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Intergenerational differences in the environmental concerns of plastic waste business owners: environmental knowledge, environmental risk exposure, and community connection as mediators

Xuan Wang[1,2,4] & Lingqiong Wu[3,4]✉

Promoting environmental concern among plastic waste entrepreneurs is a crucial step towards addressing the issue of plastic pollution effectively. To comprehend the techniques for enhancing environmental responsibility within this demographic, it is essential to examine the intergenerational shifts in environmental attitudes, which can provide valuable insights. This study investigates the intergenerational differences in two types of environmental concerns (i.e., ecological worldview and local environmental issue concern) by taking two generations of plastic waste business owners in *Wuzhen* Town, China, as a case. The roles of post-materialistic values, environmental knowledge, environmental risk exposure via new media, and community connection in mediating the relationships between generation and environmental concern were also examined in light of the Mindsponge theory. A paired-sample survey ($N = 102$) was utilized to collect data. The results of path analyses showed significant intergenerational differences in ecological worldview but insignificant intergenerational differences in local environmental issue concerns. While nondaily environmental knowledge and environmental risk exposure via new media significantly and positively mediated the relationship between generation and ecological worldview, community connection significantly and negatively mediated the relationship between generation and local environmental issue concern. Although a significant difference was found in the post-materialistic values between the two generations of plastic waste business owners, this variable did not significantly predict environmental concern.

[1] School of Public Administration, Hohai University, 211100 Nanjing, China. [2] Research Center for Environment and Society, Hohai University, 211100 Nanjing, China. [3] Management School, Nantong University, 226019 Nantong, China. [4] These authors contributed equally: Xuan Wang, Lingqiong Wu. ✉email: lqwu@ntu.edu.cn

Introduction

Environmental concern is a classic topic in the field of environmental sociology. Environmental concern refers to people's "degree of awareness and support for or willingness to contribute to the solution of ecological problems" (Dunlap and Jones, 2002). With the rise of environmental movements and considerable growth in the environmental concern of the public, a series of studies have been conducted in relation to environmental concern, covering topics such as the instrumentation of environmental concern (Guber, 1996; Xiao and Dunlap, 2007); the social bases of public environmental concern such as age, gender, residence, religious beliefs and other social attitudes (Van Liere and Dunlap, 1980; McElwee and Brittain, 2009); the relationship between environmental concern and environmentalism, including general environmental behaviour (Gansser and Reich, 2023) and specific domains of environmentalism such as residents' willingness to sort waste (Domina and Koch, 2002). However, issues concerning the relationship between generation and environmental concern have scarcely been examined. Given the rapid development of information technology in contemporary societies, in particular, scholars frame environmental issues as social constructs and environmental concerns as postmodern phenomena. This perspective implies that intergenerational differences in environmental concern may have new features that are worthy of further investigation.

A generation can be understood as a group of people connected by a common spiritual bond formed by having a similar time of birth or upbringing (Mannheim and Kecskemeti, 1952). As different generations have different social experiences, they may hold different values that may lead to different levels of environmental concern. Past research has mainly examined intergenerational differences in environmental concern by using age as the proxy variable. However, no consensus has been reached concerning the relationship between age and environmental concern. Several studies (Hornback, 1974; Olli et al., 2001) have reported negative effects of age on environmental concern, whereas others (Shen and Saijo, 2008) have shown that older generations are more concerned about the environment and environmental issues than younger generations are. These inconsistencies in the findings of these studies may be partly attributed to factors such as cultural differences or a series of social experiences in different stages of social development. However, these inconsistencies may also be partly due to the simplified operationalization of the concept of "generation" in these studies. As environmental pollution and risks are often geographically unevenly distributed, individuals of the same age may have different social experiences associated with environmental pollution or protection. As a result, using age as a proxy variable for generation may mask intergenerational differences caused by different environmental experiences.

This research focuses on the environmental concerns of plastic waste business owners. Plastic waste business owners are closely related to the environment, and their personal environmental concerns affect environmental decisions for the overall plastic waste recycling industry to a certain extent. In recent years, plastic pollution and related environmental and health risks have attracted increasing attention from governments, the media, academia, and the general public. In addition to the top-down approaches with more comprehensive policies and stricter environmental regulations, bottom-up methods that target the environmental concerns of business owners—a specific population that has been largely neglected in previous studies—are equally important.

Owners of plastic waste recycling businesses in China have unique regional characteristics. The first generation (Gen1) of business owners began to engage in plastic recycling and processing in the late 1970s when China promoted the policy of reform and opening-up. They mostly came from towns and villages with limited educational experiences. Their participation in the plastic waste recycling industry has provided an important ground-level force for waste recycling in China. The second generation (Gen2) of owners took over the business from their parents in the mid-1990s. This research intends to examine intergenerational differences in environmental concerns among plastic waste business owners as well as key social–psychological mechanisms explaining intergenerational differences in environmental concerns in the Chinese setting.

A paired sample research design was used, and two generations of plastic waste business owners in *Wuzhen* town, China, were used as the case for this study. *Wuzhen* town is currently the largest professional market town in terms of the plastic waste industry and plays a pivotal role in the plastic waste recycling and reprocessing business in China. The plastic waste business in *Wuzhen* town also provides a typical case of local green transformation, during which process the younger generation of business owners serves as a major driving force. Thus, this specific case was chosen to provide a window through which intergenerational differences in environmental concern could be well examined.

Literature review

Intergenerational differences in environmental concerns. As different generations have different social experiences, they may also hold different values (Mannheim and Kecskemeti, 1952). Two different perspectives have been proposed to understand intergenerational differences in environmental concerns. The life cycle perspective presumes that individuals hold different values and attitudes at different stages of their lives. In terms of environmental concern, as older generations perceive fewer personal benefits from environmental protection (Geys et al., 2020) and are more deeply embedded in the social structures of the status quo (Buttel, 1979), they are less likely to be concerned about environmental issues and take action for environmental protection than younger generations are. In contrast, the post-materialism perspective views environmental concern as an integral component of post-materialism and environmental well-being as an essential element of transcendence needs (Inglehart, 1995); as the younger generation has experienced both economic development and environmental catastrophes or eco-crises at the same time, whereas the older generation has suffered more from economic crises, the younger generation generally assigns more weight to environmental wellbeing and has stronger environmental concern than the older generation.

Empirically, Casalegno et al. (2022) found that Generation Z (born between 1995 and the early 2010s) was more concerned about environmental issues than previous generations, including Generation X (born between 1965 and 1979) and Generation Y (born between 1965 and 1995); additionally, Generation Y had higher environmental sensitivity and pursued healthier lifestyles than did Generation X. Based on the data of the China General Social Survey 2010 (i.e., CGSS2010), Hong et al. (2015) also revealed that persons born in the 1970s and onwards had higher levels of environmental concern than did those born in the 1960s and before. Hence, the following hypothesis is proposed:

H1: Gen2 has stronger environmental concern than Gen1.

Mechanisms explaining intergenerational differences in environmental concerns. This study targets the roles of post-materialistic values, environmental information exposure, and community connections as mediators of the relationship between

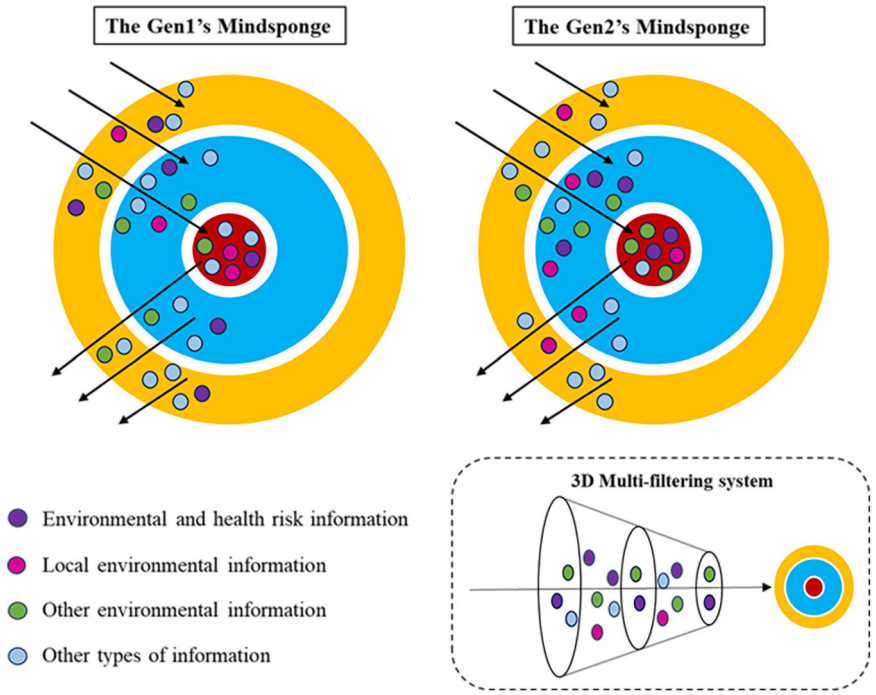

Fig. 1 The dynamic shaping mechanism of environmental concern. The figure is adapted from Nguyen et al. (2021).

generation and environmental concern. The roles of these constructs in determining environmental concern have been widely discussed in previous studies, but the mechanisms concerning how they mediate the relationship between generation and environmental concern have not yet been fully addressed. The three constructs are incorporated into one integral framework (Fig. 1) based on the Mindsponge theory (Vuong, 2016). Generally, the development of environmental concerns can be viewed as a continuous process of learning, reflection, and reconstruction through dynamic social interactions. This means that the information process plays a critical role in shaping individuals' environmental values, beliefs, and attitudes. Within the circle of mindset (i.e., the red zone in Fig. 1), personal core values that develop in certain cultural settings (i.e., the yellow zone) play the most fundamental role in determining environmental concern. Once new information emerges, it will diffuse via certain cultural mechanisms in the yellow zone and enter into a buffer zone (i.e., the blue zone) where personal self-protective affirmation mechanisms (such as trust) are activated to govern the process of information screening, evaluation, and integration (Vuong and Napier, 2015). On the one hand, the self-protective affirmation mechanism allows useful information to enter into the red zone and contribute to updating the new value system (Vuong et al., 2022). On the other hand, outdated elements that no longer fit into the status quo are expelled from the core value system.

Regarding intergenerational differences in environmental concern, modernity and emerging postmodern culture change both the cultural setting and the information process, which in turn leads to differences in environmental concern between the two generations. In comparison with Gen1, who grew up in a traditional society, for Gen2, who grew up in a more modernized cultural setting, not only are their values becoming more post-materialistically oriented, but also the way they obtain access to environmental information relies more on new media. A weakened connection with local communities also weakens the influence of traditional culture and changes the basis of the personal trust mechanism for Gen2. More details concerning the hypotheses developed for these three aspects of mediating mechanisms are described in detail in the three subsections below.

Values as a mediator. Values provide an essential basis upon which environmental concern develops (Stern, 2000). Inglehart proposed a two-dimensional structure of values, i.e., materialistic vs. post-materialistic values. While materialistic value emphasizes order, economic stability, and personal and property security, post-materialist value highlights the importance of freedom of speech, quality of life, sense of belonging, aesthetics and value realization. Based on the information processing mechanism of the Mindsponge, individuals with post-materialistic values are more inclined to turn on the "radar" to affirm and accept environmental information (such as environmental risk data and knowledge) and care about environmental issues.

Inglehart (1997) prioritized discussing the mediating role of materialistic/post-materialistic values in intergenerational differences in environmental concern. In light of his scarcity hypothesis, it is the satisfaction of material needs in childhood and adolescence that affects the formation of post-materialistic values. The new generation lives in a more affluent and secure environment and is therefore more concerned with meeting high-level needs, such as environmental protection. Based on data from the World Values Survey, Inglehart found that postwar generations (i.e., the generation born after World War II) in Western developed countries tended to pursue post-materialism goals and were significantly and positively correlated with pro-environmentalism (Inglehart, 1995).

However, Inglehart's view on the relationship between post-materialism and environmental concern has also been questioned by other scholars. Based on the results of three World Values Surveys (i.e., 1990–1993, 1995–1998, and 1999–2001), Dunlap and York (2008) found that the willingness to make economic sacrifices for environmental protection and confidence in the green/eco-environmental movement is negatively correlated with national wealth. In China, scholars have examined intergenerational differences in post-materialistic values and environmental concerns and found that age negatively predicted environmental

concerns but not post-materialistic values (Hong and Lu, 2011; Gu et al., 2020). These findings suggest that the relationship between post-materialistic values and environmental concerns may vary in different economic settings. As China has witnessed rapid economic development in the past two decades, the younger generation in China might have more positive post-materialistic values, and this variable is more critical in determining environmental concerns in younger generations than in older generations.

Therefore, the post-materialistic values-environmental concern hypothesis is proposed:

H2: Gen2 is more likely to have post-materialistic values (H2a), which in turn leads to stronger concern for the environment (H2b).

Environmental knowledge as a mediator. Exposure to environmental information is an important prerequisite for the development of environmental concerns. However, only information that is perceived to be valuable and trustful will be absorbed and reflexively integrated into one's knowledge system. Hence, environmental knowledge reflects an individual's ability to recognize various cues, ideas and behavioural patterns related to environmental protection (Laroche et al., 2001). Understanding environmental problems, as well as their causes and consequences, allows people to build environmental concerns that can influence their decision to take environmental action (Barber et al., 2009). Studies on sustainable consumption have revealed that environmental knowledge can increase interest in environmental issues and intention to buy green products (Saari et al., 2021).

Theoretically, younger generations with relatively higher educational levels have more sophisticated abilities to acquire environmental information from more diverse sources and are hence more likely to gain a higher level of environmental knowledge. Lavuri (2021) examined the relationship between generation and environmental knowledge and found that millennials were more ecologically conscious and had a higher level of environmental knowledge than other generations. Therefore, the following hypothesis is proposed:

H3: Gen2 has a higher level of environmental knowledge (H3a), which in turn leads to a higher degree of environmental concern (H3b).

Exposure to environmental risk via new media as a mediator. From the perspective of modernity, exposure to environmental risk can arouse negative emotions such as depression, fear, and anxiety (Giddens, 1991), which drive people to be concerned about the environment. Mass media, especially new media, is an important mechanism for environmental risk exposure in modern society. On the one hand, it can narrow the distance between the audience and environmental risks (Adam et al., 2000), dissociate environmental risks from the physical world and reconstruct them into a controversial open symbolic system, which invites the public to examine environmental issues reflexively (Stuart et al., 2000). On the other hand, new media intensifies individuals' exposure to environmental information and is superior to traditional media in amplifying environmental risk efficiency (Chung, 2011; Ng et al., 2018). Yu et al. (2023) compared public attention to information on two different kinds of environmental health risks, i.e., smoke haze and dengue fever, which were diffused via new media in Southeast Asia. Their study revealed that although dengue fever lasts longer and may have more severe impacts on health, the public's subjective risk perception of the smoke haze was stronger because of the way the risk information was selectively amplified through new media.

People in different age groups have different media use preferences. Younger people are generally more inclined than older people to obtain information from new media because of their higher acceptance of internet-based technologies (Sogari et al., 2017). This also means processing more information about environmental risks. Based on the above considerations, the following hypothesis is proposed:

H4: Gen2 utilizes new media more frequently and has a greater awareness of environmental risks (H4a), resulting in a higher level of environmental concern (H4b).

Community connection as a mediator. Community connection is generally regarded as a bond between an individual and the community. Besides personal emotional affiliation with the community, this concept also contains a cognitive dimension that emphasizes a sense of identity as being a member of the community (Beggs et al., 2010).

According to the general theory of place attachment, the more people see themselves as part of a community and as being connected with others in the community, the more likely they are to pay attention to local environmental threats or issues for the sake of the wellbeing of the community (Vorkinn and Riese, 2001; Brehm et al., 2006; Macias and Nelson, 2011; Armstrong and Stedman, 2018).

This is especially true in the context of a traditional society where community connection develops from geographically localized social ties (such as family and neighbourhood ties). In such circumstances, individuals pay close attention to others' evaluation of their own behaviours (Fei et al., 1992). As the environment is viewed as a common good, the individual must ensure that his or her behaviour will not negatively impact or destroy the environment to maintain the quality of the environment and its continued support for the normal lives of others.

Intergenerational differences in community connections are a common theme in postmodern studies. Giddens's (1991) theses of modernity assert that as traditional social ties fade away, the younger generations in contemporary societies are becoming increasingly disembedded from the social structure and becoming more independent in making consumption decisions on their own. In light of the Mindsponge theory, the weakened local social ties as a consequence of modernity would influence both cultural mechanisms and personal self-protective affirmation mechanisms that govern the information process. The weaker the connection with the local community, the less significant the information on local environmental issues, and hence, the less concern for the local environment. Empirically, Robson et al. (2020) found that younger generations tended to leave the communities where they once lived for personal development reasons. Thus, the following hypothesis is proposed:

H5: Gen2 has a weaker degree of community connection (H5a), which in turn leads to a lower level of concern about local environmental issues (H5b).

In summary, the present study proposes that generation influences environmental concern through post-materialistic values, environmental knowledge, environmental risk exposure via new media, and community connections. The hypothesized model is shown in Fig. 2.

Method

Research site. *Wuzhen*, a market town in northwestern Anhui Province, has a total population of 65,000 and covers an area of

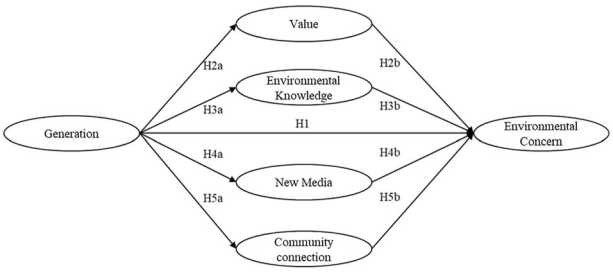

Fig. 2 The hypothesized model to be tested. Value refers to post-materialistic value; New media refers to environmental risk exposure via new media.

46.4 square kilometres. According to the 2021 local government work report, the annual GDP of *Wuzhen* is 6.02 billion yuan, accounting for one-sixth of the province's annual GDP at the town level, and the per capita disposable income is 16,798 yuan (~2434 dollars), which is approximately half the national per capita disposable income level (i.e., 35,128 yuan; ~5090 dollars). The plastic waste recycling industry is the main industry in *Wuzhen*. It represents one of the largest market towns for plastic waste recycling in China. The amount of recycled plastic collected in *Wuzhen* alone (1.8 million tons) accounted for approximately 10% (20 million tons) of all recycled plastic in China in 2014.

The origin of the plastic waste recycling industry can be traced back to the late 1980s, when residents started to engage in the recycling, sorting and resale of plastic waste, using their family yards as work sites (i.e., family workshops). Since the late 1990s, a considerable number of companies have been established to perform activities related to crushing and granulation. Given the context of loose environmental management and the extensive economy at that time, the environmental impacts of such activity were largely ignored by the enterprises. As they did not take any environmental protection measures, wastewater containing caustic soda and dishwashing detergent was discharged directly into the sewer or even the nearby river without any treatment. During this period, water pollution became a local issue. In 2005, the local government began to establish an industrial park along with strict environmental management requirements and tried to regulate the production behaviour of those business owners. Many family workshops and companies in the plastic waste recycling industry were encouraged to settle in the park during this time.

In 2016, environmental remediation was carried out within the plastic waste industry nationwide. Benefitting from earlier environmental management of the industrial park, the plastic waste recycling industry in *Wuzhen* town achieved successful green transformation rather than being banned. At present, more than 100 enterprises doing business related to plastic waste recycling (e.g., cleaning, granulation, modified plastics, injection moulding products, and rolled products) have gathered in the industry park. Almost all of these enterprises are family enterprises that have been engaged in recycling-specific business since the late 1980s.

The sample. This study took the business owners of local plastic waste recycling enterprises settled in the industrial park as the case. In total, there were 144 recycling enterprises in the industrial park. As this study focused on differences between the first (i.e., Gen1) and second (i.e., Gen2) generations of local business owners, eight business owners from enterprises that had entered the park only recently were excluded. Additionally, another eight enterprises owned by the same person as another enterprise in the park were identified and excluded, resulting in 128 business owners for the final sample.

Table 1 Basic information of the sample.

Item	Category	Number	Frequency (%)
Age	25–35	18	17.6
	35–45	30	29.4
	45–55	35	34.3
	55–65	19	18.6
Gender	Male	89	87.3
	Female	13	12.7
Education	Primary school or less	27	26.5
	Middle school	38	37.3
	High school/Technical training	22	21.6
	College/University	15	14.7

The survey was administered in July 2022 and was approved by the Institutional Review Board at the School of Public Administration of Hohai University, Nanjing, China. All of the business owners were contacted and asked for their consent to participate in the survey. Participants were informed that the survey was voluntary and anonymous in nature, and a consent form indicating the purpose of the survey was provided before the participants completed the questionnaire. The survey was administered face-to-face. Upon filling in the questionnaire, they were asked to report which generation they belonged to. They were also well informed that Gen1 refers to the first generation who started the plastic waste recycling business and Gen2, who inherited the business from their parents. To achieve a high participation rate, each participant was given a gift of 50 yuan (~7.25 dollars). A total of 102 business owners completed the questionnaires, and no invalid questionnaires were found. Among these participants, 91 were males and 13 were females; 53 were Gen1 (52.0%), and 49 were Gen2 (48.0%). The basic information of the participants is shown in Table 1.

Measures. The questionnaire contains five measures, which include environmental concern, values, environmental knowledge, environmental risk exposure, and community connection. All of the measures were adapted from existing scales (see details in the subsection below) based on feedback from the pilot fieldwork at the research site. The pilot fieldwork was conducted to determine how local business owners perceive environmental issues and how they understand the statements on the measures. Interviews were conducted with four core members from the local plastic waste recycling industry. Statements with confusing wording or expressions were then identified and revised according to their comments.

Environmental concern. The measure of environmental concern contained two dimensions, i.e., general ecological worldview and local environmental issue concern.

Ecological worldview: The Chinese version of the New Ecological Paradigm (the NEP) scale (Dunlap et al., 2000) was used to measure the general ecological worldview. The NEP scale is the most widely used instrument for measuring environmental concerns. It measures one's general attitudes towards the environment as well as the relationship between human beings and the environment. The Chinese version of the NEP scale was developed by Hong (2006) and incorporated as a key element of the environmental module in the CGSS. Previous studies have shown that the NEP is applicable for use with Chinese residents, although its structure varies among different populations (Wu et al., 2012; Wang and Fu, 2011; Wu and Zhu, 2017; Xiao et al., 2019). The NEP scale includes five dimensions: limit of growth, balance of nature, anthropocentrism, exceptionalism, and

eco-crisis. Based on the pilot fieldwork, nine items pertaining to anthropocentrism, exceptionalism, and the balance of nature on the Chinese version of the NEP scale were selected for use in the present study. Participants were asked to rate their responses on a 5-point Likert-type scale, with "1" as "strongly disagree" and "5" as "strongly agree". An initial analysis identified two problematic items (i.e., NEP2, *"Humans are the most important and can change the environment to suit their needs"*, and NEP5, *"At present, human beings are abusing and destroying the environment"*), which were inconsistent with the remaining items on the NEP measure. As a result, these two items were deleted from the formal analysis. The internal consistency coefficient after deleting the two problematic items was 0.69. Although the results from the explanatory factor analysis indicated two principal factors with eigenvalues >1 (accounted for 54.9% of the variance), the first unrotated factor explained 36.1% of the variance (with factor loadings ranging from 0.476 to 0.696), which suggested a common theme across these items.

Local environmental concern: The measure of local environmental concern (the LEC) contained two items based on previous research (Tal and Nathan, 2021; Luisa et al., 2022) and previous field investigations. Participants were asked to report the extent to which they agreed or disagreed with the following two statements: (1) I am very concerned about the local environmental pollution; (2) I am concerned about whether the plastic waste processing industry will have a serious impact on the surrounding environment, on a 5-point Likert-type scale in which "1" represented "strongly disagree" and "5" represented "strongly agree". The internal consistency coefficient on this scale was 0.70, showing good internal consistency.

Post-materialistic values. A revised Chinese version of Inglehart's (1995) value scale was used to measure post-materialistic values. The revised Chinese version of Inglehart's post-materialistic value scale was adapted to fit in with Chinese culture by Hong and Lu (2011). This scale was also incorporated into the environment module of the CGSS2010 and validated for use with Chinese residents (Peng and Cao, 2018). The revised Chinese version contains eight options, four of which reflect post-materialistic values. These include: (1) the government should listen more to the opinions of the people when making important decisions; (2) freedom of expression should be guaranteed; (3) it should be ensured that future generations have a good environment and adequate resources; and (4) the negative effects of modern technology should be considered. The remaining four options pertain to materialistic value: (1) social order and security should be ensured; (2) unemployment should be controlled, and economic growth should be ensured; (3) the living standards of modern people should be improved; and (4) science and technology should be developed. Participants were asked to choose four options that they considered the most important. The options associated with post-materialism values were recoded as "1", whereas the other options were recoded as "0".

Environmental knowledge. Environmental knowledge was measured using the 12-item environment knowledge scale on the CGSS2010 (Hong and Lu, 2011). Participants were asked to report if they knew of the following 12 environmental issues: (1) air pollution (EK1); (2) water pollution (EK2); (3) noise pollution (EK3); (4) industrial waste pollution (EK4); (5) household waste pollution (EK5); (6) insufficient green space (EK6); (7) the destruction of forest vegetation (EK7); (8) the degradation of cultivated land quality (EK8); (9) the shortage of freshwater resources (EK9); (10) food contamination (EK10); (11) desertification (EK11); and (12) declining numbers of wild animals (EK12). A response of "yes" was recorded as "1", whereas a response of "no" or "not sure" was recorded as "0".

Initial internal consistency analysis revealed that EK1 (air pollution) and EK2 (water pollution) were inconsistent with the other items on the measure, deleting which would increase the internal reliability from 0.889 to 0.895. The relatively low item-total correlations (<0.25) for these two items may be due to the high portions of positive responses (>96%) on these items. Actually, air and water pollution are the two main environmental problems encountered in the plastic waste recycling and processing industry in China. It is not surprising that participants were strongly familiar with EK1 and EK2. As a result, these two items were deleted from the formal analysis. The structure of the revised measure was further examined by using exploratory factor analysis (with Caesar's normal maximum variance method). This resulted in two principal factors with eigenvalues >1.0. The three items loaded on Factor 1 included EK3, EK4, and EK5 (with factor loadings ranging from 0.768 to 0.905), which concerned issues that were more related to residents' everyday life and would be more frequently diffused via mass media given the specific context of suburban China. In contrast, the remaining seven items (i.e., EK6–EK10) loaded on Factor 2 (with factor loadings ranging from 0.636 to 0.862) concerned issues more distant from residents' everyday lives. Hence, the two subsets of items were divided into two separate constructs and labelled daily EK and nondaily EK, respectively.

Environmental risk exposure via new media. Environmental risk exposure via new media can be understood as one type of subjective risk exposure, which was measured using a single item adapted from the environmental information scale on the CGSS2010. Participants were asked to report how often they obtained information on environmental issues (including environmental pollution, disasters/catastrophes, and eco-crises) via new media. Responses were scored on a 5-point Likert-type scale, with "1" representing "never" and "5" representing "very often".

Community connection. The measure of community connection was adapted from an existing place attachment and identification scale reported by Ruiz et al. (2011). Participants were asked to report the extent to which they agreed or disagreed with the following four statements: (1) I will stay in the place where I live throughout my entire life; (2) I feel good when someone around me does something to improve the wellbeing of my community; (3) I will consider what my neighbours would think of me when I make decisions in business; and (4) I feel sad when speaking of moving away from the place where I live. Responses were scored on a 5-point Likert-type scale, with "1" representing "strongly disagree" and "5" representing "strongly agree". The internal consistency coefficient of the scale was 0.64. The explanatory factor analysis resulted in one principal factor with eigenvalues greater than 1 that explained 63.3% of the variance (with factor loadings ranging from 0.711 to 0.853), indicating one dimension on this measure.

Data analysis. This study used path analysis for hypothesis testing. The overall scale scores were computed in terms of the means of items scores for the NEP (ranging from 1 to 5), the LEC (ranging from 1 to 5), daily EK (ranging from 0 to 1), nondaily EK (ranging from 0 to 1), and community connection (ranging from 1 to 5). For post-materialism values, the scale score was generated in terms of the summated item scores (ranging from 0 to 4). Prior to path analyses, the normality of and intergenerational differences in both dependent and explanatory variables were examined. Basic information on the means, standard

Table 2 Intergenerational differences in environmental concern and mediating variables.

Construct	Group	*n*	*M*	*SD*	*Me*	*T* (*p*-value)	*Z* (*p*-value)
NEP	Gen1	53	3.70	0.31	-5.164	<0.001	<0.001
	Gen2	49	4.05	0.38			
LEC	Gen1	53	4.13	0.46	-1.030	0.329	0.303
	Gen2	49	4.22	0.49			
Post-materialistic values	Gen1	53	0.70	0.80	-7.583	<0.001	<0.001
	Gen2	49	2.45	0.77			
Daily EK	Gen1	53	0.59	0.44	-4.221	<0.001	<0.001
	Gen2	49	0.91	0.28			
Nondaily EK	Gen1	53	0.23	0.35	-4.774	<0.001	<0.001
	Gen2	49	0.60	0.38			
Environmental risk exposure via new media	Gen1	53	3.53	0.82	-4.822	<0.001	<0.001
	Gen2	49	4.37	0.73			
Community connection	Gen1	53	4.27	0.59	-4.368	<0.001	<0.001
	Gen2	49	3.65	0.76			

NEP represents ecological worldview, *LEC* represents local environmental concern, *EK* represents environmental knowledge.

Table 3 Correlation coefficients between the variables.

	1	2	3	4	5	6	7
1. NEP	1						
2. LEC	0.406**	1					
3. Value	0.375**	0.032	1				
4. Daily EK	0.336**	0.095	0.388**	1			
5. Nondaily EK	0.415**	0.140	0.523**	0.485**	1		
6. New Media	0.488**	0.135	0.313**	0.271**	0.311**	1	
7. Community connection	−0.096	0.275**	−0.405**	−0.325**	−0.322**	−0.079	1

NEP represents ecological worldview, *LEC* represents local environmental issue concern; *Value* refers to post-materialistic values; *EK* represents environmental knowledge; *New Media* refers to environmental risk exposure via new media.
**$p < 0.01$.

deviations, medians, and skewness and kurtosis values for the variables is provided in Appendix A. The results of basic descriptive analyses showed that the LEC and nondaily EK variables were slightly skewed (Hair et al., 2010). Hence, intergenerational differences were examined using both parametric (i.e., independent sample *t*-test) and nonparametric tests (i.e., Mann–Whitney test).

For path analyses, both maximum likelihood (ML) estimation and Bayesian estimation were conducted. Unlike frequentist methods, Bayesian analysis does not rely on asymptotic theory and hence, can provide more robust estimation for smaller sample sizes (especially when the data are not normally distributed) (Sanne et al., 2020). Specifically, because of a shortage of information concerning the effects of the four explanatory variables on environmental concern in similar populations in the Chinese setting, this study used default setting (i.e., uninformative priors) for Bayesian estimation. Path analyses were conducted using SPSS Amos 26.0.

Results

Intergenerational differences in environmental concerns. The results concerning intergenerational differences in the NEP and the LEC using both independent sample *t*-test and Mann–Whitney test are shown in Table 2. It was found that Gen2 had a significantly higher score on the NEP, but the scores on the LEC measure between Gen1 and Gen2 were statistically insignificant. Hence, H1 was partly supported. Concerning the relatively high scores (>4.0) for both Gen1 and Gen2 on the LEC measure, a ceiling effect might exist and contribute to the insignificance between these two generations on this measure.

Intergenerational differences in mediating variables. The results of both parametric and nonparametric tests also showed statistically significant intergenerational differences in the five explanatory variables (i.e., post-materialistic values, daily EK, nondaily EK, environmental risk exposure via new media, and community connection) between the two generations (Table 2). Gen1 had a significantly stronger community connection, whereas Gen2 had a significantly higher level of post-materialistic values, environmental knowledge, and environmental risk exposure via new media. Hence, hypotheses H2a–H5a were supported.

Correlations between environmental concern and mediating variables. The first-order correlation coefficients of the two environmental concern variables with post-materialistic values, environmental knowledge, environmental risk exposure via new media, and community connection are shown in Table 3. To begin with, it is not surprising to find that the NEP was positively and significantly associated with the LEC ($r = 0.406$, $p = 0.000$) since both variables were expected to examine certain dimensions of individuals' belief of the environment and the relationship between humans and the environment. However, the two variables differed in terms of their correlations with the mediating variables. All of the mediating variables except for community connection had significant and positive correlations with the NEP, with the largest correlation occurring between environmental risk exposure via new media and the NEP ($r = 0.488$,

Table 4 Path analysis for the NEP mediational model.

Path	*B* (*SE*)	*p*	β	95% BootCI[a]		Post. *M* (*SD*)	95% CCI[b]	
				Lower	Upper		Lower	Upper
NEP ← GEN	0.114 (0.108)	0.288	0.151	-0.115	0.336	0.114 (0.102)	-0.098	0.329
Value ← GEN	1.751 (0.108)	0.000	0.748	1.443	2.044	1.748 (0.157)	1.439	2.056
Daily EK ← GEN	0.314 (0.073)	0.000	0.391	0.167	0.448	0.314 (0.076)	0.165	0.461
Nondaily EK ← GEN	0.369 (0.072)	0.000	0.452	0.225	0.511	0.368 (0.074)	0.221	0.514
New Media ← GEN	0.839 (0.154)	0.000	0.478	0.535	1.136	0.835 (0.158)	0.525	1.146
NEP ← Value	0.010 (0.040)	0.809	0.030	-0.067	0.086	0.010 (0.045)	-0.079	0.099
NEP ← Daily EK	0.083 (0.084)	0.322	0.088	-0.125	0.306	0.084 (0.096)	-0.102	0.273
NEP ← Nondaily EK	0.179 (0.085)	0.036	0.193	-0.014	0.386	0.177 (0.102)	-0.023	0.378
NEP ← New Media	0.143 (0.040)	0.000	0.330	0.063	0.230	0.142 (0.043)	0.060	0.227

NEP represents ecological worldview, *GEN* represents generation; *EK* represents environmental knowledge; *Value* refers to post-materialistic values; *New Media* refers to environmental risk exposure via new media.
[a]95% BootCI refers to 95% bias-corrected confidential intervals using the bootstrap test ($n = 5000$).
[b]95% CCI refers to central 95% Bayesian credible intervals.

$p = 0.000$). Although community connections did not significantly correlate with the NEP, their correlation with the LEC was significant ($r = 0.275$, $p = 0.000$).

Jointly considering the results of variance analyses and correlation analysis, two separate mediational models were constructed for the NEP and the LEC. For the NEP, community connection was deleted for path analysis; for the LEC, post-materialistic values, environmental knowledge, and environmental risk exposure via new media were deleted for path analysis.

Path analyses of the mediation model for the NEP

The original model. For initial analysis, post-materialistic values, daily EK, nondaily EK, and environmental risk exposure via new media were put all at once into the model. The results using the ML estimation method indicated an unacceptable model fit: $\chi^2/df = 4.89$ ($\chi^2 = 29.35$, $df = 6$, $p = 0.000$); comparative fit index (CFI) = 0.89; Tucker–Lewis index (TLI) = 0.72; root-mean-square error of approximation (RMSEA) = 0.196; and standardized root-mean residual (SRMR) = 0.089. For Bayesian estimation, the posterior predictive *p*-value (i.e., PPP) was used to evaluate the predictive accuracy of the model, with a PPP of around 0.5 indicating a good fit (van de Schoot et al., 2013). Similar to the results using ML estimation, the value of PPP using Bayesian statistics also showed a poor fit (PPP = 0.01).

The results of the bootstrap test ($n = 5000$) for the significance of path coefficients and the 95% posterior probability intervals are shown in Table 4. In general, the results using different estimation methods were similar. It is shown that the direct effect of generation on the NEP was statistically insignificant. Generation significantly predicted environmental risk exposure via new media, and the latter variable significantly predicted the NEP. Both the bias-corrected 95% of confidence intervals and the 95% posterior probability intervals for the effects of generation on the environmental risk exposure via new media and of the latter variable on the NEP did not include zero. A further bootstrap test ($n = 5000$) showed the indirect effect of generation on the NEP through environmental risk exposure via new media ($p = 0.000$, 95% CI [0.049, 0.227]) were significant, which indicates significant mediating effects for environmental risk exposure via new media. Hence, H4b was accepted. For the two environmental knowledge variables, the effects of generation were significant, but the effect of daily EK on the NEP was insignificant ($\beta = 0.088$, $p = 0.322$). The effect of nondaily EK on the NEP needs to be examined with caution. Although both the bias-corrected 95% confidence interval and the 95% posterior probability interval for the path between the two variables include zero, the effect of nondaily EK on the NEP was significant at 0.1 level ($p = 0.063$). Moreover, further bootstrap test ($n = 5000$) showed the indirect effect of generation on the NEP via nondaily EK was significant ($p = 0.048$, 95% CI [0.000, 0.168]). Hence, H3b was only rejected for daily EK; although H3b for nondaily EK would be rejected at the level of 0.05, it would be held at the level of 0.1. For post-materialistic values, although the effect of generation on this variable was significant, it failed to significantly predict the NEP. Hence, H2b was rejected.

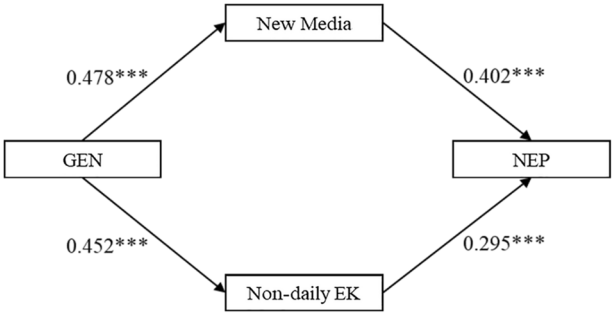

Fig. 3 Standardized path coefficients in the mediation model for the NEP. NEP represents ecological worldview; GEN represents generation; New media represents environmental risk exposure via new media; EK represents environmental knowledge. **$p < 0.01$; ***$p < 0.001$.

The parsimonious model. As the effects of post-materialistic values and daily EK on the NEP were insignificant, a parsimonious model was built by deleting these two variables. The goodness-of-fit indices showed an acceptable fit of the revised model: $\chi^2/df = 2.46$ ($\chi^2 = 4.92$, $df = 2$, $p = 0.090$); CFI = 0.97; TLI = 0.90; RMSEA = 0.120; SRMR = 0.050. The slightly high RMSEA value could be attributed to the small sample size in the present study. Similarly, the PPP value also showed a promising fit of the model (PPP = 0.32).

The path coefficients from generation through nondaily EK and environmental risk exposure via new media to the NEP are shown in Fig. 3. The result of the bootstrap tests ($n = 5000$) for the significance of path coefficients and the 95% posterior probability intervals are shown in Table 4. Generation positively and significantly predicted nondaily EK ($\beta = 0.478$, $p = 0.000$, 95% CI [0.323, 0.613]) and environmental risk exposure via new media ($\beta = 0.452$, $p = 0.000$, 95% CI [0.278, 0.615]), with latter mediating variables positively and significantly influenced the NEP ($\beta = 0.402$, $p = 0.001$ for environmental risk exposure via

new media, 95% CI [0.227, 0.561]; β = 0.295, $p = 0.011$ for nondaily EK, 95% CI [0.118, 0.459]). The 95% posterior probability intervals for both effects of generation on nondaily EK and environmental risk exposure via new media and of these two variables on the NEP did not include zero, supporting the aforementioned results using ML estimations.

Path analysis of the mediation model for the LEC. As mentioned above, only community connection showed a significant correlation with the LEC, so the model was constructed to examine the role of community connection in mediating the relationship between generation and the LEC. As the observed variables were used for path analysis, which led to the saturation of the model, the goodness-of-fit indices were not estimated. However, the PPP value of the model was 0.48, showing a good fit.

The results of the path analysis are shown in Fig. 4. The result of the bootstrap tests ($n = 5000$) for the significance of path coefficients and the 95% posterior probability intervals for the LEC model are shown in Table 5. It is shown that generation negatively and significantly influenced community connection (β = –0.416, $p = 0.001$, 95% CI [–0.570, –0.238]), with the latter variable positively and significantly predicting the LEC (β = 0.382, $p = 0.001$, 95% CI [0.198, 0.543]). In addition, generation also significantly and directly influenced the LEC (β = 0.256, $p = 0.012$, 95% CI [0.039, 0.461]). The 95% posterior probability intervals for the effects of generation on community connection and of community connection on the LEC also did not include zero. Therefore, H5b was supported.

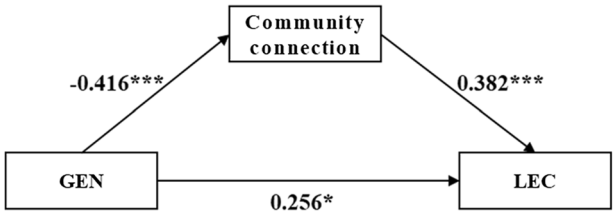

Fig. 4 Standardized path coefficients in the mediational model for the LEC. LEC represents local environmental issue concerns; GEN represents generation. *$p < 0.05$; ***$p < 0.001$.

Discussion

Intergenerational difference in environmental concern is a classic issue in the field of environmental sociology. Along with urbanization and the innovation of information technology, both ways through which the public obtains environmental information and the mechanisms involved in the development of environmental concern may vary across different age groups and environmental issues at different scales. By taking two generations of plastic waste business owners (i.e., Gen1 and Gen2) in a specific town (i.e., *Wuzhen*) in China as the population, the present study was able to examine the roles of post-materialistic values, environmental knowledge, environmental risk exposure via new media, and community connection in mediating the relationship between generation and two different types of environmental concern (i.e., the NEP and the LEC). Specifically, environmental knowledge was further categorized into daily EK and nondaily EK in light of the results of exploratory factor analysis.

The results of path analyses showed a significant difference in the NEP (i.e., general environmental concern) between Gen1 and Gen2 (with mean scores of 3.70 vs. 4.05; Table 2) but an insignificant intergenerational difference in the LEC (H1). Among the four mediational variables, only nondaily EK (H3) and environmental risk exposure via new media (H4) significantly and positively mediated the relationship between generation and the NEP; the effect of generation on the NEP was fully mediated by these two mediational variables. In contrast, community negatively mediated the relationship between generation and the LEC (H5), suggesting a suppression effect of this variable for the intergenerational difference in the LEC. Post-materialistic values show no mediational effect on the relationship between generation and environmental concern, although Gen2 did have more positive post-materialistic values than Gen1 did (H2). The results of the present study reveal a complex picture concerning the relationship between generation and environmental concerns. The influence of generation as well as associated mechanisms, may be different depending on the levels of environmental

Table 5 Path coefficients for the NEP and the LEC models using both maximum-likelihood estimation and Bayesian estimation.

Path	*B* (*SE*)	β	95% BootCI[a]		Post. *M* (*SD*)	Post. β	95% CCI[b]	
			Lower	Upper			Lower	Upper
The NEP model								
Nondaily EK ← GEN	0.369*** (0.072)	0.452	0.225	0.511	0.370 (0.074)	0.446	0.225	0.516
New Media ← GEN	0.839*** (0.154)	0.478	0.535	1.136	0.835 (0.159)	0.469	0.529	1.155
NEP ← Nondaily EK	0.276*** (0.080)	0.295	0.113	0.436	0.279 (0.085)	0.295	0.110	0.446
NEP ← New Media	0.174*** (0.037)	0.402	0.100	0.254	0.173 (0.040)	0.397	0.097	0.254
The LEC model								
Community connection ← GEN	-0.611*** (0.133)	-0.416	-0.869	-0.354	-0.612 (0.136)	-0.410	-0.876	-0.347
LEC ← Community connection	0.246*** (0.077)	0.382	0.118	0.423	0.248 (0.067)	0.380	0.116	0.381
LEC ← GEN	0.243* (0.105)	0.256	0.051	0.468	0.247 (0.099)	0.255	0.048	0.435

NEP represents ecological worldview, *LEC* represents local environmental concern, *GEN* represents generation, *EK* represents environmental knowledge, *New Media* refers to environmental risk exposure via new media.
*$p < 0.05$; ***$p < 0.001$.
[a]95% BootCI refers to 95% bias-corrected confidential intervals using bootstrap test ($n = 5000$).
[b]95% CCI refers to central 95% Bayesian credible intervals.

concern in question. In general, neither Buttel's view (1979) that age directly influences environmental concern nor Inglehart's view (1995) that post-materialism influences environmental concern was supported by the results of this study.

Surprisingly, although statistically significant intergenerational differences were found in post-materialistic values, this variable did not significantly influence environmental concerns (neither the NEP nor the LEC). This result might be attributed in part to the relatively low level of post-materialistic values of Gen2 (i.e., 2.45; Table 3), which is consistent with the findings of other studies on Chinese national values (Hong and Lu, 2011). These findings seem to jointly support Inglehart's (2013) argument that China has not yet entered a post-materialistic period. However, the low level of post-materialistic values of Gen2 may also imply that Inglehart's post-materialistic value scale may not be sensitive enough to capture the features of modernity in the Chinese cultural setting. Historically developed based on the small-scale peasant economy, Confucianism has had a profound influence on the development of individuals' values. As a result, even for the younger generations that grow up in modern society, personal stability and security, social harmony, and national prosperity still outweigh any other values (Wang et al., 2022). This does not necessarily mean that this population does not pursue a high quality of life or harmony with nature, which are commonly perceived as post-materialistic values in modern Western societies.

In addition, this finding implies that a nonlinear relationship may exist between post-materialistic values and environmental concern, at least in the pre–post-materialistic cultural settings. Further attention should be given to the potential threshold effect regarding the relationship between values and environmental concern in wider populations from developing and pre-post-materialistic cultures. For example, it would be interesting to further examine whether post-materialistic values play a more significant role in promoting the environmental concern of Generation Z (i.e., born from 2000 onwards) than of Gen2 included in the present study.

Moreover, the present study helps examine the roles of two different types of environmental knowledge (i.e., daily EK and nondaily EK) in mediating the relationship between generation and general environmental concern. Previous studies (Bradley et al., 1999) have reported that nondaily EK had a positive effect on environmental concerns. These findings align with those of the present study. More importantly, the present study further compared the effect of nondaily EK with that of daily EK and found that only nondaily EK significantly predicted the NEP and mediated the relationship between generation and the NEP. These findings corroborate previous findings suggesting that systematic environmental knowledge through environmental education (e.g., school-based environmental education and pre-service environmental training), as well as chances to receive such environmental education, may be crucial in enlarging intergenerational differences in general environmental concern.

Consistent with the findings of Chung (2011) and Fellenor et al. (2017), the present study showed that environmental risk exposure via new media had a significant and positive effect on the NEP. These findings confirm the statement that new media plays a critical role in strengthening the NEP owing to their high efficiency in amplifying environmental risks. This specific feature allows new media to provide a critical intermediate mechanism linking the path from generation to the NEP. However, it should also be noted that environmental risk exposure via new media failed to predict the LEC in the present study. This specific finding suggests that the role of new media in environmental risk amplification may depend on the types of environmental issues in question. The function of environmental risk amplification of new media may not work as well on local environmental issues that are more immersed in residents' daily lives as on those geographically distant and experience-independent ones. It is beyond the scope of the present study to examine this thesis, but it is worthy of additional research to compare the roles of new media and traditional media in amplifying environmental risks in relation to both kinds of environmental issues.

The findings concerning nondaily EK and environmental risk exposure via new media as two critical variables mediating the relationship between generation and general environmental concern suggest that modernity would be a better theoretical perspective to understand intergenerational differences in general environmental concern. Drawing on Giddens's (1991) theory of modernity and reflexivity, the concurrence of nondaily EK and environmental risk exposure via new media as two critical determinants of the NEP in the present study implies that reflexive sectors, including mass media (especially new media) and environmental education, may play essential roles in shaping the NEP. As such, we can understand the general ecological worldview as an essential consequence of high modernity. In comparison with the older generation, who live in a premodern society, the younger generations growing up in highly modern societies have advantages in obtaining more remote and general yet systematic environmental information (e.g., about global warming and biodiversity reduction) via the reflexive sectors. This enables them to rebuild general beliefs about and attitudes toward the socio-environmental system (including the relationship between human and the environment), which is distant from their daily life.

However, the findings of the present study also reflect a conflict rooted in modernity: given the disembedded consequences of modernity, can social ties still play a critical role in promoting the responsibility of residents who care about the wellbeing of their local community? In the present study, it was found that community connection negatively mediated the relationship between generation and the LEC. From the perspective of modernity, this finding implies that the time-space disembedding mechanisms that contribute to the development of the NEP among the younger generations also emancipate them from localized social ties and weaken their connections with local communities. The weaker the community connection, the less concern about the well-being of local communities. This lack of concern would hinder the information acquisition and assimilation process with respect to local environmental issues, resulting in weaker environmental concerns at the local level. Jointly considering the insignificant correlations of the LEC with both generation and the other four explanatory variables, as well as the significant and direct effect of generation on the LEC in the parsimonious model (Fig. 4), we argue that community connection may have a pivot role in determining environmental concern at the local level. The negative effect of generation on local environmental issue concerns through community connection may neutralize the effect of generation through other variables that were not included in this study (e.g., environmental identity). Thus, the negative effect of generation on community connection as a consequence of modernity cannot be neglected and deserves greater attention for future research. Scholars are encouraged to further examine the roles of community connection in shaping local environmental concerns and actions from the perspective of modernity.

Conclusion

To sum up, this study explored intergenerational differences in environmental concerns among environmental business owners from the perspective of modernity by using plastic waste business owners in *Wuzhen* town as the case. The findings of path analyses

using both ML estimation and Bayesian estimation prove that non-daily EK and environmental risk exposure via new media play crucial roles in influencing overall environmental concern between generations, while community connection negatively mediates the relationship between generation and local environmental concern. However, the finding concerning the insignificant effect of post-materialistic values on both overall and local environmental concerns implies Inglehart's thesis of post-materialism may not work well in explaining intergenerational differences in environmental concerns, at least as far as the specific business owners in China are concerned.

Although this study pays special attention to a specific population in China, the findings of this study hold several theoretical implications in the general sense. Overall, this study sheds light on the social–psychological mechanisms underlying intergenerational differences in environmental concern. It also contributes to a deeper academic understanding of the complex relationship between generation and environment from the perspective of modernity. In contrast to the mainstream approach that emphasizes the materialistic/post-materialistic dimension of intergenerational differences in environmental concern, this study introduces a modernity perspective to address this issue. It highlights the roles of knowledge and information in shaping general environmental concerns among younger generations while at the same time emphasizing the negative consequence of the disembedding mechanism, which may lead to an attenuation effect on local environmental concerns among this population.

Policy implications. Currently, some second-generation entrepreneurs are investing in improving the efficiency of plastic waste utilization and energy-efficient production equipment, increasing product durability, and researching environmentally friendly materials due to their heightened concern for the environment. If more business owners in the plastic waste industry raise environmental concerns and incorporate environmental protection into their profit goals, this approach will help reduce the plastic pollution problem. Recommendations on fostering environmental concerns of business owners are proposed from the aspects of in-service environmental education, re-embedding strategies, and eco-surplus culture enhancement.

Putting forth in-service environmental education for business owners. Current in-service environmental education research in developing countries focuses predominantly on teachers (Álvarez-García et al., 2015), leaving environmental concerns among business owners largely overlooked. Thus, it is recommended that both local authorities and local industry associations encourage in-service environmental education for business owners in environmentally related sectors. For instance, in-service environmental education training can be integrated as an essential element of cleaner production training for local environmental businesses.

Considering the critical roles of nondaily EK and environmental risk exposure in mediating the relationship between generations and the NEP, both science literacy and environmental knowledge concerning causes and consequences of local environmental issues are strongly emphasized in in-service environmental education. For example, local industry associations can invite environmental scientists and researchers to design case studies for business owners, hence fostering critical thinking during the course of their environmental learning.

Strengthening links between business owners and local communities. In order to enhance community connections among business owners (especially for the younger generation), it is highly encouraged to include voluntary activities of local enterprises in the scheme of voluntary instruments for local sustainable development. Local industry associations are encouraged to collaborate with local communities and schools to put forth community-oriented public service initiatives for business owners. Such activities may entail planting trees, clearing litter, or more during a variety of environmental theme days so that both their sense of community connection and environmental awareness can be enhanced. Local environmental non-governmental and non-profit organizations are also encouraged to involve more local environmental issues within their initiatives.

Local authorities are recommended to add community-oriented public participation as a key indicator for green enterprise appraisal/recognition. It is also suggested that local authorities incorporate community-oriented extracurricular activities into the criteria for establishing green schools, thereby creating opportunities for business owners to engage in these activities.

Cultivating eco-surplus culture. It is time for businesses to shift from an eco-deficit culture to an eco-surplus culture, as highlighted by Vuong et al. (2021) and Nguyen and Jones (2022). Business owners need to recognize that improving the environment can also provide significant economic returns. To meet this end, policymakers need to enhance monetary incentives on the one hand and to strengthen public environmental propaganda on the other hand. Monetary incentives can encourage the creation of environmental value (Vuong et al., 2021). For instance. market-based incentives (e.g., tax policies) can curb carbon emissions and promote cleaner production in the local plastic waste recycling industry. It is also suggested that local authorities enhance public environmental propaganda using both new and traditional mass media to raise awareness about the environmental impact of plastic waste and to encourage green consumption practices.

Research limitations. The present study has several limitations worthy of further note. First, the present study utilized a typical case and focused mainly on a specific entrepreneur population (i.e., plastic waste business owners) in a developing region (i.e., a town setting) in China, which inevitably limits the sample size. Nevertheless, such a case study design enabled us to focus on two paired generations of environmentally sensitive populations in a homogenous cultural setting so that we could address environmental concerns at the generational level. In addition, we tried our best to include the entire population of business owners in the park at the research site and administered the questionnaires face-to-face to ensure the reliability of the data for the present study. Moreover, Bayesian estimation was used in addition to ML estimation for path analyses to increase the reliability of the results. Further studies need to be conducted in other similar professional towns and among wider populations with other environmental professions.

Second, due to the cross-sectional nature of the present study, it was impossible to investigate whether environmental knowledge or environmental exposure via new media predicted changes in environmental concern over time. It is suggested that scholars use longitudinal research design to examine intergenerational differences from the perspective of the life cycle (i.e., changes in environmental concern over time).

Additionally, this study focused mainly on factors in association with information processes, such as values, environmental knowledge, and environmental risk exposure. Although the findings of this study suggest a cultural mechanism may be involved in influencing the relationship between generation and

environmental concerns in the Chinese setting, it is beyond the scope of this study to examine what factors and how these factors contribute to intergeneration differences in environmental concerns. For instance, to promote sustainable green transformation of plastic waste business, the business owners may build a green identity during the course of green enterprise culture building. It would be worthwhile for future research to examine how green identity influences the development of environmental values and concerns between different generations.

Data availability

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

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Author contributions

All authors contributed to the study conceptualization, methodology, and data analysis. XW: Data curation, investigation, writing—original draft. LW: Supervision, funding acquisition, writing—review & editing.

Competing interests

The authors declare no competing interests.

Ethical approval

Ethics approval was obtained from the Institutional Review Board at the School of Public Administration of Hohai University, Nanjing, China, and the Ethical approval protocol number: HHUPA20220715. The survey process and procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Informed consent

The data collection process was conducted with strict adherence to ethical considerations. Informed consent was given to all respondents, and respondents were assured that their data would be treated confidentially and used only for research purposes. They were also informed that all personal information, including their names, would be anonymized in the study results.

Additional information

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Correspondence and requests for materials should be addressed to Lingqiong Wu.