The municipal council, my neighbors and me: Social environmental influences in the city

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ABSTRACT

This study seeks to examine the extent to which the level of municipal environmental management affects and complies with the behavioral norms of urban communities (city norms), and to what extent these affect environmental behavior at the individual level. We used a two-step, mixed-methods approach: a quantitative study of a representative sample of the urban sector (n = 1000) in Israel, followed by a qualitative in-depth interview process (n = 20). Municipal environmental management was found to be strongly correlated with city norms. Multiple regression analyses revealed that the residents' environmental behavior was strongly influenced solely by city norms (and not by the municipal council's conduct). However, our interviews revealed that residents explicitly attributed their pro- or anti-environmental behavior almost solely to the municipal council's conduct (and not to city norms). These relative contributions of municipal environmental management versus city norms on environmental behavior varied across environmental domains. In the Discussion section, we offer an explanation to the seemingly contradictory findings, and offer specific recommendations for several actions and initiatives that local authorities can adopt to promote pro-environmental behavior among its residents' and thus reduce the ecological footprint of the city as a whole.

1. Introduction

As of 2018, more than half (60%) of the world's population live in cities, and the expected future trend is for a continued increase in this percentage (Wilmoth, 2018). This implies that local authorities, particularly in cities, have and will continue to have a widespread impact on climate change. The fact that local authorities have the power and responsibility to create positive environmental changes was acknowledged as early as 1987 by the Brundtland Commission (Keeble, 1988). Municipal councils are increasingly viewed as major agents of change, being the closest governmental entity to the people. (Cities and the Sustainable Development Goals. ICLE BRIEFING SHEET, 2018; United Nations Sustainable Development, 2018). The way local authorities operate has a significant role in the lives of citizens by providing infrastructure, setting regulations, enforcing the law, providing information, education, creating activities and community

and responding to residents when needed (The Israel Democracy Institute, 2018). Together with being subject to the government, there are many factors under the local authority's responsibility and duty of care, as it is considered "the executive of the state" (The Israel Democracy Institute, 2018). For example, in the field of energy, the local authority has the main power to reduce energy consumption in public institutions, as well as the ability to invest in and promote solar panel projects, each authority according to its ability, when such moves are effective in reducing air pollution. In the field of waste management and recycling, the local authority is legally responsible for providing waste and recycling bins, clearing them and ensuring that the waste goes to the appropriate treatment facilities, along with responsibility for cleaning public areas within its territory (Tsarfaty and Shafran, 2018). The local authority is also responsible for providing and developing public transportation systems, bike lanes and sidewalks, as well as providing shade in public areas such as parks, public gardens and sidewalks

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(Tsarfaty and Shafran, 2018). In addition, the local authority is responsible for the education system in its territory. Although the Ministry of Education determines the content and budgets for implementing the programs, the local authority has the ability to design and add content and programs in formal and informal education as it sees fit, so that it can introduce and encourage environmental and sustainability education (Israel Ministry of Education, 2019). In summary, the local authority can influence the behavior of its residents through its activities in the fields of energy, recycling, education, as well as by sharing its environmental conduct with the public.

The present study does not claim to measure the unique *physical* impact of municipal councils (MCs) on the environment, and the object of observation is not the MC, but rather the *city residents*. Specifically, the study focuses on the question: In what ways (if at all) does the municipal council's management of environmental issues, as perceived by the residents, influence their own environmental behavior (EB)? In order to explain the theoretical framework and the research model in this study, we will first briefly review the various factors that influence EB at the individual level, with an emphasis on where, within all this, there is room for the influence of the local authority (1.1). After reviewing EB at the individual level, we will continue to review EB at the municipal level (1.2), followed by focusing on place-dependent behavioral norms, with emphasis on the mutual effects that exist between them and the local authority (1.3). In section 1.4, we will describe the environmental domains examined and then present the research model that describes the relationships we expected to see between the three main research variables: 1. (perceived) municipal environmental management (MEM); 2. city environmental norms; and 3. the individual residents' EB. The last section (1.5) will present the research questions.

2. Literature review and theoretical framework

2.1. Environmental behavior at the individual level and its influencing factors

The factors that influence individual behavior, and particularly in the environmental context, are many and complex (Kollmuss and Agyeman, 2002; Morren and Grinstein, 2016). Despite its importance, it is difficult to find effective models that include all the motives and factors for choosing one behavior or the other (Kollmuss and Agyeman, 2002; Morren and Grinstein, 2016). Clayton and Myers (2015) attempted to describe this complexity and classify the factors influencing EB into "external factors" versus "internal factors". As examples of external factors, they indicate the ability to conduct the behavior, the existence and type of feedback, reinforcement goals, cues and social norms; examples of internal factors are values, feelings, self-efficacy, knowledge and information, responsibility and attitudes. They argue that the internal factors are more difficult to change than the external ones, pointing out that, despite the division into the various factors, these are affected and influenced by one another on a regular basis. Since, in this study, we examine the influence of MCs on individual behavior, we maintain that, in terms of Clayton and Myers' classification, the influencing factors are mainly external and, therefore, should be expected to have a tremendous influence on resident behavior. For example, affordance depends to a great extent on the local authority's actions. Research shows that in the absence of appropriate infrastructure and when a behavior does not fit into daily life and compromises comfort, the extent to which people behave environmentally decreases (Tonglet et al., 2004; Knussen et al., 2004; Hage et al., 2009; Morren and Grinstein, 2016). Other external factors that are largely dependent on the MC and which may encourage its residents to behave in a more environmentally-friendly way are providing positive reinforcement, feedback, setting reinforcement contingency goals and prompts, such as creating local competitions, and recognizing families, neighborhoods or streets that show pro-environmental behavior (PEB), according to criteria set by the MC (Vine and Jones, 2016).

Individual behavior is influenced to a large extent by another external factor: environmental social norms (ESN). The influence of ESN on behavior has been extensively studied and demonstrated in the environmental context (Schultz et al., 2007; Cialdini and Trost, 1998; Bamberg and Möser, 2007). For example, ESN have made people reuse towels, stop unauthorized dumping of waste and reduce their electricity consumption (Cialdini, 2007; Schultz et al., 2007; Pellerano et al., 2017; Allcott, 2011; Allcott and Rogers, 2014; Nolan et al., 2008).

2.2. The municipal council's activities in the environmental field and its impact on residents' behavior

Since the study focuses on the impact of MEM on the EB of the individual, we have found it to be more relevant to understand the residents' perceptions of their local authority's environmental conduct than to assess the environmental conduct itself, for two reasons:

First of all, assessing and comparing objective and comparative MEM is not straightforward, mainly because of the lack of a valid index. Since it is not a single-domain measure, it is difficult to find a one-dimensional index that will provide an overall assessment. At the individual level, EB is multidimensional (Stern, 2000). Environmental management at the municipal level is also reflected in a range of areas, which are integrated into the MC's ongoing activities (Tsarfaty and Shafran, 2018). For example, there are municipalities where high percentages of recycling can be seen, but a relatively low amount of open spaces (Israel Central Bureau of Statistics, 2018). Furthermore, even if there was a valid index, it is difficult to obtain valid data because such information largely depends on the local authority's reporting, and sometimes there are areas for which local municipalities' conduct is not reported or is inaccessible to the public (Mair et al., 2018; Berman and Orttung, 2020).

The second reason for choosing the MC's *perceived* conduct rather than its actual practice is that the way in which residents perceive the MC's actions is not only due to the objective end result visible to the residents, but it is also influenced by the degree of trust in the local authority and the perception of its fairness of procedures, professionalism and integrity (Glaser and Denhardt, 2000). In recent decades, the subject of residents' perceptions of municipal activities seems to be gaining more and more emphasis in the research world. Many studies examine residents' perceptions of local authority's activities from the aspects of satisfaction, policy success, service efficiency and transparency, and public participation (Vigoda-Gadot, 2006; Song and Lee, 2016; Wichowsky and Moynihan, 2008; Andrews and Van de Walle, 2013). However, studies that examine residents' perceptions of the *environmental* conduct of their MC are still rare. Indirect evidence for the influence of residents' awareness of services and infrastructure provided by local authorities on individuals' behavior can be found in the following studies: Bolton and Lemon (1999) and Ismail et al. (2012) reported a positive relationship between individuals' satisfaction with public services and their use of these services, as well as between individuals' assessment of the performance of the service provided and the use of the same service. It has also been found that satisfaction with public services (such as public transportation and parks) increases the frequency of the use and that a positive user experience reinforces the desire to increase use (Van Ryzin and Charbonneau, 2010; Wu et al., 2017). More direct and relevant evidence for the present study can be found in a study conducted by Wan et al. (2014), which focuses on the relationship between (perceived) EB at the municipal level and individuals' EB in the context of recycling. In their study, it was found that the MEM of recycling had a strong and significant impact on residents' reported behavior. In light of this, the researchers suggested that, in order to encourage residents to recycle, the local authority should provide more recycling bins and guidelines for their use, and should inform residents about the actions it has taken to facilitate and encourage recycling in the city. In summary, the impact of perceived municipal conduct has been found in some studies to influence residents' behavior in areas where infrastructure and services are essential elements. The

present study focuses on the impact of perceived municipal conduct on individual behavior in the environmental context.

2.3. The relationship between municipal conduct and place-specific environmental social norms

In the research literature on changing EB, place-dependent behavioral norms are highly acknowledged for having a decisive influence on the behavior of individuals. These norms are created by formal or informal institutions operating in a specific place, and here the MC has a central role. In their review, Hansen and Coenen (2015) show how changes can be made by top-down processes (e.g., when an institution creates policies that can change norms) and bottom-up (e.g., when public debate and civil pressure lead to changes in regulations) (Angel and Rock, 2009). Therefore, it is quite clear that the relationship between the MC and residents' behavioral norms can be reciprocal (Faller, 2014). In the urban context, research shows that municipal conduct and ESN are mutually influenced and mutually influential in all kinds of forms and domains (Flatt, 2008; Nyborg et al., 2016). Flatt showed how knowledge and education about environmental conditions and the behavior that the MC seeks to change can influence ESN in a city, and thus change and shape the residents' behavior. Another example of the MC's effect on city norms is a certain local authority in Australia that is considered and recognized as an environmental authority by working hard to reduce carbon emissions in its territory. By encouraging the use of local vegetation in gardens, it has affected the ESN of its residents, creating a landscape that it is more environmentally friendly and has local characteristics (Uren et al., 2015). Wang et al. (2018) found that providing information and publicity about environmental issues, on behalf of the MC, impacted ESN. In the context of electricity consumption and the transition to more efficient light bulbs and devices, there appears to be a close relationship between the local authority's conduct, the information it disseminates to citizens and, as a result, the growing norms on the subject, all of which, in turn, lead to a change in economic behavior and a transition to conscious social perception (Moloney et al., 2010).

The relationship between the MC and city norms can also have a reverse direction; Tsutsui and Shin (2008), for example, have shown how global ESN have influenced civil movements, which ultimately led to policy change. In addition, exposure of the MC to residents' positive ESN about improving and creating more environmental infrastructures has led to strengthening the goals and objectives of civil engineers for more environmental planning, including restoration of natural areas (Shealy et al., 2018).

Considering the above, our research assumes that the environmental conduct of the MC and the residents' ESN are mutually influenced and mutually influential on each other, and together can influence the EB of the resident.

2.4. Domains of environmental behavior: municipal level versus resident level

As mentioned above, the term "environmental behavior" is multi-dimensional and refers to a variety of everyday life behaviors and conducts (Larson et al., 2015; Stern, 2000), each being driven and influenced by different factors (Ebreo and Vining, 2001; Heimlich and Ardoin, 2008). For example, Ebro and Vining found that choosing a particular behavior, such as reduction of waste, was not associated with the decision, for example, to recycle. Therefore, it is important to distinguish between the overall concept, including all the behaviors in several behavioral domains, and the specific definition that relates to each domain separately. According to Stern (2000), "Environmentally significant behavior depends on a broad range of causal factors, both general and behavior-specific"; therefore, "A general theory of environmentalism may not be very useful for changing specific behaviors" (p. 421). In this study, we will refer to both the overall concept and the

specific definition according to five domains that we found to be relevant to the relationship between the MC and the resident: energy saving, recycling and waste management, public sharing and transparency, education for sustainability, and use of open spaces.

These domains were selected because they are important both in terms of the MC and the resident, and their measurement is relatively applicable. That is to say, in the totality of actions that are under the jurisdiction of the MC, we assume that these domains have a greater impact than others that have less influence on resident behavior, such as consumerism, transatlantic flights, reducing animal products, or other behaviors that occur within the resident's own house.

We mentioned earlier that testing predictive factors is more valid when predictors (such as MEM and ESN) are location specific. Valid testing requires not only location specificity, but also behavioral domain specificity (Carmi et al., 2015). Therefore, in examining relationships between municipal conduct, local behavioral norms and subjects' behavior, we have been careful about domain specificity (as will be explained in detail in the Methods section). Therefore, in this study, we examined the links between the three main research variables: the environmental conduct of the MC, the city-specific environmental norms and resident behavior in general, as well as across the five behavioral domains, as shown in Fig. 1 below.

3. Objective of the study

The purpose of this study was to examine the relationship between the environmental conduct of the MC (as perceived by the residents) and the ESN prevalent in the city (*a* in Fig. 1), and how both affect (reported) resident behavior (b, c in Fig. 1) across five environmental domains. Specifically, our goal was to examine which of all the actions that an MC can (or cannot) take reaches the residents' awareness, thereby influencing their behavior, and to what extent did the conduct of the MCs affect and influence the social norms of their residents. Another goal was to determine whether there is a domain in which the conduct of the MC has a greater impact on behavior. Alongside the quantitative assessment of the relationships and influences, the purpose of the qualitative research was to add information about the channels in which the local authority affects, or does not affect, the residents. The qualitative part was expected to provide a causal-mechanistic explanation for how the MC's conduct can (or cannot) contribute to shaping environmental norms and how social norms can (or cannot) influence policy in the context of urban environmentalism.

4. The significance of the study

The environmental conduct of municipalities can have a huge impact, for better or worse, on the EB of its residents. The significance of this study is in identifying the most effective channels through which a municipality can act to encourage pro-environmental behavior among its residents.

5. Methods

5.1. Research variables, terms and definitions

For the sake of scientific brevity, the following terms and acronyms are used:

"Environmental behavior" (EB) refers to the extent to which the respondents *report* behaving in an environmentally friendly manner.

"Municipal environmental management" (MEM) refers to the local authority's environmental activities in the city, as *perceived* by the resident.

"Environmental social norms" (ESN) refer to the EBs of other residents of the city, according to the evaluation of the respondents.

Fig. 1. The relationships between the main research variables; The MEM, City SN, and individual-resident's EB.
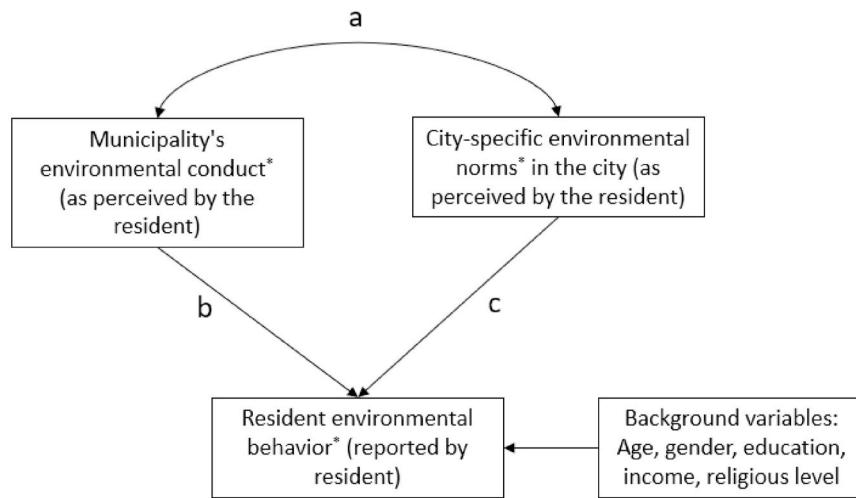
The "environmental domains" refer to the following five behavioral contexts (individual as well as municipal) examined in this research: 1. energy saving; 2. recycling and waste management; 3. environmental management of the local authority and its institutions, transparency and public participation; 4. promotion of environmental education in the community; and finally, 5. maintaining and developing open green spaces.

5.2. Research design

In this descriptive, mixed-methods research, the first phase was a quantitative study based on a specifically built questionnaire that was aimed at examining the three main variables mentioned in Section 2.1 and quantifying their relationship in general, as well as across each of the environmental domains. The second qualitative stage was based on semi-structured in-depth interviews, consisting of 17 questions aimed at gaining a deeper understanding of how the residents experience the MC in their city, their PEB, the city's environmental norms, and the relationship between these variables.

5.3. The quantitative study

5.3.1. The instrument

We used a questionnaire that was specially formulated for the purpose of this study. First, the environmental domains had to be selected. We used Heschel Center for Sustainability's publication: "From a promising to sustainability authority: Ten measures of a sustainable local authority, 2012". We also consulted with leading Israeli experts in the field of municipal sustainability in order to find environmental domains that are relevant and can be measured at *both municipal and individual levels* (i.e., they can be observed). Asking residents about their MC's and neighbors' environmental actions requires that the respondent can observe at least some of the behavior. Another reason for our choice in defining behavioral domains is that studies show that domain-specificity strengthens the predictive explanatory power of models (Stern, 2000; Larson et al., 2015). This process was challenging, since we also had to bear in mind the potential biases of self-reports, the ways that local authorities are able to act sustainably, and the limitations on what is reasonable to expect the common citizen to know about the MC's conduct. We ended up with the five domains, as described in Section 2.1.

Once these were selected, we formulated questions about individual behavior, ESN and perceptions of municipal conduct in each environmental domain. For example, in the domain of energy saving, we asked the respondents to what extent they perceived the municipality/other city residents/themselves to be making an effort to become more energy efficient. Another example of three serial questions in the recycling domain were regarding the accessibility of recycling bins (paper/-bottles/plastic/glass/packaging) and to what extent the respondents and the residents in their neighborhood recycled. (For the full questionnaire, see Appendix A.) The study, whose final version consisted of 42 questions (except for the demographic data), was distributed over the Internet by the polling company. The average response time in the study was 8 min.

At the beginning of the questionnaire, there was a brief explanation, specifying the purpose of it as learning about "public attitudes toward city life". It was emphasized that the questionnaire was anonymous and that the data would be used solely for the purpose of the study. At the end of the questionnaire, the respondent was asked whether she/he was prepared to be contacted for a further interview on the topic. Subjects were selected for the qualitative part of the study from those who answered "yes".

5.3.2. Sample and sampling

To obtain a large and representative sample of the urban sector in Israel, the research questionnaire was distributed to the subjects through the Panel4All survey company (Panel4All - Panel Book, 2019). Data from 1000 subjects, representing the urban sector in Israel, were collected, comprising 498 men (49.8%) and 502 women (50.2%). The ages of the subjects ranged from 18 to 82, with the mean age being 40.33 and the median 38. The representativeness of the sample was verified with data collected by the Central Bureau of Statistics, 2019.

5.3.3. Statistical analyses

After performing reliability analyses of the indices, we calculated means, medians, standard deviations and Pearson correlations. To explain the variance in residents' EB, we used a hierarchical multivariate regression model, in which we entered sets of predictors including R-square change tests. We used this procedure to analyze the general as well as the domain-specific regression models. In the interpretation of the effects sized of the correlation, we adopted Cohen's (1988, 1992)

definition in which the effect size of around 0.1 is considered low, medium if r varies around 0.3, and large if r is more than 0.5.

5.4. The qualitative study

5.4.1. The interviewees

After the end of the quantitative initial phase, and after an initial analysis of the quantitative data, out of the 687 respondents who expressed their willingness to be interviewed, 20 residents living in eight different cities in Israel were selected. Twelve women and eight men, ranging in age from 23 to 61, representing diverse socioeconomic status and background, were interviewed. We tried to have representation in terms of demographic variables as well as cities (size and peripherality).

5.4.2. The research tool

The research tool was a semi-structured (face-to-face) in-depth interview (Appendix B). The questions were formulated after analyzing the quantitative research data in such a way that the answers provided an in-depth understanding of the relationships that were found; specifically, how the resident perceives MEM, city norms and the connection between them. The interview data were processed using the "constant comparison" method, which is a central analysis strategy of "grounded theory" (Strauss and Corbin, 1994). According to this method, text sections are coded into categories through data comparison and identification of common meanings and patterns. In the present study, we went through the interviews in depth, identified repetitive themes and then categorized them into groups with similar meanings that constituted the main themes.

6. Results

6.1. The quantitative data

6.1.1. Levels of municipal environmental management, environmental norms and environmental behavior: descriptive statistics of the main study variables

Table 1 presents the descriptive measures of the main study variables: the MC's conduct, local norms and (reported) resident behavior in general and in each of its environmental domains, along with the item numbers and reliability of the indices. The perceived MC's overall environmental conduct, environmental norms and residents' behavior were medium. In all the indexing variables, all perceptions about the MC's conduct had good reliability. In the norms and behavior variables there were indices where reliabilities were not sufficient. In several domains with only one item no alpha score was reported.

6.1.2. Factors affecting overall EB (all domains combined) of city residents

To analyze the effects of the study variables, including all the demographic variables on EB, we performed a multiple regression, whose results are illustrated in Fig. 2. The regression model was found to be significant (F (7,791) = 41.37, p < .001), with an explained variance r^2 of 26.8%). Fig. 2 shows that environmental norms had the strongest

effect on EB. Contrary to our expectations, the contribution of the resident's perception of MEM (municipal environmental management) was not significant. As for the demographic variables, we found that older, secular and educated residents (reported to) behave in a more environment-friendly manner. Gender was not found to be significantly influential.

6.1.3. Factors affecting domain-specific environmental behavior of city residents

Table 2 presents the multiple regression analyses of domain-specific EB.

In the energy saving domain, the strongest predictor of EB was environmental norms. A weaker effect was age (positive effect), then income (negative effect) and, finally, a very weak positive effect of education level. Notably, perception of local authority, gender and religious identity were not found to be significant. In the waste management and recycling domain, norms and age had positive medium effect sizes. A weaker effect was found for perceptions of MCs. Religious identity had a weaker, yet significant, effect and education level had a very weak positive effect.

In the domain of the environmental management of the local authority and its institutions, transparency and public participation, we found that the strongest predictor was the environmental norms with a large effect size. Very weak, yet significant, effects were those of age (positive), perception of the local authority and education. It should be noted that the EB index in these two domains had insufficient internal reliability. Relative to the other domains, promotion of environmental education in the community was exceptional, as the strongest effect was the perception of the local authority (significant medium-strong effect size). A weaker effect was ESN. The contributions of age, income, education, sex and religious identity were not found to be significant.

In the fifth domain, use of open spaces, we found that environmental norms had a very strong effect. A weaker effect was the perception of the local authority, education (positive), and age (negative).

6.2. The qualitative findings

The interviews took place in locations, dates and time that were convenient for the interviewees and according to their choice. Each interview lasted between 30 and 90 min, while after they answered the questions, they each had time to mention and talk about related issues and give their input.

6.2.1. The interrelationships between the municipal council and city environmental norms

The qualitative findings support our working hypothesis that there is a mutual influence between the MEM and the ESN of its residents.

The interviewees were asked if there is a congruence between the residents' ESN and MEM, and to give examples to explain their answers. Out of 20 interviewees, 13 said that there was.

Table 1
Descriptive statistics of the research variables in specific domains and in general.[a]

Predictor	Domain								
	MC's conduct (perceived)			Social Norms that prevail in the city			City resident behavior (reported)		
	Mean ± SD	α	Items	Mean ± SD	α	items	Mean ± SD	α	Items
Energy saving	2.8 ± 0.94	0.79	3	2.8 ± 0.65	0.69	3	3.5 ± 0.85	0.67	3
Recycling and waste management	3.5 ± 0.65	0.65	5	3.1 ± 0.66	0.36	2	3.9 ± 0.67	0.26	2
Environmental management, transparency and public participation	3.0 ± 0.75	0.82	5	2.6 ± 0.64	0.49	2	1.4 ± 0.81	0.45	2
Promotion of EE	2.5 ± 0.99	0.67	2	2.5 ± 0.88	–	1	2.0 ± 0.74	–	1
Open green spaces	3.4 ± 0.88	0.63	2	3.5 ± 0.85	–	1	3.2 ± 1.01	–	1
General	3.2 ± 0.59	0.86	17	2.9 ± 0.43	0.65	9	3.0 ± 0.49	0.64	9

[a] Mean ± SD of scores that range between 1(least) - 5 (most) pro-environmental (the explained variance of EB in each environmental domain).
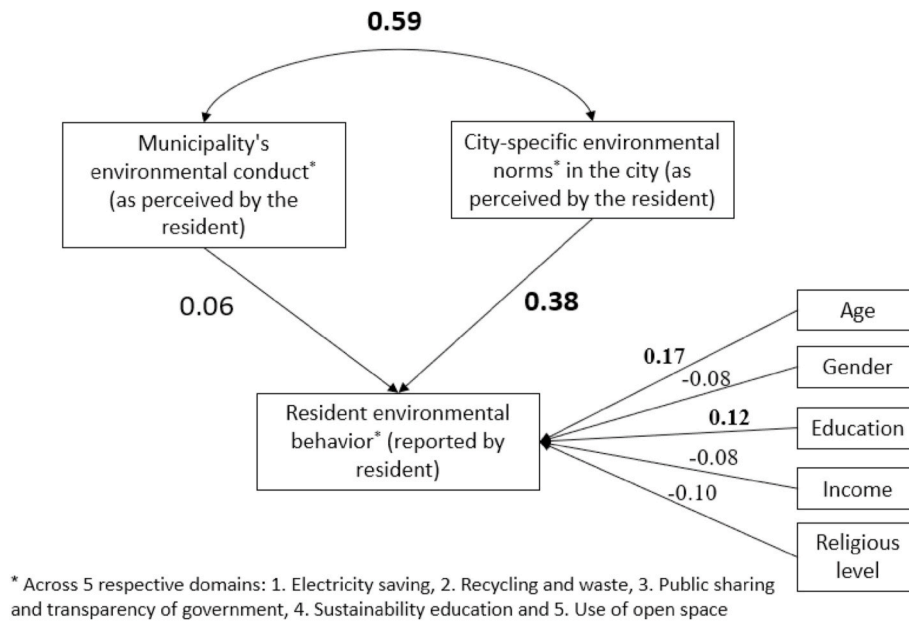
Fig. 2. The research model: Standardized effects in multiple regression of EB.

Table 2
Multiple regression results: Prediction of EB in each of the 5 environmental domains[a].

Predictor	Domain							
	Social Norms	Perceived MEM	Age	Education	Income	Gender	Religious Identity	R^{2b}
Energy saving	**.34**	.07	**.18**	**.08**	**-.13**	-.03	-.07	0.22
Waste and recycling[c]	**.22**	**.16**	**.21**	**.07**	-.03	-.02	**-.12**	0.21
Environmental management transparency and public sharing[c]	**.35**	**.09**	**.10**	**.08**	.02	-.01	-.01	0.19
Promotion of EE	**.17**	**.28**	-.06	.03	.01	.05	-.06	0.17
Open green spaces	**.41**	**.20**	**-.09**	**.09**	-.01	-.02	-.03	0.29

[a] Numbers denote the standardized β′s, bold numbers denote statistical significance (α = 0.05).
[b] R^2 is the explained variance of EB in each environmental domain.
[c] In this domain, the internal reliability of the EB was not sufficient.

I think so … As much as there is still a lack of awareness in this field, the fact that they [the MC] put a recycling facility for plastic bottles, even in the most uneducated neighborhood, I would yes, there is cooperation, because you see that it fills up. Both the residents and the local authority want it" … "I think it goes hand in hand. Look, I know that representatives of Tel Aviv City Council went to the "smart city" conference in Barcelona. I suppose this issue engages the world so I suppose it has been touched on there as well, but I also think there is a lot of demand from the residents here and the residents are motivating things here, making things happen. They work together: the local authority does work and so do the residents (R. 28 YO woman).

In an answer to the question of who initiates the environmental activities in the city (the municipality or the residents), we received answers that include all the possibilities: Four interviewees commented that environmental initiatives come only from residents' action and motivation:

Only totally from the residents. Here, in a specific neighborhood, two very big tower blocks are going to be erected now. At the beginning of their construction, in the planning stages, I and a considerable number of tenants united and filed an urgent letter from a lawyer to the municipal council. We demanded that, while there must be building, they should pay attention to our green areas, …. and the truth is that in the end it did work because there's going to be an enormous park between the tower blocks … which proves it is totally up to the residents (D. 26 YO man).

Eight interviewees testified that, in their opinion, environmental action in the city is an initiative of the MC alone:

I don't know anything about residents leading initiatives, I'm not aware of anything communal happening here; maybe there is and I don't know about it, but I think it comes from the municipal council. I think everything is the council: public transport is the Ministry of Transport, the bins are contractors who clean the streets − sub-employees of the council − whatever you call them. I haven't seen private people engaged in it; I don't know anyone who is engaged in it (T. 61 YO woman).

Seven interviewees commented that the city's environmental activities were initiated by the local authority *and* the residents together, so that they cooperate and motivate each other.

It's both. There is a lot of dialogue with neighborhood committees. For example, there are very old neighborhoods here where there's been a dialogue with the neighborhood committee for a year; for example, neighborhood D, which is considered one of the problem neighborhoods. In the new neighborhoods, there are both committees and property management committees that are very involved with the municipal council. That is, if a property management committee sees that there's litter and stuff, there's a possible contact at the council to call and ask (A. 48 YO woman).

6.3. Explaining residents' environmental behavior

Obviously, the influences of ESN and MEM on the respondents' EB was not asked about directly. The self-report effect of social norms on behavior is known to be biased (Pronin et al., 2007; Nolan et al., 2008), so such questions would be irrelevant. However, the ways that the MC and norms affected EB emerged while referring to specific environmental domains. Out of the 20 interviewees, 16 mentioned how their local authority influenced their EB. Nine out of these 16 interviewees mentioned that the MC affects the residents through education, enhancing residents' awareness of environmental subjects and the environmental events it initiates.

The local authority implements enrichment programs into schools, the local authority eventually gives this service to the citizen, that is, whether there are or aren't bins, the local authority organizes focused days, park activities, for sure. The local authority is the address for this field, and if the local authority places importance on the environment then it permeates down (H. 48 YO woman)

This may support and validate the quantitative finding that the only domain in which the MC's effect on EB was stronger than the norms was the promotion of environmental education in the community domain. In the rest of the domains, the effects of norms were medium-strong and stronger than the effect of the MC. Other domains that were mentioned, though less often, were recycling, public transportation and cleanliness of public spaces.

Several interviewees related to the effect of the MC on their EB in the recycling domain by attributing their EB to the availability of facilities:

Everything is here, there's clothes recycling, we have everything here. Sometimes my husband tells me, "Come on, let's throw it in the trash." But I tell him, "No, there's a recycling bin, isn't it a pity?" Like, if you have it, why not put it in the recycle bin or with the bottles? (M. 49 YO woman)

Or to the lack of facilities:

I would like to separate the household waste more, to have more types of recycling bins. Recycling containers (orange bin) is not in my neighborhood at all, so if I have containers then I just have to accumulate them and go around to other neighborhoods (D. 57 YO woman).

Finally, we asked what the most significant action is that a local authority can take to influence and promote PEB among its residents.

Five interviewees indicated the importance of improving infrastructure and recycling bin distribution, and bringing it to the public's attention:

Maybe make things accessible, I mean if the recycling bins and that or those for the paper would be more accessible and emptying more accessible, then you won't say, "OK, I'll take my bottles in the car and put them somewhere, so let's put them in the bin. Maybe just make it accessible, and make it known (L. 33 YO woman).

Three interviewees maintained that an MC should follow what is happening in the city and be in continuous contact with the residents and property management committees and share information about hazards, possible ways to work together, and so on:

Someone should come who will speak, someone who will really come to check, who will monitor the activity, like with the property management committee, let's say, in this case … they should come and show willingness and show their face (A. 46 YO man).

Three interviewees specified environmental education in schools and formal and informal education institutions as the most effective means of promoting PEB:

To make the environmental issue more accessible in terms of infrastructure and in terms of awareness, education in schools, first and foremost. The truth is that only in schools. Nothing else really matters (A. 30 YO man).

Two interviewees noted the importance of branding the city and creating a sense of pride:

What actually succeeded here, in my opinion, is the branding of the city and its activities. For example, the fact that the mayor went to all sorts of places in the media and made a noise about it, …raised the morale of everyone and it also raised the morale in a way that we are behind him, we will do what he says, leadership … But the sense of pride that this city produces along with the pride and branding, is what does it (A. 48 YO woman).

To sum up, the quantitative analyses show that norms, in general, are the strongest predictors of EB, compared to the residents' perceptions of local authorities' conduct, which was not found to be a significant predictor of overall EB. However, the qualitative findings point almost exclusively to the MC's conduct as the explanation for individual's engagement or non-engagement in EB.

In addition, when looking at the multiple regression models in each of the five domains, it is clear that social norms are significant and relatively strong predictors of EB, but in contrast to the overall model, here the effects of how residents perceive their MC depend on the specific domain. Apart from the energy saving sector, in which the MC's effect on EB was null, in all other domains the MC had some, mostly weak, significant effects. Moreover, age appears to be an important factor in predicting EB in all areas, except for promotion of environmental education in the community.

7. Discussion

The main goals of this study were to explore to what extent perceived MEM correlates with the city's ESN and the extent to which these two factors influence the individual residents' EB. Another goal was to assess whether the above-mentioned interrelations differ across various domains of environmental conduct.

7.1. The relationship between the perceived municipal council and city environmental norms

The findings of the present study show that MEM and city environmental norms are strongly correlated. Specifically, in cities that are perceived as environmentally conscious by their residents, prevailing pro-environmental norms are stronger. This was revealed both directly by the interviewed residents who explicitly noted that there is a congruence between the MEM and residents' ESN, and indirectly in the strong correlation between these two variables. The interviews enabled us to learn how this relationship is expressed. For example, in some cases, city residents demanded from the MC certain infrastructures needed for enabling and facilitating pro-environmental conducts, and this encouraged the local authority to provide them. Such a dynamic was described by Bullard and Johnson (2000) as "bottom-up leadership", to which they attributed huge impacts on public policy decision making, and this was explicitly described by our interviewees regarding various environmental domains. An opposite ("top-down") dynamic was also demonstrated by cases in which the MC supplied certain infrastructures and services which encouraged the use of these facilities by the residents. These mutual processes were reported also in negative contexts: Where interviewees perceived a lack of interest on behalf of the MC in creating favorable conditions for EB, the development of environmental norms was negatively impacted. Sisser et al. (2016) maintain that for understanding environmental conduct on a city scale, it is crucial to be aware of these municipal conduct-city norms interrelations. Our study analyzes these relationships and confirms that the two processes indeed

resonate with each other. Interestingly, similar two-way interrelations were reported also by other scholars, with a particular emphasis on *observable* behaviors (Flatt, 2008; Nyborg et al., 2016). Flatt gave an example from the city of London, where the local authority increased the residents' knowledge and awareness about environmental issues and conduct and thus created targeted environmental norms, which according to him, could not have been influenced at other governmental levels. Nyborg et al. (2016) referred to the MC and social norms as two institutions that can influence residents' behavior formally and informally, respectively. Through the example of bicycling norms, they showed how, when cycling became a norm, the local authority enhanced this behavior by the construction of bicycle lanes, so that the policy itself added reinforcing feedback to pre-existing norms. They maintain that if top-down policies are not compatible with local social norms, legal and institutional measures may "turn virtuous circles into vicious ones". If one adds to it observability, which means that social sanctioning and social learning induces residents to comply and cooperate with the norms, for better or worse, then it is easy to see how tipping points can be created. In another observable environmental domain, urban landscaping, Larson (2014) showed how formal rules (regulations and ordinances) and informal ones (i.e., norms) influence yard management, and how these institutions interact in particular neighborhoods.

In light of this, the strong correlations, for better or worse, between MEM and city norms found in our study may be attributed also to the fact, pointed out earlier, that we chose observable domains of environmental conduct from the outset. Resident's perception of the infrastructure and services the MC provides leads to conclusions about the EB of the rest of the city's residents. It seems that, at least when it comes to observable domains of environmental conduct, the MC and its residents are part of one system that is connected and operates together, whether intentionally or not.

7.2. The impact of social environmental norms on overall and domain-specific (reported) resident behavior

The EB of the individual city-resident is influenced at multiple scales; municipal policies, neighborhood norms and individual resident's decision-making (Sisser et al., 2016). Here, we discuss first the findings regarding the influence of neighborhood norms on individual behavior and, in the next section, the influence of perceived MEM on the resident's EB.

In general, ESN are known to have a substantial influence on the individual's EB across various domains (for a review, see Farrow et al., 2017). In this study, we referred to "other city dwellers" as the social reference group. We found that the influence of the norms is extensive in almost every one of the domains examined in the study.

As mentioned earlier, the relationship between the operation of the local authority and the norms of the residents exists mainly when it comes to areas that are easy to see. The importance of the visibility of the action also exists when it comes to the influence of norms on behavior. When examining the literature in the field of EB change due to social influence, it can be seen that visible PEB (visual ESN) has a bigger effect on behavioral change than non-visible behaviors (Babutsidze and Chai, 2018; Brick et al., 2017; Reno et al., 1993).

An interesting finding is worth highlighting: The effect of norms on behavior only came out as significant in the regression models (both the overall and the domain-specific), but in the interviews, which were supposed to identify the facilitators or barriers to the individual's EB, it was not mentioned even once. Instead, *the MC* was the main, and almost only, reason for the individual's pro- or anti-environmental behavior. This phenomenon of the influence of social norms on behavior was also reported and discussed in the context of energy saving by Nolan et al. (2008), who defined it as underdetection of the effects of social norms. They also found that, when asked about their motives to conserve energy, city residents believed that their neighbors' behaviors, i.e., norms, had the least impact on their own energy conservation, while statistical

analyses showed that ESN prevalent in the community actually had the strongest effect on participants' energy conservation behaviors. This is consistent with Pronin et al.'s (2007) idea that people's explanation for their own behavior is susceptible to an "introspection illusion", in which their tendency to comply with social pressures is under-recognized, or as they put it: "Recognizing personal conformity is a blind spot" (p. 588). Interpretation of our findings in light of the above ideas may suggest that, in fact, no matter what the MC is perceived to be doing, the residents' EB will eventually develop according to the ESN that exist in their city. This is, of course, a generalization because, as we showed earlier, EB is strongly correlated with city norms, and these relationships also vary to some extent across diverse environmental domains. We elaborate on this further below.

We also aimed at examining whether the effect of norms on behavior varies across the behavioral domain. The environmental domain in which the impact of ESN on behavior was strongest was the use of open spaces. This result is consistent with the knowledge that visible ESN have a greater impact on behavior than non-visible ones (Babutsidze and Chai, 2018; Brick et al., 2017; Reno et al., 1993). We have not found studies examining the relationship between norms and behavior in this specific domain in the professional literature, but other studies show that the motivation to spend time in public parks and open spaces goes far beyond pro-environmental action or interacting with nature. Spending time outdoors in open spaces has many physical, psychological and social benefits (for a review, see Chawla, 2015), many of which depend on the presence of other community members and their tendency to frequent these open spaces. This may explain the strong effect of ESN on the individual resident's behavior in this domain. Specifically, when residents perceive public spaces as lively and a preferred place of recreation, their desire and choice to spend time in these places increase.

When examining the impact of social environmental norms in the other domains, it was found that in the fields of reduction of energy consumption, waste management and recycling, environmental management by the local authority and its institutions, transparency and public participation, ESNs had a greater effect on behavior than perceived local authority conduct. Recycling and waste management, and environmental management by the local authority and its institutions, transparency and public participation are both visible behaviors. Some public recycling containers are transparent, so people notice if they are full or not. It is possible that this leads them to draw conclusions about other residents' behaviors and, as a result, motivates them to do the same (Babutsidze and Chai, 2018; Brick et al., 2017; Reno et al., 1993). In addition, Skoric et al. (2016) found, in their meta-analysis review, that social media has an influence on public participation such that it promotes citizen and political engagement. Dalton (2008) describes, in his paper, how public participation is a normative behavior, and is viewed as the norm in many democratic societies. These examples may provide an explanation as to why, in the field of environmental management by the local authority and its institutions, transparency and public participation, ESNs had a greater effect on PEB than the local authority.

In conclusion, the fact that the behavior of other city residents was not cited as a reason for the existence or absence of PEB on the part of the resident does not indicate that the influence of ESN does not exist. For the same reason, we offer that the fact that the local authority's conduct was not found to contribute to shaping the behavior of the resident (in the statistical analyses) does not indicate that it does not influence EB, as will be expanded upon in the next section.

7.3. The effect of the perceived municipal council's environmental conduct on the overall and domain-specific environmental behavior of its residents

The hypothesis regarding the effect of the perceived MEM on the reported behavior was not confirmed. In other words, residents' reported behavior was not predicted by MEM. Given the lack of the MC's

statistical effect on reported behavior found in the first (quantitative) phase, we did not expect interviewees to link their pro- or anti-environmental behavior to their local authority's conduct. However, most of the verbal explanations for their behavior related to the MC. In other words, the explicit explanations attributed pro- or anti-environmental behavior mainly to external factors (the MC), but, indirect evidence (the results of the regression) clearly shows that EB depends solely and strongly on ESN. This finding is similar to the cases from other studies quoted above, which found that, even though ESN were one of the main reasons for behavior, people tended to attribute their behavior to other reasons (Keizer et al., 2008; Nolan et al., 2008; Abrahamse and Steg, 2013).

Looking into specific environmental domains, we found weak or no effect of the MC on behavior. For example, in the energy saving domain, perceived MEM had null effect on residents' reported behavior. Changing to energy-efficient light bulbs, reducing the use of air-conditioners and cost-effective energy management are important for reducing the polluting emissions caused by the local authority's electricity consumption but, nonetheless, these are actions that the residents cannot easily see, or do not necessarily pay attention to, during their day-to-day life. It is possible that for the conduct of the local authority to have an impact, it must make its activities transparent and accessible to its residents and encourage them to behave similarly. Not only is the electricity consumption of the local authority not made public to the city's residents, to the best of our knowledge and after searching a large number of sources, we concluded that no official report on it exists that is accessible to the public. In order for a local authority to create municipal environmental norms and bring about a change in behavior among residents, alongside provision of infrastructure, it must provide information about the issue at hand, as well as explanations of how the resident can behave differently (Moloney et al., 2010). The lack of transparency concerning energy consumption by local authorities in the country is a possible explanation for the fact that the perceived MEM did not affect EB in the energy saving domain.

In the other four environmental domains examined in this study, we found that the way in which the residents perceived the MC's environmental conduct had statistically significant yet weak effects on their reported behavior. One domain, promotion of EE in the community, stood out from the others in two aspects: First of all, it had the strongest (although still moderate in intensity) impact on behavior; and second, it was the only domain in which perceived MEM had a stronger effect on EB compared to ESN. Here, both explicit *and* implicit evidence showed the importance of MEM. The examples given by the interviewees were of councils that do not organize enough activities, or the content of the activities were not sufficiently attractive, which reduced residents' motivation to participate, *even if they thought other residents would go*. The organization and quality of public educational activities may be considered as infrastructure for all intents and purposes, in the absence of which even high civic motivation is insufficient. The type of activities, their content and the way in which they are transmitted are of much importance, to the extent that the local authority's provision of education to the city's residents may be considered as a "soft", though necessary, type of infrastructure (Lombardi et al., 2012).

In the domain of use of open spaces, we found that perceived MEM had also a statistically significant low-medium influence on reported behavior; i.e., visiting and spending time in open green areas. The use of open green spaces for recreation is often related to the condition of the areas, in terms of cleanliness, maintenance and accessibility (Gobster and Westphal, 2004); therefore, this finding is consistent with the research literature and adds to the importance of the MC's performance in this domain, since it is responsible for the preservation and maintenance of these areas in its territory.

The perceived municipal environmental conduct was found to have some influence on behavior in the domain of waste management and recycling, as well. Similar to existing literature, we found that raising awareness and advocacy about recycling, as well as accessible and convenient distribution of recycling bins by the MC may facilitate behavioral performance and the choice to recycle (Nyamwange, 1996; McCarty and Shrum, 1994; Omran et al., 2009). It seems that in order for a local authority to encourage its residents to recycle, it must provide a wide distribution of suitable infrastructure and conduct information and education systems for the residents regarding the importance of recycling and separating waste into the appropriate bins. Yet, one should remember that providing infrastructure may encourage recycling only by facilitating activation of pre-existing recycling norms (Thomas and Sharp, 2013). The interviewees gave us another view of the results: Even though they were not asked specifically about how the MC affected their own behavior, six interviewees mentioned that if there were more accessible recycling bins, they would recycle; two mentioned that they had recycled until the bins had been taken away; and four mentioned that from the time the MC provided recycling bins, they recycle.

Themes that rose from the interviews helped give us a deeper understanding of the resident-MC relationship. For example, interviewees mentioned that the MC had a negative effect by its lack of activity. Other themes that came up during the interviews were the effect of the MC on the residents by raising awareness, environmental education and activities, and providing, or not providing, facilities. From this we can learn that MCs that do *not* encourage PEB by providing suitable facilities and raising public awareness through EE may have a negative impact (Zhang et al., 2019; Thomas and Sharp 2013). In other words, if the MC does not take it upon itself to raise environmental awareness by making activities and education accessible to their residents, and does not provide appropriate facilities, the probability that the citizens will behave in a pro-environmental manner diminishes.

The current (general) model predicts 27% of reported EB (Fig. 2). There are other factors that have not been examined in the study that may have an impact on EB. As mentioned above, EB is influenced by a number of internal and external factors (Clayton and Myers, 2015), and an examination of these factors may offer a deeper understanding of the impact on reported behavior and its predictive power.

7.4. Conclusions and recommendations

The finding that, in general, the MC's effects on EB were nonsignificant, or moderate at best, does not suggest that there is nothing the MC can do to encourage residents' PEB. The finding that the MC was strongly correlated with city norms, which exert a strong effect on EB, suggests that there is room for the MC to use this influence by *making normative messages more salient*. The literature offers several ways in which norm salience can be manipulated (Keizer et al., 2008; de Groot et al., 2013). Following are several recommendations on how to adapt these ways to the context of MC-city norms-residents' EB so that they can be used by the MC to encourage PEB in the individual.

Since norm activation depends on the existence of pre-existing personal norms (DeGroot et al., 2013), the first way that the MC can empower ESN is by being attentive to and cooperating with "pre-existing" grassroots activists and their bottom-up initiatives. Including such initiatives in MCs' agendas was found to be successful in various contexts (Bullard and Johnson, 2000; Gough and Accordino, 2013; Ali et al., 2019; Ahmed et al., 2020). Secondly, the MC can strengthen the influence of pre-existing desirable norms by increasing the salience of the municipal ordinances. This action may facilitate community members who have pre-existing personal pro-environmental norms to convey these norms to neighbors with weaker personal norms (Sisser et al., 2016). While the former recommendation related to the salience of injunctive norms, the latter refers to descriptive norms. Huber et al. (2017) highlighted the powerful role of societal descriptive norms, indicating the importance of making it clear to citizens what their fellow citizens are doing. In the context of municipal conduct, a third recommendation is creating and consistently maintaining pro-environmental descriptive norms, either by publicizing achievements of the whole community or certain neighborhoods. Lastly, the MC can normalize

residents' city PEBs by creating, enhancing and maintaining a green city identity. Thomas and Sharp (2013) reviewed the role of ESN in the normalization of recycling behavior and concluded that, for recycling to become a normal behavior, local authorities need to not only provide services and knowledge, but also promote the identity of "a recycler". Bearing this in mind, we suggest that embedding PEB in a city's identity can be an effective action to promote desirable behaviors on the individual resident's scale.

To sum up, as cities continue to grow, the need for information on how to promote pro-environmental conduct at municipal and individual levels becomes more important. The present study delved into the interactions between the local authority, the community and the individual resident in the context of environmental conduct, from the resident's perspective. We provided an empirical basis for several actions and initiatives that a local authority can adopt to promote PEB among its residents and thus reduce the ecological footprint of the city as a whole. We showed the external factors that are "in the hands" of the MC. Clayton and Myers (2015) argue that EB depends on internal as well as external factors, and that the internal factors are more difficult to change. The findings of our research emphasize the importance of the role of the local authority in changing EB at the individual resident level.

7.5. Restrictions and limitations

The present study was conducted in a way that combines qualitative and quantitative research in an attempt to reach a broad and in-depth level of understanding about the contexts and effects of perceived MEM, ESN and reported behavior. Despite the many advantages of a mixed-method study (Greene and Caracelli, 1997; Creswell et al., 2003), there may still be some limitations.

The study was conducted on a large representative sample of residents from the urban sector only, with most of the subjects in the quantitative study and all the subjects in the qualitative study being Jews. Even though they are the majority in Israel, it is possible that their behavior and influences from social and environmental norms, as well as from the MC, vary between different countries, cultures and sectors (Morren and Grinstein, 2016). A second limitation concerns the issue of the respondents' reported behavior. Self-reported behavior often does not accurately reflect the subject's true behavior: Variables such as the researcher's desire and perhaps even misconception may create bias in the answers. This phenomenon is mentioned in certain cases where there is a mismatch between reported and actual behavior (Arnold et al., 2018). Third, although the indices used in the general model had sufficient internal reliabilities, in the division of the general model into the five domain-specific models, the internal reliability of certain main variables in two specific domains was insufficient. A final limitation concerns the definition of "local authority" as it appeared in the questionnaires. Municipal elections had been held in Israel in the year preceding the study, with mayors being replaced in some of the cities. It is possible that this factor influenced the way the residents perceived the local authority and its conduct, depending on whether they were satisfied with the election results or not, and that the preoccupation with certain issues during the election aroused the subjects' opinions on issues they do not normally deal with.

Credit author statement

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Declaration of competing interest

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

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