

1 **Urban Residents' Environmental Citizenship Behaviour: The Roles of**
2 **Place Attachment, Social Norms and Perceived Environmental**
3 **Responsibility**

4
5 **Abstract**

6 Little attention has so far been devoted to the roles that perceived environmental responsibility
7 and social norms respectively play in the established relationship between place attachment
8 and pro-environment behaviour of residents. These two variables matter when we consider the
9 context of cities where typically residents are from different backgrounds which can exacerbate
10 the difficulty in engaging residents in civic activities such as pro-environment behaviour. Using
11 data collected in Beijing (n=1388) and employing a structural equation modeling approach, our
12 findings first demonstrate that attachment to a place activates an individual's perceived
13 environmental responsibility that acts as a mediator between place attachment and pro-
14 environmental behaviour. Second, we find that place attachment influences both subjective and
15 local norms, but that only subjective norms transfer the impact to perceived environmental
16 responsibility and then to pro-environmental behaviour. These findings provide local
17 authorities with new avenues of policy intervention regarding the use of social norms and
18 perceived environmental responsibility respectively when designing place attachment policies
19 to engage urban residents in pro-environment behaviour.

20 **Keywords**

21 Environmental citizenship behaviour, place attachment, social norms, perceived environmental
22 responsibility

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1. Introduction

Engaging urban residents in environmental behaviour remains problematic as it is fundamentally an activity where the benefits and rewards are intangible and altruistic (White, Habib & Hardisty, 2019). To address this problem, there is an established body of research in the domain of place attachment (PA thereafter) which has shown that enhancing individuals' attachment to their place of residence is an avenue of policy intervention to motivate residents to engage in activities that benefit the place (Daryanto & Song, 2021). The implementation of such policies is based on the premise that when residents feel or are made to feel attached to a place, they are more likely to engage in pro-environment behaviours. In some big cities such as Beijing, the municipal governments typically have slogans that encourage their residents to take care of the environment by high-lightening their sense of belonging or affective feelings towards the city. One example is the popular slogan “Be a civil and polite Beijing-er and go for green travel”, which emphasizes the place identity of Beijing residents and uses it as a trigger for pro-environmental behaviours¹. For a more recent example, to prepare for the Winter Olympics 2022 which was held in Beijing, the municipal government launched a public campaign “Live a green low-carbon life and build our beautiful home” in the communities surrounding the venue of the game². By referring to the city as their “home”, the policy-makers are trying to encourage more pro-environmental initiatives of the residents.

Whilst there is evidence that PA promotes pro-environmental behaviour, researchers are continuing to scrutinize the nature of that relationship. This is useful from a theoretical perspective to study the underlying mechanism through which PA affects pro-environmental behaviour. This type of analysis – mediation analysis in particular, informs policy making by

¹ http://zt.bjwmb.gov.cn/2011wmjt/wmjthdjs/t20110317_380879.html
² http://www.beijing.gov.cn/renwen/sy/whkb/202109/t20210924_2500855.html

1 providing specific levers of intervention where- for instance-different measures are required
2 for different groups to enhance their respective levels of place attachment to promote pro-
3 environment behaviour. Song and Soopramanien (2019) studied whether the impact of PA on
4 pro-environmental behaviour differs between Beijing-born residents and those who have
5 migrated to the city. The policy implication from their work is that, whilst the main relationship
6 holds, the way in which both groups are attached to the city differs thus requiring different
7 policy measures to promote PA for migrants and non-migrants respectively. We contribute to
8 this body of work that studies the relationship between PA and pro-environment behavior and
9 more specifically our research proposes that the overlooked roles of these two factors -
10 personal responsibility and norms, provide new insights regarding the process of that
11 relationship.

12
13 Making individuals feel responsible for an action can motivate them to change their behaviours
14 and act in a more pro-social manner (De Groot & Steg, 2009; Winterich & Zhang, 2014).
15 Previous research by Kaiser and Shimoda (1999) for example shows that activating one's
16 perceived environmental responsibility leads to engagement in pro-environmental behaviours.
17 The core implication from this body of work is that we must consider measures that can raise
18 individuals' environmental responsibility to engage in such activities. So, whilst there has been
19 work on the importance of individual responsibility, as far as we are aware, there has not been
20 much research on whether PA can enhance an individual's sense of responsibility to engage in
21 pro-environmental behaviour. So, in addition to studying the direct relationship between PA
22 and pro-environment behaviour, we study whether PA influences individuals' PER and in turn
23 their pro-environmental behaviour. Effectively, we consider the mediating role of perceived
24 environment responsibility.

25

1 Research has shown that social norms, through other peoples' actions or their expectations,
2 matter in influencing an individual's engagement in pro-environmental behaviour (Farrow,
3 Grolleau & Ibanez 2017). The policy intervention in that context might take the form, for
4 instance, on the framing of information about other peoples'
5 action. Goldstein, Cialdini and Griskevicius (2008) found that informing hotels guests of other
6 guests' behaviour to reuse towels instead of requesting new ones was more effective than
7 providing generic information about the importance of recycling. In the context of our research,
8 we are concerned role of social norms but in particular within an urban setting where different
9 groups of people live where the behaviour of some groups is regarded to be more influential
10 (Farrow, Grolleau & Ibanez, 2017). Using data from different cities in Italy, Fornara et al
11 (2011) differentiate between the effects of local and subjective norms on pro-environmental
12 behaviour. Local norms (LN hereafter) describe how individuals perceive the action of others
13 who are physically closer to them (such as their neighbours next door or those living on the
14 same street). Subjective norms (SN hereafter), on the other hand, represent how individuals
15 perceive the norms of people who are important but not necessarily close to them spatially.
16 Fornara et al. (2011)'s work is highly relevant to our work because they found that
17 differentiating between the two types of norms in the same environment matters because some
18 urban residents pay more attention to other people who are affectively rather than physically
19 closer to them. In the domain of place attachment, Hernández et al. (2010) found that an aspect
20 of PA, place identity, affected how people perceive others' action which subsequently reduced
21 their likelihood of breaking environmental laws. They, however, did not differentiate between
22 LN and SN in their work. Concerning the role of social norms therefore, compared to other
23 work, we investigate first if PA influences LN and SN. Second, following Schwartz (1977)'s
24 norm activation theory, De Groot and Steg (2009) posit that awareness of others' action can
25 activate an individual's sense of responsibility to act in a pro-social manner. In the domain of

1 pro-environmental behaviour, Onwezen, Antonides and Bartels (2013) show that awareness of
2 others action can increase an individual's sense of environmental responsibility. Following
3 this, in our work we also consider whether and what types of social norms (i.e., LN or SN) can
4 have a greater influence on individual's PER.

5
6 To summarise, our research contributes to the PA literature focusing on urban residents' pro-
7 environmental behaviour. Following the proposition of Crusius, Horen and Mussweiler (2011)
8 for studying problems from a process perspective, our specific contribution is to unpack new
9 underlying processes through which PA affects pro-environmental behaviour. More
10 specifically in this research, we first propose PA as an alternative variable that can ascribe a
11 sense of responsibility to take part in pro-environment behaviour. Secondly, taking into
12 consideration that relationship and the role of social norms to foster pro-environment
13 behaviour, we argue that there is a need to study how PA can affect the way in which the
14 perception of others' behaviour can influence an individual sense of responsibility to take part
15 in pro-environment environment behaviour. Thus, we propose that raising a resident' PA may
16 also make them become more concerned about others' favorable attitudes towards pro-
17 environment behaviour. Consequently, this may further enhance residents' sense of
18 responsibility and engagement in pro-environment behaviour.

19
20 Following the work of Fornara et al (2011) that stress on the importance of differentiating
21 between LN and SN in urban areas, we investigate whether PA has a differential impact on LN
22 and SN respectively. If we are to consider the role of norms and how to embed them into or as
23 part of a package of policies to raise place attachment, our contention is that we need to study
24 how PA affects these two types of norms and, possibly, which type of norms is more effective
25 at enhancing an individual sense of responsibility and engagement in environment behaviour.
26 In the opening paragraph, we presented some examples of slogans used by the local

1 government to promote pro-environment behaviour which emphasised to residents that this
2 city is their home. One of the policy objectives of this research is to provide insights into how
3 to reposition such slogans by also highlighting what others are doing and, in that respect, more
4 specifically whether to explicitly highlight LN or SN. This will be elaborated upon further in
5 the last section of the paper.

6 7 **2. Literature Review and Hypotheses**

8 The conceptual model that depicts our research objectives can be found in Figure 1. The
9 specific hypotheses, presented in that same figure, are outlined in this section alongside the
10 associated constructs. As is customary in such empirical analyses, we present the control
11 variables in the methodology section of the paper, which follows this section.

12
13 *<insert Figure 1 about here>*
14

15 **2.1 Environmental Citizenship behaviour**

16 The benefits that accrue from engaging in pro-environmental behaviours are altruistic, which
17 can also act as an obstacle in taking part. But some pro-environmental behaviours may not
18 require a lot of effort and may even be beneficial to residents. For example, using less water
19 and electricity is beneficial to the environment but the individual also saves on utility bills.
20 These types of activities have been termed as low effort behaviours in comparison to high effort
21 ones (Song & Soopramanien, 2019; Ramkissoon, Smith & Weiler, 2013). High-effort pro-
22 environment behaviours typically entail a higher cost, in both a monetary and non-monetary
23 sense. Take, for example, the decision to buy an electric car instead of a petrol-fuel car; the
24 former is currently more expensive to buy and entails a significant change in car usage
25 behaviour.

26
27 Stern (2000), Dobson (2010), and Takahashi, Tandoc Jr., Duan, and Van Witsen (2017) present
28 the case for a citizenship conceptualisation of pro-environmental behaviour which goes beyond

1 differentiating between low and high effort behaviours. Goldman et al (2020) cite Dobson
2 (2010) regarding the conceptualisation of Environmental Citizenship behaviour (hereafter ECB)
3 as “*pro-environmental behaviour, in public and private, driven by a belief in fairness of the*
4 *distribution of environmental goods, in participation, and in the co-creation of sustainability*
5 *policy*” (p. 6). From that quote, the notions of participation-beyond the acts of private
6 consumption-and co-creation are relevant to our research, in particular when we consider that
7 one of our research objectives is concerned with the role of others in influencing residents’ pro-
8 environment behaviour in a particular setting. The citizenship dimension of pro-environmental
9 behaviour entails that there is a need to understand what would motivate residents to co-create,
10 with the co-operation of other fellow residents, an environmentally friendly place of residence.
11 Song, Daryanto and Soopramanien (2019) have used the concept of ECB in studying the effect
12 of place attachment on pro-environment behaviour. One of their arguments for using ECB
13 rather than pro-environmental behaviour as the behavioural outcome is that it better reflects the
14 pro-social nature of such behaviours and that one of the dimensions of place attachment (which
15 we will discuss next in more detail) is about social interactions between individuals. However,
16 they do not consider the role of social norms which could characterize the way in which PA
17 influences ECB. In this research, we consider the roles of both PA and social norms, and we
18 discuss and present the specific hypotheses regarding the roles of these factors next.

19

20 **2.2 Place Attachment and Environmental Behaviour**

21 Place attachment has been defined as affective bonds between people and places (Lewicka
22 2011; Daryanto & Song, 2021), and been empirically demonstrated as a good predictor of pro-
23 environmental behaviour. That is, when people relate to places, they tend to do things which
24 will benefit the place and, importantly, they are likely to perform activities that will benefit
25 other people who also live (residence- Scannell & Gifford, 2010) or visit (tourism-Ramkissoon,
26 Weiler & Smith, 2013) or use (Universities- Xu et al., 2015) the place.

27

1 Whilst in a recent meta-analysis study (Daryanto & Song, 2021), PA promotes pro-
2 environment behaviour, it is still important to examine the underlying mechanism through
3 which PA affects pro-environmental behaviour. Note that, in their study, they do not consider
4 factors that explain the nature of the underlying mechanism. The present study contributes the
5 literature by filling this gap.

6
7 Our first hypothesis (see H1 in Figure 1) has been established in the literature and is replicated
8 as part of this study to empirically establish the main relationship in our model before testing
9 the other hypotheses which describes the process whereby PA influences ECB.

10
11 H1: There is a positive relationship between PA and ECB.

12 13 **2.3 Perceived Environmental Responsibility**

14 *2.3.1 Perceived Environmental Responsibility (PER) and Environmental Citizenship* 15 *Behaviour (ECB)*

16 De Groot and Steg (2009) proposed that, in the context of pro-social behaviours such as pro-
17 environmental behaviours, heightening individuals' perceived responsibility toward an
18 environment (hereafter PER) would increase their "*moral obligations for taking pro-social*
19 *actions.*"(p. 446) For example, Winterich and Zhang (2014) found that individuals who feel a
20 personal sense of responsibility for the welfare of others were more likely to donate to charity
21 or dedicate their time to volunteering. PER has also been found to positively influence
22 individuals' pro-environmental engagement (Hines, Hungerford & Tomera, 1986; Kaiser &
23 Shimoda, 1999; Kaiser et al. 1999). Kaiser et al (1999) argued that it is important uncover how
24 to make people feel morally obliged to take action that would benefit others due to the pro-
25 social nature of pro-environmental behaviour. In their research, they empirically show that the
26 addition of responsibility provided a much better explanation of the heterogeneity in
27 individuals' engagement in environment behaviour.

28

1 2.3.2 Place Attachment (PA) and Perceived Environmental Responsibility (PER)

2 Place can foster residents' sense of responsibility related to their place of residence (PER),
3 which influences their specific behaviors (e.g, pro-environmental behaviour) (Relph, 1976;
4 Groot & Steg 2009; Williams & Vaske, 2003). The premise for considering the role of PER on
5 ECB is grounded on the theory of norm activation (Schwartz, 1977) whereby if individuals
6 become more aware of their sense of personal responsibility towards others, their moral
7 obligation to be prosocial will increase. De Groot and Steg (2009) argued that the sense of
8 responsibility to perform pro-social behaviours must be ascribed; that is, it must be raised or
9 enhanced or be made explicit to trigger or motivate behavioural change. This follows from and
10 is related to the discussion above from Kaiser et al (1999) about the need to understand how to
11 activate that sense of personal responsibility.

12
13 While the link between PA and pro-environmental behaviour has been established (e.g., Vaske
14 and Korbin, 2001), the relationship between PA, PER, and environmental citizenship
15 behaviour (ECB), which is a sense of moral and pro-social obligation related to pro-
16 environmental behaviour has not been largely empirically documented. In line with the
17 aforementioned previous concepts and relationships (Relph, 1976; Groot & Steg 2009;
18 Williams & Vaske, 2003), we propose that PER mediates the relationship between PA and
19 ECB (H2 in Figure 1). Therefore, we hypothesize:

20
21 H2: PER mediates the effect of PA and ECB.

22 23 **2.4 Social Norms and Environmental Citizenship Behaviour (ECB)**

24 The definition of social norms is particularly relevant when we consider the citizenship element
25 of environmental behaviours which are voluntary, altruistic and not binding on formal rules
26 and laws: "*Social norms are rules and standards that are understood by members of a group,*
27 *and that guide and/or constrain social behaviour without the force of laws.*"(Cialdini & Trost,
28 1998, p. 152) Research has generally shown that social norms motivate individuals to engage

1 in pro-environmental behaviours (Farrow, Grolleau & Ibanez, 2017; Gifford & Nilsson, 2014).
2 For social norms to have the desired effect, individuals need to relate and identify with the
3 group that is producing these norms. This finding is based on the social identity theory (Tajfel
4 & Turner, 1979) which posits that we are more likely to follow the actions of people with whom
5 we identify. Schulte et al. (2020) in their meta-analysis study found that this social
6 identification effect mattered in pro-environmental behaviours.

7
8 In their place of residence, residents encounter, observe and reflect upon the actions of other
9 fellow residents and may consider the action of some and disregard those of others. Fornara et
10 al. (2011) empirically demonstrated the importance of an individual's attitude towards different
11 types of social norm. Based on the social identity theory, individuals identify with different
12 groups of people and thus form different attitudes towards the actions that different groups
13 perform. Fornara et al (2011) consider two different types of normative influences, local and
14 subjective norms respectively, and compare their effects on pro-environmental behaviours of
15 residents, more specifically waste recycling. In their research, SN influences are characterised
16 by the importance residents attach to significant others' pro-environment behaviour compared
17 to the LN influences which focus on how residents relate to and perceive the actions of fellow
18 residents who live in same city. That difference matters in the case of residents' behaviour
19 because, as Fornara et al (2011) argue, they may follow the actions of other residents with
20 whom they share no "affective bonds" (i.e, SN) but "[share] the same spatial-physical
21 environment" (i.e., LN) (p. 625). We apply that categorization in our research too.

22
23 There have not been many studies that have considered whether place attachment can influence
24 normative behaviour in the context of pro-environment behaviour. That is, when people relate
25 to particular place, are they more likely to follow the normative influences of that place? An
26 exception is Hernández et al (2010), who find that PA positively enhances how people might
27 be influenced by other individuals. The rationale for the positive effect of PA on social norms
28 is as follows. Individuals who are attached to a place are more likely to internalise and relate

1 to the norms that govern how one ought to act in that place compared to those who are less
2 attached. Hernández et al (2010) do not however consider whether the effect of PA on social
3 norms may vary when we differentiate between SN versus LN. We consider this difference in
4 our research which is important when studying residents' behaviour and which groups of fellow
5 residents are more likely to exert an influence.

6
7 Dywer, Maki and Rothman (2015) studied whether social norms could affect an individual's
8 personal sense of responsibility to act pro-environmentally. The rationale is similar to the case
9 where social norms might be internalised to positively raise an individual sense of
10 responsibility to act. These authors argue that social norms may act as normative "nudge"
11 signals following the research of Thaler and Sunstein (2008) on the use of nudge to change
12 behaviour. The normative influence in Dywer, Maki and Rothman (2015) consisted of
13 providing the normative influence in the form of an information signal as to whether the lights
14 were left on or off in public toilets by other users when an individual entered the facilities. In
15 another experiment they also made somebody turn off the light or left it on as each user would
16 enter the toilet. They found that these different signals in terms of what other users were doing
17 (i.e., the norm) impacted whether each user felt personally responsible to turn the light off after
18 they have used these facilities. Social norms thus can be used to make people feel more
19 personally responsible based on what they see others do. This is relevant in the context of this
20 research where residents observe and reflect on what others are doing which may enhance their
21 level of personal responsibility to act pro-environmentally. This should also be considered in
22 the discussion on the importance of enhancing residents' PER and, thus, normative influence
23 might be one of the ways to achieve this. Whilst as we have just shown there is research on the
24 effect of social norms on PER, previous work does not differentiate between the effects of local
25 or subjective norms.

26
27 To summarise, the hypotheses concerning the role of social norms are as follows.

28

1 H3a. LN mediates the relationship between PA and PER.

2 H3b. SN mediates the relationship between PA and PER.

3

4 **3. Methodology**

5 A questionnaire was developed to gather responses and test the hypotheses. [Data were collected](#)
6 [over a time span of two weeks targeting Beijing urban residents in January 2019](#). A professional
7 data collection agency, Sojump, specializing in online research was hired to collect the data.
8 Respondents were recruited from the agency's large sample pool and were given an incentive
9 to encourage their participation. After removing the questionnaires with missing values, we
10 were able to use data from 1388 responses. The demographic information of the respondents
11 revealed that the proportions of male (49.7%) vs. female respondents were relatively equal.
12 This reflects a similar gender ratio of the city as reported in *The Seventh National Population*
13 *Census of Beijing*, where the gender ratio is reported to be 51-49 (Beijing Statistics Bureau,
14 2021). All respondents indicated that they were Beijing residents and only 46% indicated that
15 they were born in Beijing. Most of the respondents had attained at least a college degree (87%).
16 The mean age of respondents was 30.38, with standard deviation of 11.56. In general, the
17 sample is composed of relatively younger and better-educated residents in the city, which
18 reflects a common problem in online surveys (Curtin, Presser, & Singer, 2000; Moore & Tarnai,
19 2002; Singer, van Hoewyk, & Maher, 2000). In our analysis furthermore we have controlled
20 for such demographic variables effect in the analysis thereby reducing potential bias
21 concerning the effect of our focal variables.

22

23 **3.1 Measures**

24 All the items used for the constructs were developed from existing scales based on previous
25 research. PA was measured using scales from Ramkissoon, Smith and Weiler (2013), and ECB
26 was measured using items following Song, Daryanto and Soopramanien (2019). PER was

1 adapted from Winterich and Zhang (2014) to fit the context of environmental behaviour. The
2 original scales from Winterich and Zhang (2014) were originally employed in the context of
3 charity-giving behaviour. Local norms scales (e.g., “Most of the Beijing residents take the
4 initiative to protect the local environment”) and subjective norms scales (e.g., “Many among
5 the persons important to me take the initiative to protect the environment”) were adapted from
6 Fornara et al. (2011). All items were rated on a 7-point Likert scale, with responses ranging
7 from “strongly disagree” (1) to “strongly agree” (7).

8

9 **3.2 Control Variables**

10 We used three control variables in our analysis: gender, age, and respondents’ long-term
11 orientation. These variables can influence variances in pro-environmental behaviours beyond
12 the main effect variables (Gifford & Nilsson, 2014). For example, research on gender
13 differences in pro-environmental behaviours has consistently found that women are more likely
14 to behave pro-environmentally (Gifford & Nilsson, 2014). With respect to the impact of age,
15 research findings have been mixed. Some research has found that older individuals tended to
16 behave pro-environmentally (e.g., Pinto, Nique, Ana~na, & Herter, 2011) whereas other studies
17 have found the opposite (Zhang, 1993). Concerning the effect of orientation of individuals,
18 recent research has indicated that long-term orientation is positively related to pro-
19 environmental behaviours (Lange & DeWitte, 2019).

20

21 **3.3 Measurement model**

22 We conducted a confirmatory factor analysis using the R package lavaan (Rosseel, 2012) to
23 assess the psychometric properties of each construct and to evaluate their discriminant and
24 convergent validity. We operationalized PA and ECB as the second-order constructs. Our
25 second-order CFA model showed an acceptable fit to the data ($\chi^2 = 1056.896$; $df = 279$; $CFI =$
26 0.956 ; $TLI = 0.949$; $RMSEA = 0.045$; $SRMR = 0.040$). We show the standardized factor

1 loadings for each construct in Table 1, and the composite reliability (the square root of the
2 average variance extracted) and correlations among the constructs in Table 2. The standardized
3 loadings in Table 1 indicated that all measures exhibit strong internal validity as all the
4 standardized factor loadings exceeded the threshold of 0.5 (Bagozzi and Yi, 2012) and as
5 shown in Table 2, the composite reliability of all constructs surpassed the threshold of 0.70
6 (Fornell & Larcker, 1981). As also shown in Table 2, all constructs had a higher Average
7 Variance Extracted (AVE) than the benchmark of 0.5, showing that convergent validity was
8 achieved. The discriminant validity of each construct was also achieved, as indicated by the
9 AVE of each construct being greater than all corresponding correlations (Fornell & Larcker,
10 1981) (See Table 2).

11

12 *<Insert table 1 about here>*

13 *<Insert table 2 about here>*

14

15 **4. Empirical Analysis and Results**

16 To test hypotheses, we used the R package lavaan (Rosseel, 2012). We tested our hypotheses
17 by conducting a series of structural equation models (SEM) models. First, we tested the effect
18 of place attachment (PA) on environmental citizenship behaviour (ECB) without mediator
19 variables – testing H1. The result was significant ($b = 0.444$, $p < 0.001$) as depicted in the top
20 diagram of Figure 2, supporting H1. Next, we tested the mediation effect of perceived
21 environmental responsibility (PER) on the relationship between PA and ECB by inserting PER
22 into the model that we used to test H1 – testing H2. In the second model, we also included a
23 direct path from PA to ECB to test the direct effect of PA. Our results are presented in the
24 middle diagram of Figure 2. Our results showed that the effect of PA on PER was significant
25 ($b = 0.332$, $p < 0.001$) and the effect of PER on ECB was also significant ($b = 0.560$, $p < 0.001$),

1 suggesting the presence of a mediation effect with the presence of a direct effect of PA to ECB
2 ($b = 0.441$, $p < 0.001$). Next, we used the bootstrap resampling technique to test for the
3 mediation effect of PER with 5000 bootstrap samples. A mediation or indirect effect is
4 significant if a bootstrap confidence interval does not contain zero. The test of indirect effect
5 (see first row of Table 3) indicated that the mediation of PER on PA and ECB relationship is
6 significant ($CI = 0.134, 0.238$). Finally, following the significant mediation effect of PER, we
7 tested the mediation effect of subjective norm (SN) and local norm (LN) by including the two
8 constructs into the model. Our results are shown in the bottom diagram of Figure 2. We found
9 that PA was positively related to Subjective Norm (SN) ($b = 0.722$, $p < 0.001$) and Local Norm
10 (LN) ($b = 0.734$, $p < 0.001$). With respect to the effect of norms, our results showed that SN
11 was positively related to PER ($b = 0.306$, $p < 0.001$), while the effect of LN was not significant
12 ($b = -0.010$, n.s.). Next, we conducted a bootstrap resampling technique to test for the
13 mediation effect of SN and LN with 5000 bootstrap samples. The test of indirect effect (see the
14 second and last row of Table 3) indicated that (1) the mediation of PA through SN and PER
15 was significant ($CI = 0.026, 0.140$); (2) the mediation of PA through SN and PER was not
16 significant. Thus, the findings support H3a but not H3b. With respect to the effect of the control
17 variables on PER, all variables were significant ($b_{Age} = -0.070$, $p < 0.001$; $b_{Gender} = -0.092$, $p <$
18 0.001 ; $b_{LTO} = 0.253$, $p < 0.001$) suggesting that age was negatively related to PER; female and
19 long-term oriented individuals were more likely to exhibit PER. Although the results seemed
20 to suggest that younger individuals are more likely to exhibit PER, but their attitude did not
21 translate to behaviour, revealing the attitude-behaviour gap at young individuals (see e.g.,
22 Juvan & Dolnicar, 2014). Similar results for gender, where the effect of gender on ECB was
23 not significant. Interestingly, the effect of long-term orientation on ECB was significant ($b =$
24 0.112 , $p < 0.001$), which is consistent with previous research (Lange & DeWitte, 2019). That
25 is, long-term-oriented individuals tend to exhibit ECB because the long-term consequences of

1 environmental degradation might be more salient for these individuals, and this can be
2 explained by their higher sense of environmental responsibility toward environment.

3 4 5 **5. Discussions and Conclusion**

6 Despite broad acknowledgement that there is a positive relationship between PA and ECB,
7 little attention has been devoted to researching the factors that characterize this established
8 relationship. In this respect, we consider and empirically demonstrate that two factors,
9 perceived environmental responsibility and social norms, play important roles when we study
10 urban residents' attachment to their city and its effect on their propensity to engage in pro-
11 environment behaviour. We provide below the theoretical contributions and policy
12 implications that emerge from our research contributions and findings. These, it should be
13 highlighted, are grounded on the roles of responsibility and norms which are particularly
14 pertinent in cities which are characterised by what is known as urban anomie (Fischer, 1973;
15 Pols, 2003) and how the latter negatively impacts, through the lack of social capital (Nakano
16 & Washizu, 2021), on group responsibility and engagement of urban residents in civic activities
17 such as pro-environment behaviour.

18 19 **5.1 Theoretical Contributions**

20 The core theoretical contribution of our work is guided by our objectives to better understand
21 the manner in which PA motivates a resident to engage in pro-environment behaviour, the
22 process perspective suggested by Crusius, Horen & Mussweiler (2011). Our first contribution
23 is about the relationship that an urban resident has with a place and how this enhances his/her
24 sense of responsibility to act in a way that will benefit that place. More specifically, the
25 mediating role of PER indicates that there is an indirect route through which PA enhances ECB.
26 In the broader realm of ethical consumption and pro-social behaviour, researchers have

1 highlighted the importance of raising and activating an individual's responsibility to engage in
2 pro-social activities, such as ECB (Carrington et al., 2020; De Groot & Steg., 2009). Following
3 this line of thought, as far as we are aware, we are the first to conceptualise and empirically
4 demonstrate that enhancing attachment to a place of residence plays a significant role in raising
5 an individual's sense of responsibility to act in a way that would benefit the environment.

6

7 Our second contribution concerns the role that social norm plays in the relationship between
8 PA, PER and ECB. Previous research has shown that activating individuals' sense of
9 responsibility plays an important role in motivating behavioural change that benefits the
10 environment (Kaiser & Shimoda, 1999). To this end, the novelty of our research findings on
11 individuals' PER is that it can be raised by the effect of subjective but not local norms. In
12 particular, we empirically demonstrate that an individual's attachment to a place tends to
13 activate the individual's sense of responsibility towards the environment via subjective norm
14 which, in turn affects their likelihood to engage in environment behaviour. This would imply
15 that previous work has overlooked the incremental role that PA plays in enhancing ECB by
16 increasing the sense of responsibility via subjective norms. This finding is particularly pertinent
17 and addresses how an individual's place attachment, subjective norm and sense of
18 responsibility can play a crucial role in counteracting the constraining effect of social dilemmas,
19 which has been recognised as a major hurdle in engaging individuals in pro-environmental
20 behaviours (Irwin & Berigan, 2013).

21

22 More importantly, our findings support the contention that social norms should be considered
23 as a mediating factor in the relationship between PA and PER and, specifically, that SN matters
24 more than LN. In fact, despite PA affects LN, the latter does not necessarily translate to PER.
25 One possible explanation is that when residents are prompted to think about others' opinions

1 and expectations on environmental responsibilities, their own sense of responsibility to act in
2 an environmentally beneficial way towards their city tend to be enhanced. This is more likely
3 to occur when they believe that those who are affectively important to them share the same
4 sense of responsibility. The involvement of their fellow residents and neighbours, on the other
5 hand, does not seem to matter. This concurs with the argument proposed by Fornara et al.
6 (2011) when they explain the differential effects between SN and LN on environment
7 behaviour. They argue that we need to consider what significant others represent to the
8 individual. These significant others, the authors suggest, can include one's housemates, partner,
9 parents, or children. Neighbours may be spatially closer, but individuals are more likely to care
10 about others who are affectively closer and, hence, will also be more inclined to pay more
11 attention to what they are doing compared to the former group. In the context of Beijing
12 residents, and the Chinese context in general, where family, friends and colleagues are
13 considered more important and influential than neighbours (Li et al., 2006), our findings
14 provide an interesting and new avenue for such types of connection to be considered in policy
15 making to motivate individuals to engage in ECB. We must acknowledge here the possibility
16 that the positive effect of locality may be implicitly captured by PA given that one of the sub-
17 dimensions of this construct captures how people feel about their local connections where they
18 reside. So, the impact and importance of locality effects should not be entirely discounted in
19 policy design.

20

21 **5.2 Policy Implications**

22 Environmental behaviours that are framed as citizenship engagement are more likely to be
23 sustained compared with those driven by regulatory incentives and penalties (Dobson, 2007).
24 [Our findings about the roles of individuals' perceived responsibility and social norms,](#)

1 respectively, offer new and specific avenues for the design of policies to enhance individuals'
2 place attachment with the objective of effectively promoting ECB.

3
4 When individuals are not legally forced to perform certain activities that will benefit the
5 environment, this may result in a social dilemma situation, where an individual feels that it is
6 not in his/her own interest to take actions that will benefit others. This poses challenges for
7 policy makers as they still have to consider interventions to encourage pro-environmental
8 behaviours through collective actions. In that context, our empirical findings suggest that
9 policies which are designed to enhance one's attachment to his/her place of residence can
10 counteract this effect of social dilemma by increasing an individual's sense of responsibility to
11 behave and act in an environmentally friendly manner.

12
13 One of the core findings of our paper is that place attachment promotes pro-environmental
14 behaviour by activating an individual's sense of responsibility that is shared amongst a group
15 of people who are affectively closer to each other, but not amongst neighbours and other
16 residents who happen to live in the same city. In big metropolitan cities, such as Beijing,
17 neighbours are often simply other people who one just happens to live next to. One is likely to
18 care more about colleagues, friends and relatives/parents, which resonates with Fornara et al
19 (2011) who find that norms from this group of people matter more than those from neighbours:
20 the idea of affective versus physical proximity. Thus, public messages promoting pro-
21 environmental behaviours can, for example, emphasise that it is the collective responsibility of
22 significant others (such as different members of families or close colleagues) to behave pro-
23 environmentally as looking after people who you care most about leading to a sense of shared
24 responsibility to look after the environment. This policy recommendation also acknowledges
25 and reflects the Chinese context of our study where family expectations and shared

1 responsibility for actions are more important than in many other cultural contexts (Bian, Logan
2 & Bian, 1998).

3
4 Public policies centred on PA designed to motivate pro-environment behaviour of urban
5 residents do not typically account for the consequent role of norms. Our research suggests that
6 the effect of PA on social norms (both SN and LN) should explicitly be considered. Our
7 research findings in that context indicate the relative importance of SN such that, for place
8 attachment policies to be more effective, they should be accompanied by policies that also
9 consider other residents' pro-environment behaviours, in particular those with whom they feel
10 that they have an important relationship and connection captured by SN. This can be, for
11 example, in the work context for new colleagues-who are likely to be new residents-where
12 social activities should be organised to welcome new comers such as visits to landmarks of the
13 city, meetings in socialising places (pubs, cafes etc) or visiting public parks or gardens where
14 perhaps other colleagues/friends may have done some volunteering activities that have
15 benefited these places. Following on from that example, new colleagues are normally provided
16 with onboard documents which normally contain information about work but also non-work-
17 related activities of employees of the organisation. Such documents are meant to feature why
18 these new employees have made the right decision to move to this new organisation and by
19 implication enhance their level of attachment to their new place of residence. These brochures
20 could feature volunteering activities of colleagues (i.e., subjective norms effect) who take part
21 in pro-environment behaviours. Of course, employers can also play a role in this as part of their
22 corporate social responsibility initiatives by organising group activities where employees can
23 take part in voluntary pro-environment behaviours and/or be rewarded for organising or taking
24 part in such activities.

1 **5.3 Limitations and Further Research**

2 We have illustrated the roles that social norms and PER play in the relationship between PA
3 and ECB but in a specific urban context where we have collected the data. By acknowledging
4 the limitations that emerge from studying a specific context and the data that we use, this also
5 represents an opportunity to test some our propositions in other cities or countries. Other cities,
6 even in China or in other cultural contexts, with different facets (such as towns or smaller cities
7 or new urban areas) may for example reveal whether these variables, social norms, and PER,
8 operate differently. Similarly, for further research, there is a need to consider how the
9 relationships that we find in our research may differ in different neighbourhoods within the
10 same city. ³

11

12 The COVID-19 pandemic interestingly represents an opportunity to test the proposed
13 contentions and relationships of our research as this unprecedented event has raised our
14 awareness of the association between the state of the environment and how our relationship
15 with it may lead to the emergence and spread of viruses. But more relevant to our study
16 contributions, the social restrictions that have been imposed and the need for collective and
17 civic participation to achieve a common goal may provide an interesting context to study how
18 the relationship between PA, PER and in particular social norms have impacted residents' pro-
19 environmental behaviours.

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1 **APPENDIX**

2

3

Table 1. Standardize loadings of a second-order measurement model

Latent variable	Item	Wording	Item loading
Local norm (LN)	LN1	Many among Beijing residents take the initiative to protect local environment.	0.877
	LN2	Most of the Beijing residents take the initiative to protect local environment.	0.872
Subjective norm (SN)	SN1	Many among the persons important to me take the initiative to protect the environment.	0.869
	SN2	Most of the people who are important to me take the initiative to protect the environment.	0.870
PA–Place Identity (PI)	PI1	I feel BEIJING is part of me.	0.730
	PI2	I identify strongly with BEIJING.	0.780
	PI3	Living in BEIJING says a lot about who I am	0.673
PA–Place dependent (PD)	PD1	For my work and life, the resources and facilities provided by BEIJING are the best.	0.599
	PD2	For my work and life, I could not imagine anything better than the resources and facilities provided by BEIJING	0.584
	PD3	I enjoy living in BEIJING more than any other cities.	0.800
PA–Social Bonding (SB)	SB1	If I were to stop living in BEIJING, I would lose contact with a number of friends	0.535
	SB2	My friends/family would be disappointed if I were to live in another city	0.642
	SB3	Many of my friends/family prefer BEIJING over many other cities.	0.830
Perceived Environmental Responsibility (PER)	PER1	I should be expected to protect the local environment.	0.820
	PER2	We should be responsible for helping the environment around us.	0.820
	PER3	I feel it is up to me to protect the environment.	0.755
ECB–Helping (BH)	BH1	I spontaneously give my time to help my family/friends/fellow citizens take the environment into account in everything they do in the city.	0.659
	BH2	I encourage my family/friends/fellow citizens to adapt more environmentally conscious behaviour.	0.804
	BH3	I encourage my family/friends/fellow citizens to express their ideas and opinions on environmental issues.	0.718
ECB–Engagement (BE)	BE1	I actively participate in environmental events organized in and/or by my city.	0.839
	BE2	I undertake environmental actions that contribute positively to the image of my city.	0.825

	BE3	I volunteer for projects, endeavours or events that address environmental issues in my city.	0.818
	BE4	I stay informed of my city's environmental initiatives.	0.697
ECB – Initiatives (BI)	BI1	In my city, I weigh the consequences of my actions before doing something that could affect the environment.	0.706
	BI2	I voluntarily carry out environmental actions and initiatives in my daily activities.	0.741
	BI3	I make suggestions to my family/friends/fellow citizens about ways to protect the environment more effectively, even when it is not my direct responsibility.	0.681
ECB	BH		0.851
	BI		0.970
	BE		0.799
Place Attachment	PI		0.942
	PD		0.867
	SB		0.815

Table 2. Reliabilities, Latent Variable Correlations and Validities

	α	1	2	3	4	5
1. Place Attachment (PA)	0.743	0.847				
2. Responsibility	0.838	0.327	0.798			
3. Environmental Citizenship Behaviour	0.830	0.441	0.619	0.879		
4. Subjective norms	0.862	0.314	0.386	0.480	0.870	
5. Local norms	0.844	0.448	0.366	0.502	0.298	0.854

Note: The diagonal values in bold indicate the squared of average variances extracted (AVE). The scores in the lower diagonal indicate latent variable correlations. PA and ECB are second-order constructs. Fit of the second-order model: $\chi^2 = 1056.896$; $df = 279$; CFI = 0.956; TLI = 0.949; RMSEA = 0.045; SRMR = 0.040; Sample size = 1388 respondents.

Table 3. Indirect effect test

Path	Estimate	95% LL	95%UL
PA → PER → ECB	0.091	-0.004	0.188
PA → SN → PER → ECB	0.085	0.026	0.140
PA → LN → PER → ECB	-0.003	-0.049	0.040

Note: 5000 bootstrap samples were used; ECB = Environmental Citizenship Behaviour; SN = Subjective Norm; LN = Local Norm, PER = Perceived Responsibility, SE = Bootstrap standard error, LL = Lower Limit; UL = Upper Limit. Shaded area indicates significant path because the 95% confidence interval does not contain zero.

Figure 1. Conceptual Model

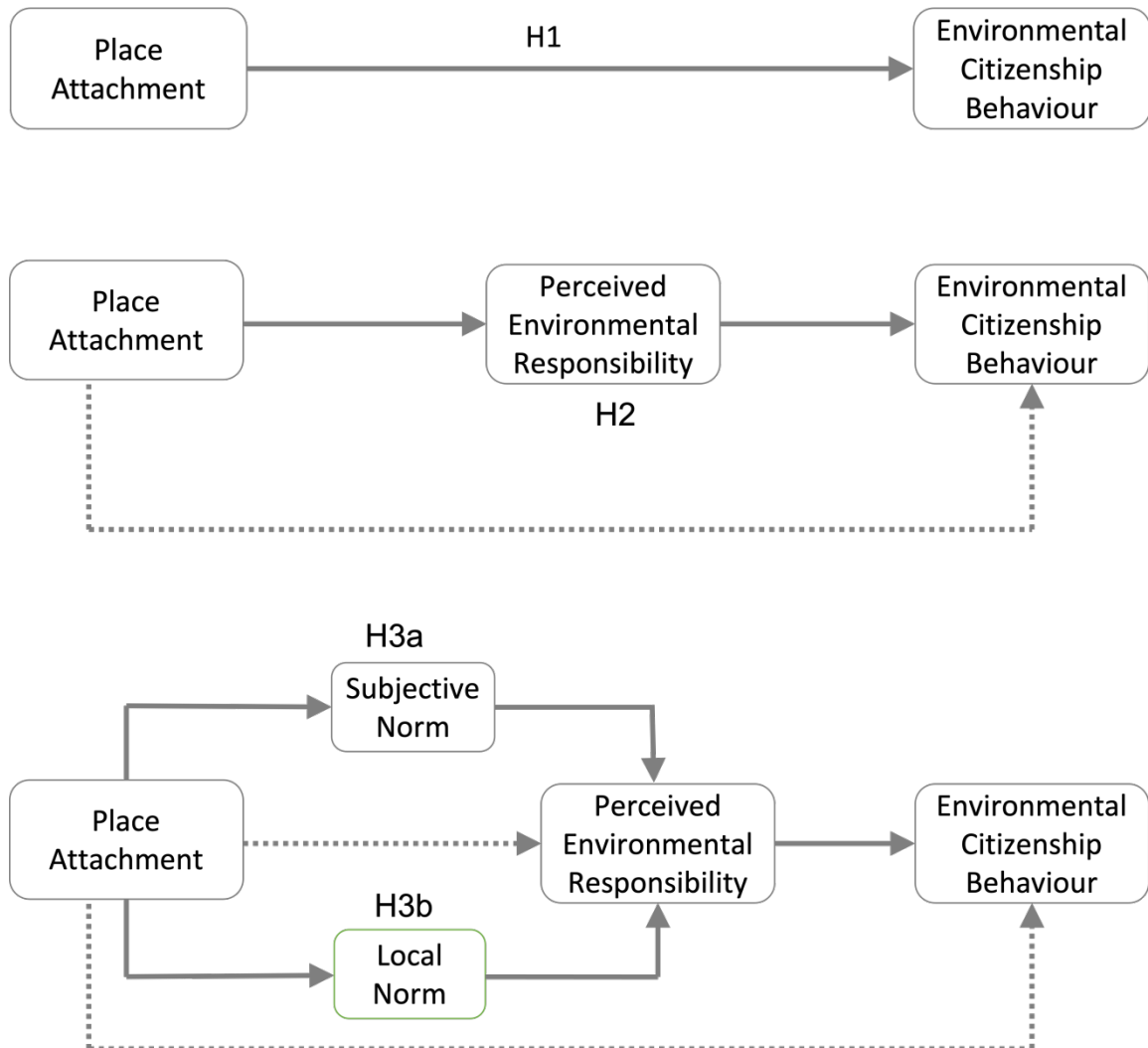
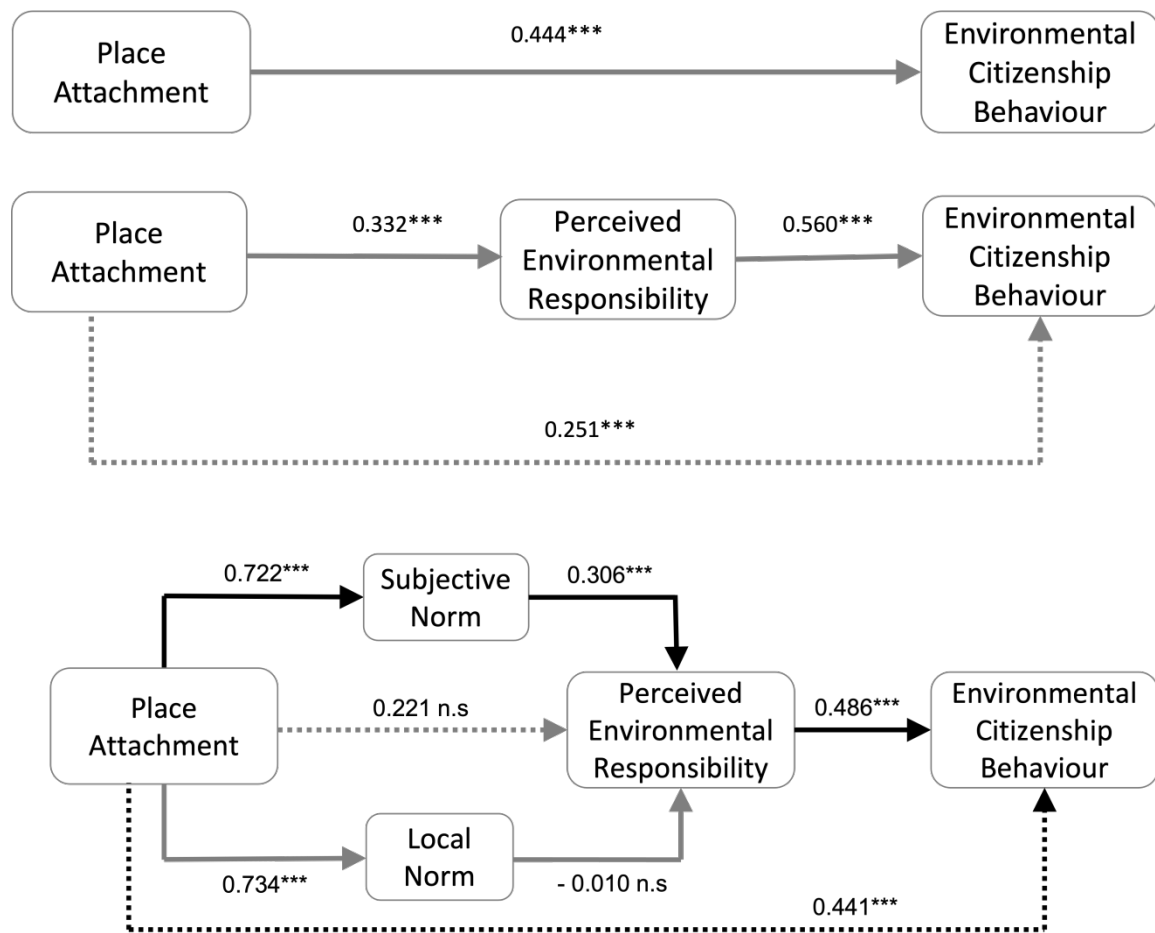


Figure 2. Results



***p < 0.001; * p < 0.05; n.s = not significant