from their placement in space", which is referred to as the Moving Time perspective; the second talks about time by "the active ego moving across time", which is referred to as the Moving Ego perspective (Li & Cao, 2019, p. 158; Clark, 1973). Studies have found that various factors influence people's temporal perspective, such as spatial priming incentives (Boroditsky, 2000; Boroditsky & Ramscar, 2002), emotional experiences and personality traits (Duffy & Feist, 2014, 2017; Wang et al., 2022), and even the pace of life (Li & Cao, 2019). Li & Cao (2019, p. 164) compared groups of people in different cities in the USA and the UK, and found that "participants with a fast pace of life more frequently adopted the Moving Time perspective than participants with a slow pace of life". They thus concluded that people's temporal perspective was affected by their pace of life. This is in line with the cultural influence on one's conception of time vie pace of life, as mentioned above. Generally speaking, Chinese culture advocates a slow and leisurely pace of life (Levin, 1997, p. 25; Han & Qian, 2006; Fan, 2014), and accordingly has a higher tendency to hold a Moving Ego perspective on a national level (Yu, 2012, p. 1352; Loermans & Milfont, 2018).

Levine (1997) compared the pace of life among 31 countries around the world, and found that Western European countries had a comparatively faster pace of life than the non-industrialized countries. This finding was further confirmed by Levin & Norenzayan (1999), and developed into the cities' differences in their paces of life for their different economic development and population sizes (Bornstein & Bornstein, 1976; Levine & Bartlett, 1984; Li & Cao, 2019). To be more specific, bigger,

more-developed cities with a larger population have a faster pace of life than smaller, less-developed cities with a smaller population. Meanwhile, work speed, as a major indicator of the pace of life (Levine, 1997, p. 20), was claimed to be subject to time pressure. Moore & Tenney (2012, p. 305–308) found that people with limited time would adopt heuristic processing instead of deliberative cognitive processing to act more quickly, and time pressure increased working speed, which would lead to a fast pace of life. Taken together, we infer that the pace of life is not only subject to the specific culture, but also to regions and time pressure. Nevertheless, all these findings were situated in a natural static setting. Thus, we tentatively put forward a hypothesis that an emergent pressing event in a region may cause high time pressure for people there, which would speed up their pace of life, and eventually remodel their temporal perspective—regardless of the macroscopic influence of their culture.

The abrupt outbreak of COVID-19 in Wuhan threw the entire city into a pressing battle against the virus, which caused high time pressure for people there. In order to test that whether this emergent event would speed up their pace of life, and then remodel their temporal perspective, we conducted two online questionnaire surveys on their pace of life and temporal perspective during Wuhan's Lockdown period (an emergent pressing event), as well as seven months after the lockdown. The details are presented in the Research Design section.

Research design

Research question

This study aims to answer the following question: can an emergent pressing event in a region speed up people's pace of life there, and accordingly remodel people's temporal perspective in a microscopic sense—regardless of the macroscopic effect of one specific culture? In other words, do emergent pressing events transform people's lifestyle? If yes, in what manner? In order to answer this question, we need to find out whether Wuhan's pace of life tended to be much faster during the lockdown, and accordingly whether people then displayed a much higher tendency to adopt the Moving Time perspective. Specifically, two questions are to be tackled:

Q1: Was the pace of life in while-lockdown Wuhan much faster than it is during the normal period?

Q2: As a result, did while-lockdown Wuhan display a much higher tendency to take Moving Time Perspective than Wuhan during the normal period?

Participants

Because quarantine measures were in effect across China, all the participants were recruited online. A snowball sampling (Dewaele, 2018, p. 38) was used: potential participants were contacted and asked to recruit their friends, and so on. The first

session of the online survey was carried out from February 3rd 2020 to March 15th 2020; and the second session from January 10th 2021 to January 25th 2021. Overall, 186 (93 for each session; 97 females; aged from 23 to 52) participants answered both our online questionnaire and the classic clock question by Lai & Boroditsky (2013). All participants were permanent residents in Wuhan with Chinese as their native language, and took part in the survey voluntarily, although a small amount of money as a reward was available through digital red envelopes.

Questionnaire and data collection

During the lockdown period (an emergent pressing event) in Wuhan and seven months after the lockdown, we designed an online questionnaire about the pace of life (see Online Appendix) in reference to Levin (1997) and Li & Cao (2019), and distributed it to Wuhan in a snowball sampling manner (Dewaele, 2018).

Levin (1997, pp. 22–25) measured people's pace of life in 31 countries from three dimensions: (1) walking speed—the time pedestrians in downtown take to walk a distance of 60 feet; (2) work speed—the time the postal clerks take to compete a standard request to purchase a stamp; (3) accuracy in minutes of public clocks. Li & Cao (2019, p. 162) adapted a pace-of-life questionnaire from one devised by Wiseman (2006), which consisted of seven questions about talking speed and habits, eating speed, walking habits, doing-nothing feelings, queuing habits and problem-solving habits. Table 1 presents the details of their measurement of pace of life.

Since people were in quarantine, we removed the questions (in italics) about walking and working in both Levin (1997) and Li & Cao (2019), and also queuing habits in Li & Cao (2019). The final questionnaire consisted of six questions, five of which originated from Li & Cao (2019) and one from Levin (1997) (see Online Appendix). The answers were arranged on a 1–3 scale (1 score for choice 1, 2 scores for choice 2, and so on; the total score ranges from 6 to 18). After the questions about personal information and pace of life, the classic clock question by Lai & Boroditsky (2013, p. 4) was added to test their temporal perspective: Suppose the clock says it is 1:00 p.m. now. You need to move it one hour forward. What time will it be adjusted to? The possible correct answers would be 12:00 p.m., which implied

Table 1 Measurement of pace of life

Levin (1997, pp. 22–25)	Li and Cao (2019, p. 166)
1. Walking speed—the time pedestrians downtown take to walk a distance of 60 feet;	1. Do people tell you that you talk too quickly?
2. Work speed—the time postal clerks take to compete a standard request to purchase a stamp;	2. When someone takes too long to get to the point, do you feel like hurrying them along?
3. Accuracy in minutes of public clocks	3. Are you the first person to finish at mealtimes?
	4. When walking along a street, do you feel frustrated because you are stuck behind others?
	5. Would you become irritable if you sat for an hour without doing anything?
	6. Do you walk out of restaurants or shops if you encounter even a short queue?
	7. When you are faced with an unfamiliar problem, what do you usually do?

a Moving Time perspective, or 2:00 p.m., which implied a Moving Ego perspective. The answers would be matched to the results of pace of life to test our hypothesis that pressing event in a region would speed up pace of life and accordingly remodel people's temporal perspective in a microscopic sense. All questions were written in the Chinese language and compiled into Wenjuanxing—an internet-based questionnaire service. Then, the online questionnaire was distributed to the recruited participants to gather data about their pace of life and temporal perspective.

Results and discussions

Results

In order to find out whether the pace of life in Wuhan during the emergent period was much faster than it was during the normal period (Research Question 1), we calculated the average pace of life scores of while-lockdown Wuhan and after-lockdown Wuhan respectively. The results are shown in Fig. 1 below.

Figure 1 shows that the average pace of life score of people in Wuhan during the special period (while-lockdown Wuhan) was 14.68 ($N=93$, $SD=1.46$), which was much higher than that in after-lockdown Wuhan ($M=11.16$, $N=93$, $SD=1.18$), its normal pace of life score. As mentioned above, Wuhan ranks 24th among 35 major cities in the aspect of pace of life. We thus expected Wuhan to have a medium pace of life score during its normal period. The results showed that after-lockdown Wuhan had an average pace of life score of 11.16 out of a total of 18, which verified our expectation. An independent sample t-test indicated that the pace of life of while-lockdown Wuhan ($M=14.68$, $SD=1.46$) was significantly faster than that of after-lockdown Wuhan ($M=11.16$, $SD=1.18$) (t (176) $=18.04$, $p<0.05$, $d=3.77$). Thus, we can say that the emergent outbreak of COVID-19 in Wuhan sped up people's pace of life there.

In order to find out whether this changed pace of life would lead to a change in people's temporal perspective (Research Question 2), we calculated the numbers of answers 12:00 and 2:00 to the classic clock question (Lai & Boroditsky, 2013) of while-lockdown Wuhan and after- lockdown Wuhan respectively. It was expected that the number of the answer 12:00 (which resulted from a fast pace of life) in

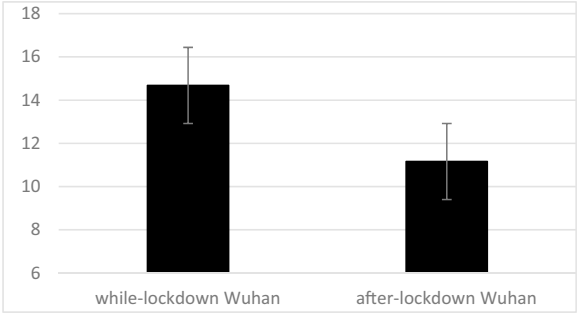

Fig. 1 Average pace of life scores of while-lockdown Wuhan and after-lockdown Wuhan

while-lockdown Wuhan would be much larger than that in after-lockdown Wuhan. The calculated results are shown below in Fig. 2.

Figure 2 shows that 92% (86 out of 93) of people in while-lockdown Wuhan adjusted their clocks to 12:00 p.m., while only 54% (50 out of 93) people in after-lockdown Wuhan gave the answer 12:00 p.m. A chi-square test verified that while-lockdown Wuhan held a significant higher tendency to adjust their clocks to 12:00 p.m. (χ^2 (1, 186) = 35.4, $p < 0.05$), which implied a Moving Time perspective, than the after-lockdown Wuhan. This indicates that the faster pace of life in Wuhan during the lockdown brought a higher tendency to adjust the clock to 12:00 pm, a Moving Time perspective. Therefore, we can draw the conclusion that people in Wuhan altered their temporal perspective for their changed pace of life. This result confirmed our hypothesis that the emergent pressing event sped up the involved people's pace of life, which remodeled their temporal perspective.

General discussion

Both culture (Han, 2017, p. 42) and time pressure (Moore & Tenney, 2012, p. 305) influence people's pace of life, and pace of life has been claimed to affect people's temporal perspective (Li & Cao, 2019). Believing that there is an intimate relationship between pace of life and people's attitude towards time, this study intended to further test whether an emergent pressing event would speed up people's pace of life, and accordingly remodel people's temporal perspective regardless of the macroscopic regulation of one specific culture, based on the fact that all the existing research was carried out in a static state. The results confirmed our hypothesis that an emergent pressing event would not only change the involved people's pace of life, but also their temporal perspective, which is determined by its culture macroscopically. The emergent outbreak of COVID-19 in Wuhan significantly increased its pace of life compared to after-lockdown Wuhan, and people in while-lockdown Wuhan also displayed a much higher tendency to adopt the Moving Time perspective, which was the result of the changed pace of life there. Due to the limitations imposed by the extraordinary circumstances, we only adopted the questionnaire methodology. This needs to be noted as a limitation of our study.

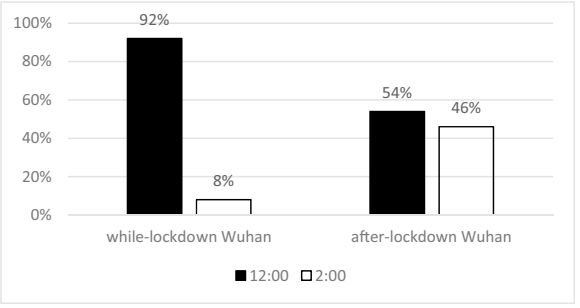

Fig. 2 Percentages of the two answers

Chinese culture generally advocates a slow and leisurely pace of life (Levin, 1997, p. 25; Fan, 2014, p. 94), and lacks a sense of time (Ming, 1998, p.34), which macroscopically regulates Chinese people to be more likely to take a Moving Ego perspective. However, due to the rapid development of the country, the pace of life has become different in some regions. The pace of life in first-tier cities has begun to catch up with western countries (Fan, 2014, p. 94). The second-tier cities (such as Wuhan) are in the process of transforming into having a fast pace of life and the Moving Time perspective, which is supported by the pace of life score of after-lockdown Wuhan (11.16) in Fig. 1, and the slightly higher percentages of answer 12:00 in Fig. 2 (54% for after-lockdown Wuhan). However, time pressure would lead to a fast pace of life (Moore & Tenney, 2012). During Wuhan's lockdown, people there were in a pressing situation to save people's lives, and this time pressure sped up their pace of life, which was much faster than that in Wuhan's normal situation (14.68 versus 11.16 in Fig. 1), and consequently remodeled people in Wuhan into a much higher tendency to adopt the Moving Time perspective (95% versus 54% in Fig. 2). This suggests that culture exerts a macroscopic influence on its people's pace of life and then temporal perspective, yet high time pressure of a pressing event would remodel the involved people's pace of life and then temporal perspective in a microscopic sense.

Our first finding that people in while-lockdown Wuhan adopted a faster pace of life was in line with one commonality on pacing theory, that the assumption of tightly limited time to work caused workers to speed up (Brodsky & Amabile, 2018, p. 6). In this emergent period, to save time was to save lives, thus all people in Wuhan were under great time pressure. All the highest pace of life scores (17 scores out of the total 18) appeared among this group of people. This suggests that time pressure could have an immediate influence on people's pace of life. Whether this finding in the special period could still hold in the non-special period needs further research.

Our second finding that people's temporal perspective could be accordingly remodeled by the changes in people's pace of life further confirmed Li and Cao (2019, p. 163)'s finding that pace of life influences people's preferred temporal perspective. This was also in accordance with the finding that people's personal agency was related to their temporal perspective (Duffy & Feist, 2014; Richmond et al., 2012). Particularly, our finding was based on an emergent changing setting, which suggested that pace of life not only modeled temporal perspective in a chronic manner, but also remodeled temporal perspective in an immediate-effect manner. This may broaden the explanation scope of embodied cognition theory, which was based on long-term "reoccurring patterns of bodily experiences" (Landau et al., 2010, p. 1062), to the immediate outbreak of emergences. People's cognition is thus an integrated result of long-term experiences and immediate emergencies.

Conclusion

This study investigated whether an emergent pressing event would speed up people's pace of life, and accordingly remodel people's temporal perspective regardless of the macroscopic regulation of one specific culture. Through two online questionnaire

surveys, we found that as a result of the emergent outbreak of COVID-19 in Wuhan, people there displayed a much faster pace of life than the after-lockdown Wuhan, which accordingly led to a higher tendency to adopt the answer 12:00 to the classic clock question (Lai & Boroditsky, 2013) in while-lockdown Wuhan. This indicates that pace of life was regulated by a specific culture in a macroscopic sense, and might be changed by certain pressing events in a microscopic sense. Besides, the changed pace of life might exert an effect on metaphorical temporal perspective. This finding furthers the effect of culture and time pressure on pace of life in a changing emergent setting, and broadens the explanation scope of embodied cognition theory to the immediate outbreak of emergences in addition to long-term reoccurring patterns of bodily experiences. Further studies could check the findings in other emergent events and more specific groups of people like doctors, patients, and ordinary citizens.

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Author contributions Both authors of this manuscript have directly participated in planning, execution, and analysis of this study.

Data availability The raw/processed data and code required to reproduce these findings cannot be shared at this time as the data also forms part of an ongoing study, but they are available if requested by reviewers and editors.

Declarations

Conflict of interest Both authors of this manuscript have no conflict on the submission of it to this journal.

Ethical approval Both authors read and approved the final manuscript, and agreed to submit it to this journal exclusively.

Consent to participate All participants in this study joined the research voluntarily and provided digital consent.

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