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Taking Environmental Action: The Role of Local Composition, Context, and Collective

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ABSTRACT / This article explores individual and community action taken in response to perceived environmental risks by investigating the determinants of environmental action across a range of action types. A conceptual framework is first presented, which provides a foundation for investigating the role of local compositional (i.e., individual characteristics), contextual (i.e., neighborhood environment), and collective (i.e., social networks) factors in environmental action. To test the utility of the conceptual framework, a quantitative survey was administered to a random sample of households (n = 512) in Hamilton, Canada. The results suggest that the predictors of environmental action vary by action type (i.e., personal change, individual civic action, and cooperative civic action), and that factors related to perceived environmental exposure and social capital generally play a stronger, more consistent role in civic environmental action than sociodemographic or neighborhood factors. The results underscore the role of social connection in responses to perceived environmental risks.

Civic action around local environmental issues is increasingly important to community development and sustainability given the retrenchment of environmental protection and the devolution of (environmental) service provision to the local level in many jurisdictions (Feitelson and Lindsey 2001; Furuseth and Cocklin 1995). In lieu of government regulation and control, local activism has become a driving force in environmental protection, as residents band together to gain a greater say in decisions affecting their neighborhoods (Northridge and Shepard 1995). Local governments are grappling with how to involve citizens in various aspects of environmental governance and planning to increase responsiveness, reduce costs, and avoid conflict (Godschalk and others 2003, Grodzinska-Jurczak and others 2003; Vigoda 2002). In this context, a fuller understanding of how and why people take environmental action becomes vital for stimulating progressive change.

KEY WORDS: Environmental action; Social capital; Risk perception; Local context; Air pollution

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Environmental action is defined in this study as behavior intentionally undertaken to benefit the environment (following Stern 2000). Within the social sciences, environmental action has been both seen and studied in different ways. Social theorists have focused on environmental action in the context of new social movements (Mayer and Roth 1995; Offe 1985) linking macrolevel social forces to changing patterns of environmentalism. In particular, recent work has emphasized the importance of social capital (i.e., the networks and norms that facilitate social engagement) to the development of collective action (Putnam 2000). This research has tended to neglect the relevance of local ecological conditions and local social contexts to civic participation. It also has generally failed to address questions concerning the determinants of environmental action at the individual level (that is, who takes environmental action and why) (Greenberg and Schneider 1997). This is especially important given the suggestion in much of the literature that although awareness and concern around perceived environmental risks are typically high, levels of action taken are relatively low (Elliott and others 1993, 1999).

The fields of environmental psychology and environmental education have been more active in their investigation of individual motivations for and deterrents to environmental action (Gardner and Stern 1996; Kollmuss and Agyeman 2002; Seguin and others 1998; Stern 2000). A substantial portion of the work in this area uses a rational actor and/or psychoanalytic approach, cataloging factors that facilitate or hinder the choice to get involved (Rydin and Pennington 2000) and developing broadly applicable models of activism. However, this research has tended to focus on individuals almost exclusively (Zelezny and Schultz 2000), despite the potential relevance of factors such as local ecological context (e.g., existing environmental conditions) and interpersonal connection (e.g., neighborhood social networks) to environmental action.

Geographers and others have explored *local* environmental action within the frames of environmental justice (Agyeman 2002; Agyeman and Evans 2004; McGurty 2000) and political ecology (Mackenzie and Dalby 2003). The investigation of environmental action in these literatures emphasizes the connection between social marginalization and environmental disenfranchisement at the local level, and the importance of *collective* civic action as a mechanism for social and environmental change. It also has tended to focus on the (primarily qualitative) exploration of specific local contexts, neglecting the larger social and ecological issues that have an impact on local conditions (Walker 2003), and failing to highlight the potential similarities between involvement across localities.

This article begins to draw together these disparate bodies of literature for a broader conceptualization of the factors influencing environmental action. In particular, it focuses on the ecological and social characteristics of places as potential determinants of civic action. This is consistent with the work of Macintyre and others (2002), who emphasized the impacts of composition (i.e., aggregated individual characteristics), context (i.e., characteristics of the local environment), and collective (i.e., characteristics of the local social networks to which individuals belong) on local experiences. It contrasts with more traditional approaches to environmental behavior, which generally focus on individuals as autonomous decision makers (Corraliza and Berenguer 2000), and thus neglect the multiple ways in which individual decision making is influenced by and embedded in local context (see also Blake 2001). In addition, all work in this area has tended to conflate different types of environmental action (e.g., recycling vs attending protests), or has used one type of action (e.g., consumer behavior) as a surrogate for environmental action more generally (Blake 2001).

The article has two key objectives: first, to lay out a conceptual framework that incorporates the wide variety of potential determinants of environmental action, including local context, composition, and collective; and second, to use this framework to investigate the determinants of several different types of environmental action in an empirical case study in Hamilton, Ontario, Canada.

The article starts by outlining the conceptual framework that guided the research. Next, the case study is described, starting with the research design and followed by the results of the analysis. The article concludes with a discussion of the possible implications this work has for future studies of environmental action.

Influences on Environmental Action: A Conceptual Framework

The following conceptual framework brings together the social science literatures discussed earlier, also drawing on the literature around environmental risk perception (Slovic 2000) as well as individual and community response to environmental exposure (Luginaah and others 2000), to present a comprehensive picture of the factors that potentially influence environmental action. In this framework a number of preexisting, mutually interdependent characteristics (i.e., of the individual and his or her environment, social network, and wider community) set the stage for environmental action (Figure 1). This wide range of factors and their interactions can affect both predisposition (i.e., motivation reflected by values, beliefs, and attitudes) and capacity (i.e., skills and resources that empower individuals and communities) to take action (Green and Kreuter 1991). Predisposition and capacity mediate the relationship between characteristics of the person/environment/community and the likelihood and type of environmental action taken, in ways elaborated in the following discussion. It should be noted that we are by no means implying through this model that human action is somehow predetermined by a set of causal factors. Rather, this framework and subsequent attempts to use it are seen as a lens through which environmental action can be explored and interpreted, while still allowing for individual agency and intentionality (see Ferrero 2002 for a further discussion of current themes in action philosophy).

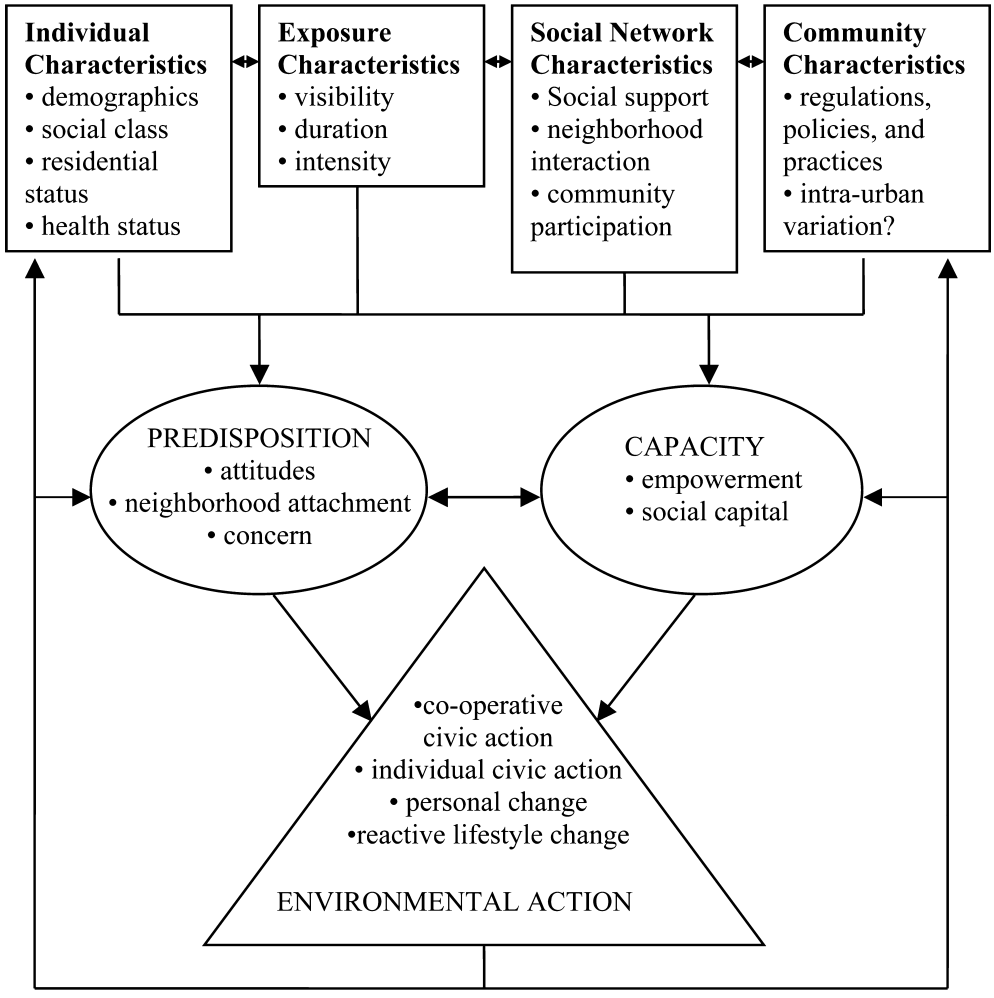

Figure 1. Conceptual framework.

Characteristics Influencing Predisposition to and Capacity for Environmental Action

A wide range of potential factors influencing environmental action have been identified. Certain characteristics of the *individual* have been identified in past studies as important to environmental action (Jones and Dunlap 1992; Walsh and others 1993). For example, young, well-educated, high-income, healthy people are thought more likely to take environmental action than older, poorer, and sicker individuals. However, these relationships are not necessarily consistent across studies. In addition, social class and residential status (i.e., owning vs renting; Rohe and Basolo 1997) can affect residents' perceptions of their community and their place in it (Wilkinson 1997), and thus may influence both predisposition and capacity to take action around environmental issues.

Characteristics of local *environments* also are thought to influence environmental action (Figure 1). Physical environments, although experienced at the individual level, exist at the ecological level. By explicitly incorporating perceptions of local environments, this investigation attempts to root individuals within broader (environmental) contexts. Characteristics of environmental contexts identified in other research as important predictors of concern, which may in turn influence action, include the visibility, duration, and intensity of environmental pollution (Gould 1993; Zeiss 1998).

Past research has shown the importance of a supportive *social network* (Figure 1) in enhancing the ability of individuals to cope with environmental stressors (Lazarus 1993). Other work has suggested that the development of social network ties as well as more formal organizational participation within a community may be central to the development of local capacity for action (Putnam 1993, 2000). These collective elements of community life may play an

important role in mediating context and composition (Macintyre and others 2002).

The conceptual framework also incorporates characteristics of the wider *community* system and structure, including government regulations (e.g., the presence and local enforcement of environmental protection legislation), policies (e.g., the presence of environmental programs such as recycling), and practices (e.g., the extent to which public participation in local decision making is encouraged) (Macintyre and others 2002; Stern 2000). These factors are unlikely to vary significantly *within* a particular city or municipality, although variations among cities might be observed. However, some local variation in the application of broader structures may exist at the local level.

Mediators: Predisposition and Capacity

The relationships between these broad classes of variables and environmental action are mediated by predisposition and capacity (Figure 1). *Predisposition* has been conceptualized in other work as a series of attitudinal factors influencing environmental action, for example, worldviews (Dunlap and others 2000; Nevitte and Kanji 1995), values and beliefs (Uyeki 1999), altruistic tendencies (Kaplan 2000), and orientation toward activism (Finger 1994). These attitudes and perceptions are grounded in individual circumstances, social networks, and wider community structures and identities. They therefore may be empirically related to the characteristics of the individual and context, as described earlier.

Concern about the environment and local environmental problems also may predispose individuals to environmental action, although concern about environmental problems is a poor predictor of environmental action on its own (Finger 1994; Seguin and others 1998). An individual's level of attachment to place could serve to predispose the person to environmental action (Vorkinn and Riese 2001). This attachment can be influenced by features of the natural, built, and social environments (e.g., housing type, access to services, and exposure to environmental contamination), and by local social involvement and integration (Hummon 1992). In this framework, predisposition is seen as a necessary but insufficient determinant of environmental action. That is, although predisposition is important, individuals also must have the capacity to undertake environmental action.

Components of *capacity* with potential relevance to environmental action include empowerment and social capital. Individual empowerment (a sense of control over one's life and circumstances; Rissel 1994) is an important component of capacity. A sense of empowerment may result from high relative social status or a high level of education, and from the possession of relevant skills (e.g., skills related to canvassing, organizing meetings, or writing letters; Ife 1995). Many theorists assert that empowerment is a first step in the development of group solidarity and willingness to act around an issue (Rissel 1994; see also Kollmuss and Agyeman 2002). Social capital (Figure 1) refers to the networks, norms, and trust that facilitate community coordination and cooperation (Putnam 1993). In particular, this framework focuses on the cognitive aspects of social capital in the form of prosocial norms (e.g., a sense of civic responsibility) and social trust. Involvement in the community is thought to produce shared norms of behavior between community members and a generalized trust in individuals and institutions. These may in turn facilitate civic action around societal issues (Putnam 2000).

Environmental Action

Environmental action is categorized in this framework using a taxonomy developed from existing literature and informed by an earlier qualitative study (Wakefield and others 2001). A number of categorizations of environmental action types have been suggested (Dietz and others 1998; Stern and others 1999; Uyeki 1999). In addition, there are longstanding taxonomies of political action in the political science literature (e.g., Arnstein 1969; Langton 1978). Considerable overlap exists between these classifications and the one presented in this discussion. The latter provides additional richness, however, by drawing on elements of both literatures and by providing a framework incorporating the potentially intrusive nature of environmental pollution. Environmental pollution may encroach on daily life to such an extent that some response to the exposure (although not necessarily a proactive one) is necessary. This framework attempts to capture this element of action.

In this taxonomy, four types/categories of active responses to environmental concern were identified (Figure 1), which differ not only in nature, but also in the extent to which they can facilitate environmental change, community development, or both. First, *reactive lifestyle change* is typified by individual responses to air pollution that do not support social change, but are instead behavior modifications made necessary by the intrusion of pollution into daily lives (e.g., increased cleaning, limitation of outdoor activities; Elliott and others 1999). This type of action, particularly relevant for situations in which environmental conditions have a direct impact on residents, may mitigate individual

impacts of exposure, yet do nothing to reduce the exposure itself. Previous research (Elliott and others 1999; Wakefield and others 2001) suggests that these actions are extremely common.

Second, *personal change* consists of activities that individuals undertake in an attempt to personally improve environmental quality (e.g., recycling and consumer behavior). These actions may facilitate psychological empowerment, and may have direct, if small, environmental results (Stern 2000), yet do little to develop community capital or control (Rochon 1998).

Third, *individual civic action* refers to individual activities that attempt to change societal processes (e.g., by complaining to government or industry about environmental problems or by donating to an environmental group). These activities could lead to environmental change. They also can promote individual empowerment, both psychological and skills related. They do not, however, lead to new linkages within the community.

Finally, *cooperative civic action* (e.g., attendance at public meetings and protests) promotes individual empowerment and facilitates community empowerment by creating links between community members (Rissel 1994). This form of action is focused on increasing the decision-making power and influence of local community organizations, and therefore has a fundamentally communal character.

It should be noted that all types of action can be influenced by characteristics of the individual, the environment, the social network, and the wider community, mediated by predisposition and capacity to take that particular action. For example, recycling behavior is strongly influenced by the existence of recycling programs, negative incentive programs such as per bag payment for garbage disposal, and individual motivation. The purpose of the action taxonomy is not to preclude particular determinants of action, but rather to identify the extent to which an individual acts alone or in concert with others, and whether the action is directed at operating within existing structures (e.g., recycling materials as per existing guidelines) or at changing those structures (e.g., lobbying for additional materials to be included in the recycling program).

Overall Benefit/Utility of Conceptual Framework

The framework adds to existing work by drawing together a wide range of factors that may influence environmental action, organizing them in a way that reduces the complexity of such a model to a manageable level. This allows the simultaneous consideration of factors found in a number of different fields as relevant to environmental action. In addition, investigating a wide range of potential determinants provides a more comprehensive picture of the factors influencing environmental action than usually is provided, responding to calls for ''synthetic theories or models'' (Stern 2000, p. 418).

Case Study: Applying the Framework in Hamilton, Canada

The remainder of this article is devoted to assessing the use and usefulness of certain key components of the conceptual framework outlined earlier. Survey data collected in the midsized industrial city of Hamilton, Ontario, Canada were used to test the utility of the conceptual framework in relation to one particular empirical example.

The next section describes the methods used for data collection and analysis. The empirical results then are presented, followed by a discussion on the implications of the findings for the utility of the conceptual framework and for environmental action research more generally.

Study Design

The City of Hamilton, Ontario, Canada (Figure 2) was selected as the study site. Hamilton, a city of approximately 600,000 located at the western end of Lake Ontario is home to a variety of industries, including steel manufacturing. Not surprisingly given its industrial character, Hamilton has long-standing air quality problems, which have been the focus of numerous investigations and considerable community concern and action (Hamilton Air Quality Initiative 1997a; Jerrett and others 2001). With respect to environmental service provision, Hamilton offers weekly collection of recyclables.

A survey was developed to collect data related to the conceptual framework. Data were not collected to correspond with every factor listed in the conceptual framework because of survey time constraints. In particular, data were not collected on attitudes toward the environment, community level characteristics, or the reactive lifestyle change component of environmental action. Rather, data collection was focused on those issues of most interest to the researchers, specifically characteristics of the social network and ecological context. The survey used a combination of open- and closed-ended questions. Where possible, survey items were drawn from existing sources. Data were collected on respondents' sociodemographic characteristics,

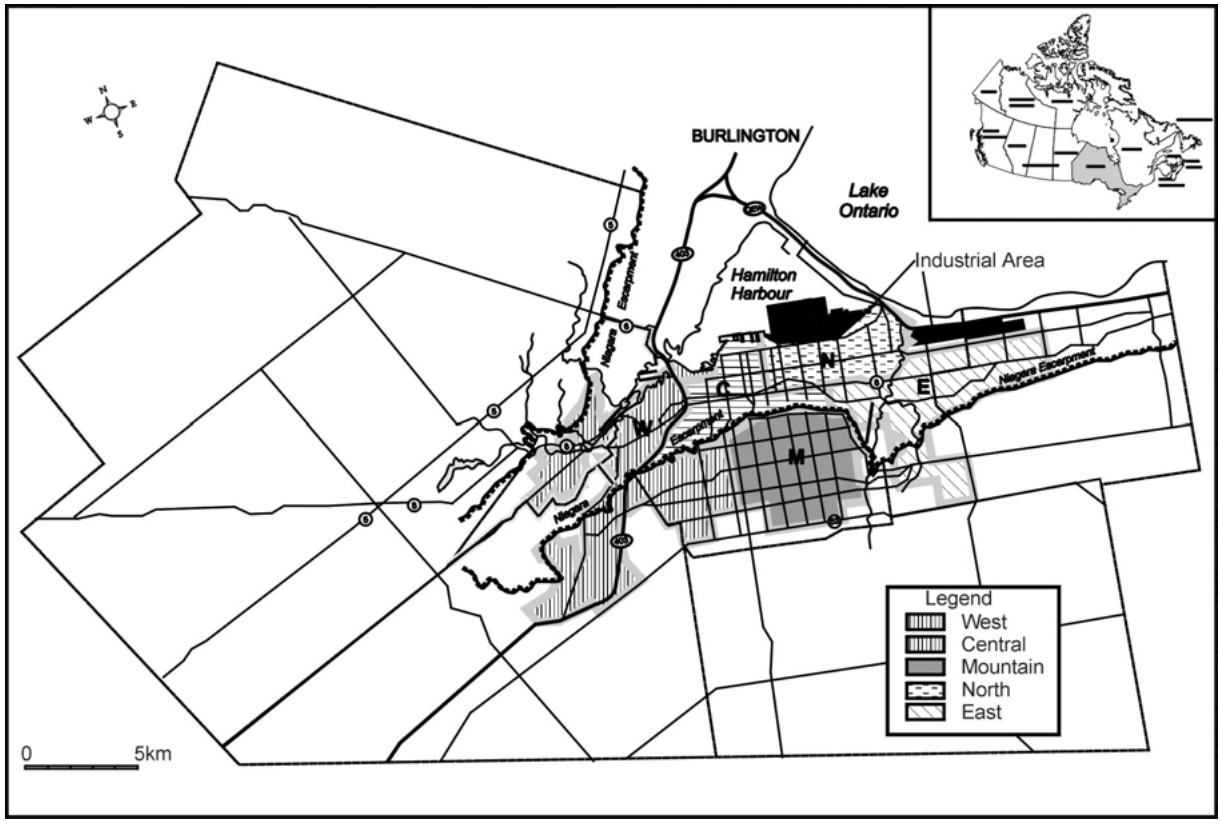

Figure 2. Location of the study areas within Hamilton, Ontario, Canada.

health and health behaviors, perceptions of neighborhood quality, perceived air pollution exposure, environmental concerns, air pollution–related health concern, and environmental action-taking (Table 1). Items pertaining to neighborhood interaction and support, community participation, civic responsibility, social trust, and perceived self-efficacy also were included in the survey.

The survey was administered to a random sample of households (n = 512) within the urban area of Hamilton, defined in this discussion as all contiguous zoning neighborhoods with populations of 1,000 or more. Areas were chosen to approximate existing divisions within the city of Hamilton on the basis of sociodemographic characteristics, physical barriers (such as the Niagara Escarpment, which runs through the center of Hamilton), and exposure to air pollution (as measured by estimated exposure to suspended particulate). Five areas were identified: Central, East, Mountain, North, and West (Figure 2). The sample was stratified by area of residence, taking into account intraregional variation in social and environmental context. Central Hamilton has a relatively high proportion of residents not born in Canada and low rates of home ownership, whereas East Hamilton has a relatively large proportion of warehouse laborers and service workers (Regional Municipality of Hamilton-Wentworth 1995). The Mountain area (so named because it is located above the Niagara Escarpment, ''the Mountain'' in local jargon) is newly developing, with many residents employed in supervisory, technical, and sales positions (Regional Municipality of Hamilton-Wentworth 1995). North Hamilton is characterized by affordable housing, low average income and education, and higher than average levels of certain air pollutants (Hamilton Air Quality Initiative 1997b; Regional Municipality of Hamilton-Wentworth 1995). Finally, West Hamilton has higher-priced housing and a larger proportion of higher income professionals (Regional Municipality of Hamilton-Wentworth 1995).

Approximately 100 households were selected from each area using a City of Hamilton household database as a sampling frame. Telephone interviews, averaging 18 min, were conducted by the Institute of Social Research at York University between November, 1999 and February, 2000 using double random sampling to ensure representativeness by age and gender. The overall response rate was 70%. Rates varied slightly by area.

Table 1. Survey domains, constructs, and items

Domain	Construct	Item[a]
Individual characteristics	Demographic characteristics	Age (younger than 40, 40–59, 60+)
		Gender (male vs female)
		Ethnicity (born in Canada vs other)
		Language spoken in the home (English vs other)
		Marital status (married/partner vs other)
		Child (<18 years) in household (yes vs no)
	Social class	Household income (less than $30,000/year vs more)
		Education (less than high school vs more)
		Employment status (working for pay vs not working for pay)
	Residential status	Housing type (single family dwelling vs other)
		Housing tenure (own or rent)
		Household composition (single-person household vs other)
	Health status	Self-reported health status (good/very good/excellent vs other)
		Hayfever/allergies in household (yes vs no)
		Smoke tobacco daily (yes vs no)
		Two + people smoke inside the house (yes vs no)
		Vulnerable person in household (yes vs no)
Exposure/issue characteristics	Visibility	Neighborhood environmental dislike mentioned (yes vs no)
		Noticed air pollution in neighborhood in the past summer? (yes vs no)
	Duration	Noticed air pollution daily? (yes vs no)
		Air pollution better/worse/stayed same in past 5 years? (worse vs other)
	Intensity	Air pollution bother you? (more than half vs less than half the time)
		Air pollution affect daily life? (yes vs no)
Social network characteristics	Social support	Have someone to confide in (yes vs no)
		Have someone to help you if you need it (yes vs no)
	Neighborhood interaction	Neighbors friendly? (friendly vs not friendly)
		Help neighbors/ask for help? (once or twice a month, once/twice year, never)
	Community participation	Number of local groups belong to?
		Member of an environmental group? (yes vs no)
		Attended school board/city council meeting in the past 2 years? (yes vs no)
Community context	Intraurban variation	Area of residence
Predisposition	Neighborhood attachment	Mentioned neighborhood like (yes vs no)
		Mentioned neighborhood dislike (yes vs no)
	Environmental concerns	Mentioned 1 + environmental concerns (yes vs no)
		Unsolicited air pollution concern (yes vs no)
	Health concern	Likely that households health affected by air pollution? (yes vs no)
Capacity	Self-efficacy	Truncated Rosenberg self-esteem scale (Ranzjin et al., 1998)
	Social trust	Trust government to do right? (always/most of the time, sometimes, never)
		Most people can be trusted? (yes vs can't be too careful)
	Civic responsibility	Civic responsibility index (1990 World Values Survey)
Environmental action	Personal change	Regularly sort materials for recycling? (yes vs no)
		Refused to buy a product for environmental reasons? (yes vs no)
	Individual civic action	Contacted government/industry/media about environmental issue? (yes vs no)
		Donated money to a local environmental group? (yes vs no)
	Cooperative civic action	Attended public meeting about a local environmental issue? (yes vs no)
		Attended public protest about a local environmental issue? (yes vs no)
	Summary measure	Have taken two or more environmental actions (2+ actions vs less)

Notes: Individual characteristic measures drawn from the 1996 Canadian census, except questions on health status and smoking behavior, which were taken from the Ontario Health Survey (1990) and the National Population Health Survey (1996; all available from Statistics Canada). The ''presence of vulnerables in household'' variable indicates a household in which a person older than 65, younger than 5, or with a respiratory ailment resides. Exposure and concern questions were drawn from Elliott and others (1993). Trust and civic responsibility were measured using questions from the 1990 World Values Survey (Nevitte 1996). Perceived empowerment/self-efficacy was measured by a truncated version of the Rosenberg self-esteem scale (Ranzjin and others 1998). Environmental action questions are from the Hamilton Harbour Watershed ECOWISE Survey (1995).

[a]underlined value is reference category in logistic regression.

Table 2. Sample characteristics by area

Variable	No. reporting (% reporting) in each area of residence					
	Central (n = 94)	East (n = 101)	Mountain (n = 112)	North (n = 83)	West (n = 122)	Tolal (n = 512)
Individual characteristics[a]						
Age = 60+ years	35 (37)	35 (35)	38 (34)	29 (36)	37 (31)	174 (34)
Female gender	49 (52)	61 (60)	60 (54)	35 (42)	61 (50)	266 (52)
Marital status = 1 married*	41 (44)	63 (62)	63 (57)	41 (50)	82 (67)	290 (57)
Child (<18 years) in household*	16 (17)	29 (29)	30 (27)	31 (37)	43 (35)	149 (29)
Language spoken at home is English	82 (87)	91 (90)	104 (93)	77 (93)	109 (89)	463 (90)
Household income < $30 000/year***	38 (52)	23 (29)	27 (32)	29 (43)	17 (15)	132 (34)
Less than a high school education*	30 (32)	26 (26)	36 (32)	31 (38)	22 (18)	145 (29)
Employment status = working for pay	49 (52)	55 (55)	66 (59)	44 (53)	78 (64)	292 (57)
Housing type = single family dwelling***	31 (33)	56 (55)	73 (65)	63 (77)	85 (71)	306 (61)
Housing tenure = own home***	44 (47)	75 (74)	80 (71)	64 (77)	96 (80)	359 (71)
Single-person household**	44 (47)	19 (19)	29 (26)	21 (25)	19 (16)	133 (26)
Hay fever/other allergies in household*	28 (30)	43 (43)	55 (50)	32 (39)	61 (50)	219 (43)
Self-reported health status = fair or poor	26 (28)	23 (23)	18 (16)	20 (24)	17 (14)	104 (20)
Vulnerable person in household*	66 (70)	87 (86)	98 (88)	68 (82)	102 (84)	421 (82)
Smokes tobacco daily*	18 (19)	19 (19)	20 (18)	34 (41)	24 (20)	115 (23)
Two + people smoke inside the house***	9 (10)	9 (9)	7 (6)	21 (25)	9 (7)	55 (11)
Exposure characteristics						
Mentioned an environmental dislike***	6 (6)	5 (5)	0	18 (22)	3 (3)	32 (6)
Noticed air pollution in past summer***	69 (73)	57 (56)	59 (53)	61 (74)	55 (45)	301 (59)
Noticed air pollution daily* (n = 301[b])	12 (19)	11 (21)	4 (7)	14 (25)	4 (8)	45 (16)
Air pollution worse in past 5 years** (n = 276[b])	15 (24)	20 (38)	20 (38)	8 (14)	24 (48)	87 (32)
Air pollution bother > half the time* (n = 275[b])	31 (70)	34 (68)	41 (77)	26 (46)	32 (67)	174 (65)
Air pollution affected daily life	25 (26)	18 (18)	26 (23)	20 (24)	30 (25)	119 (23)
Social network characteristics						
Have someone to help you if you need it**	86 (92)	100 (99)	111 (99)	76 (92)	119 (99)	492 (96)
Neighbors friendly	80 (85)	90 (89)	104 (93)	77 (93)	112 (92)	463 (90)
Talk to neighbors once a week or more	66 (70)	82 (81)	81 (72)	64 (77)	90 (74)	383 (75)
Never help neighbors or ask for help*	31 (33)	14 (14)	29 (30)	17 (20)	16 (13)	107 (21)
Belong to one or more local groups	39 (42)	41 (41)	40 (36)	30 (36)	56 (46)	206 (40)
Belong to an environmental group	11 (12)	9 (9)	9 (8)	5 (6)	9 (7)	43 (8)
Attended school board/city council meetings*	32 (34)	34 (34)	28 (25)	25 (30)	54 (44)	173 (34)
Predisposition						
Mentioned neighborhood like*	86 (92)	98 (97)	106 (95)	72 (86)	119 (97)	481 (93)
Mentioned neighborhood dislike**	64 (68)	55 (55)	55 (49)	57 (68)	64 (53)	295 (58)
Had 1 or more environmental concerns	76 (81)	84 (83)	93 (83)	63 (76)	96 (79)	412 (81)
Unsolicited air pollution concern	36 (38)	34 (34)	44 (39)	34 (41)	43 (35)	191 (37)
Likely household's health affected by air pollution*	60 (68)	76 (82)	72 (69)	58 (77)	73 (64)	339 (71)
Capacity						
High self-esteem score	81 (86)	92 (91)	105 (94)	74 (89)	112 (92)	464 (91)
High civic responsibility score	53 (58)	67 (68)	74 (67)	48 (59)	84 (70)	326 (65)
Trust government all/most of the time	70 (75)	69 (68)	79 (71)	53 (64)	89 (72)	360 (71)

[a]Individual characteristics varying significantly by area and/or significantly related to environmental action only.

[b]Subset of respondents (only those who answered ''yes'' to having noticed air pollution in neighborhood).

*$P < 0.05$.

**$P < 0.01$.

***$P < 0.001$ (indicates significant variation by area).

Overall, the sample is generally representative of both the study area(s) and Hamilton as a whole. However, the sample has slightly higher proportions of individuals who have completed high school and own their own homes, and slightly lower percentages of people who have low incomes than the population as a whole (data not shown). In addition, females are over- or underrepresented in some areas. These differences should be acknowledged when the generalizability of the results is considered.

Table 3. Odds ratios of significant predictors of environmental action, all types, in logistic regression

	Odd ratios (95% confidence intervals)						
Predictors	Recycle	Refuse product	Donate $	Contact	Public meeting	Protest	Two + actions
Age (years)							
Less than 40	—	2.76** (1.4–5.5)	—	—	—	—	2.31** (1.2–4.3)
40–59	—	2.89** (1.6–5.3)	—	—	—	—	2.19** (1.3–3.8)
Gender	—	0.29*** (0.2–0.5)	—	—	—	—	0.39*** (0.2–0.6)
Language	2.35 (0.9–6.1)	10.0*** (2.8–35.3)	4.57* (1.0–20.7)	—	—	—	11.6*** (3.7–35)
Marital status	—	—	—	—	—	—	1.73* (1.1–2.8)
Employment status	—	—	2.12** (1.2–3.6)	—	—	—	—
Housing type	3.03** (1.5–6.3)	—		—	—	—	—
Self-reported health status	—	—	—	2.49* (1.0–6.2)	—	—	—
Vulnerable person	—	—	—	—	0.43 (0.2–1.0)	—	—
Environmental dislike	—	5.57* (1.4–21.4)	2.57* (1.0–6.3)	—	—	4.77* (1.3–16.9)	3.17 (0.9–10.1)
Noticed air pollution	3.18** (1.5–6.7)		—	—	2.87* (1.1–7.9)	—	—
Air pollution (AP) bother	—	2.84*** (1.7–4.9)	—	3.29*** (1.9–5.8)	3.37** (1.6–6.9)	—	3.16*** (1.9–5.3)
AP affects daily life	—		—			2.47 (0.99–6.2)	—
Neighbors friendly	—	3.37* (1.1–9.9)	—	—	—	—	2.13 (0.9–5.2)
Help neighbors							
Never	—	0.51 (0.2–1.1)	0.26** (0.1–0.6)	0.26* (0.1–0.8)	—	0.55 (0.1–2.2)	0.41** (0.2–0.8)
Once or twice a year	—	0.54* (0.3–0.9)	0.35*** (0.2–0.6)	0.81 (0.4–1.5)	—	0.27* (0.1–0.8)	0.45** (0.3–0.8)
No. groups belong to	—	—	—	—	—	—	—
Member of environmental group	—	—	4.63*** (2.3–9.3)	2.71* (1.3–5.8)	5.27*** (2.2–12.7)	4.8** (1.7–13.7)	4.71** (1.6–13.9)
Attended meetings	3.13* (1.2–8.4)	—	—	2.48** (1.4–4.4)	7.15*** (3.3–15.5)	—	2.02** (1.2–3.4)
Neighborhood dislike	—	—	—	—	2.55* (1.1–5.9)	—	—
one + environmental concerns	—	—	—	2.36*** (2.4–1.7)	1.72 (2.2–2.7)	2.59** (1.5–4.4)	1.82*** (1.3–2.4)
Unsolicited AP concern	—	—	—	—	0.49 (0.2–1.1)	—	—
Likely that household's health affected by AP	—	2.69** (1.5–4.9)	1.70 (0.9–3.1)	—	—	—	2.45** (1.4–4.2)
Trust government							
All/most of the time	—	0.34* (0.1–0.8)	—	—	0.57 (0.2–1.8)	0.49 (0.1–1.9)	—
Some of the time	—	0.59 (0.3–1.1)	—	—	0.37** (0.2–0.8)	0.17** (0.1–0.5)	—
Model rho-square	0.13	0.24	0.14	0.24	0.33	0.30	0.29
Sensitivity	0	75	83	86	89	96	71
Specificity	92	70	64	58	59	88	75

*$P < 0.05$.

**$P < 0.01$.

***$P < 0.001$.

The majority of the survey data was entered directly into the SPSS statistical software package (version 10.1). Open-ended responses were entered verbatim into a word processing file along with respondents' identification numbers. These responses were subsequently coded thematically and entered into the dataset. Bivariate analysis was performed on the data to identify characteristics that varied significantly according to area of residence, and the characteristics were correlated with environmental action.

Logistic regression models then were estimated for six outcome variables using a staged backward stepwise elimination method (Hosmer and Lemeshow 2000). The following six outcome variables were used: (1) sorting glass, cans, and the like for recycling; (2) refusing to buy a product for environmental reasons; (3) donating money to a local environment group; (4) going to a public meeting on a local environmental issue; (5) contacting government, industry, or the media about a local environmental issue; and (6) attending a public protest about a local environmental issue. In addition, a model was estimated for a composite measure that involved the taking of two or more environmental actions. The results of these analyses are discussed in the following section.

Results of Bivariate Analysis

The results of the bivariate analysis are summarized in Table 2. The results confirm expected differences between areas in terms of income, education, housing type and tenure, family type, and perceived air pollution. Overall, 20% of the respondents reported that their health was fair or poor relative to that of others their own age. By comparison, slightly more than 10% of the general Canadian population reported their health as fair or poor in the 1998 National Population Health Survey (Statistics Canada 2001).

No statistically significant differences were observed between areas in terms of how often respondents talked to their neighbors or whether they considered their neighbors friendly. However, differences were observed in terms of helping neighbors, having someone who could help one, and attending meetings, indicating variable levels of social involvement and support.

The vast majority of households in the survey (approximately 90%) reported recycling. About half reported refusal to buy a product for environmental reasons, and approximately 20% reported donation to environmental organizations. Few respondents reported contacting someone (a politician, industry representative, or the like) (16%) , attending public meetings (11%), or participating in a protest about a local environmental issue (6%). About half of the respondents (46%) had conducted two or more environmental actions in the preceding year. No significant differences in reporting by area were observed.

The Determinants of Environmental Action

The logistic regression models estimated for each environmental action are summarized in Table 3. This table displays the statistical significance of each predictor remaining in a given model, and reports the relative odds (and associated 95% confidence interval) for each variable. The relative odds indicate how much the likelihood of the outcome changes for each unit increase in the independent variable (or in the case of categorical variables, for a change from one category to another). An odds ratio greater than 1 indicates an increase in probability, and an odds ratio less than 1 indicates a decrease. In the following sections, the models related to the different types of environmental action identified in the taxonomy described earlier (i.e., personal change, individual civic action, and group civic action) are described. The composite model (i.e., the taking of two or more environmental actions) also is described. Finally, the overall similarities and differences among the models are highlighted.

Of the environmental actions identified in this research, recycling and refusal of products for environmental reasons were considered indicators of *personal change*. In the model for *recycling*, few significant predictors were estimated. In addition, the model has a low rho-square value. The rho-square is a goodness-of-fit measure, and a rho-square of 0.2 to 0.4 generally is considered to represent a good fit of the model (Wrigley, 1985). This model, then, has a relatively poor fit, which can be attributable to a lack of variation in the outcome variable. In this model, the odds ratios indicate that individuals who lived in detached dwellings, spoke English, attended meetings of the city council or school board, or noticed air pollution in their neighborhood were two to three times more likely to recycle than those who did not.

The model for *refusing/boycotting products* for environmental reasons (Table 3) has a better goodness of fit. In this model, mentioning a neighborhood environmental dislike and being bothered by air pollution both predicted refusal to buy a product. Certain individual characteristics (i.e., gender, age, and language) also led to an increased likelihood of product boycotting. Having friendly neighbors, helping neighbors, and being a member of an environmental group all facilitated refusal of products, as did voicing health concerns about air pollution. Individuals who reported trusting government all or most of the time were less likely than others to report refusing products. Inter-

estingly, there was little overlap between these two models in terms of predictors. Only language was a predictor in both cases.

Two outcomes (donating to environmental groups and contacting government and the like about environmental problems) can be considered *individual civic actions*, as defined within the conceptual framework. With respect to the former, individuals reporting *environmental group membership* were, not surprisingly, more likely to report that they had donated money to an environmental group. Other significant predictors included mentioning a neighborhood environmental dislike, being employed, speaking English, and helping neighbors. Respondents who perceived that their health was likely to be affected by air pollution also were more likely to donate, although this effect was not significant ($P < 0.05$). This model has relatively low explanatory power, as indicated by the rho-square.

The model for *contacting government or industry* about an environmental issue has, by contrast, a much better fit. In this model, exposure factors did not figure highly. Only those bothered by air pollution were more likely to take action. Individuals who reported their health as good or excellent were more likely to contact government or industry. Helping neighbors, attending meetings, expressing environmental concern, and being a member of an environmental group all were positively related to contacting government or industry.

Two *group civic actions* were investigated in this research: attending a public meeting and attending a public protest. In the model for *attending a public meeting*, several exposure-related variables were significant predictors of environmental action: mentioning a neighborhood dislike, noticing neighborhood air pollution, and being bothered by air pollution. Individuals who were members of environmental groups or had attended meetings of other sorts (e.g., school board) were more than five times more likely to attend meetings on a local environmental issue than those who were not members or had not attended such meetings. Individuals who reported unsolicited concern about air pollution and those who voiced environmental concerns more generally were more likely to attend a meeting. Finally, those who did not trust the government were more likely to attend meetings.

With respect to the other group civic action investigated, the variables that significantly increased the likelihood of *attending a protest* included mentioning a neighborhood environmental dislike, helping neighbors, being a member of an environmental group, and voicing environmental concerns. Mentioning an effect of air pollution on daily life also increased the likelihood of protest attendance, but was not significant ($P < 0.05$). Trust in government decreased the likelihood of attending a protest. In this model, no individual characteristics were significant. More overlap was observed among predictors in the group civic action models than in other action types. Specifically, environmental group membership, environmental concern, and government distrust increased the likelihood of both meeting and protest attendance. No individual characteristics were significant below 0.05 in either model.

Finally, the *composite model*, which involved taking two or more environmental actions, was quite robust, with a rho-square close to 0.3. In the 2+ action model, individual and social network characteristics were paramount. Specifically, being relatively young, female, and married, and speaking English at home increased the likelihood of an individual taking two or more environmental actions, as did finding one's neighbors friendly, helping one's neighbors, belonging to an environmental group, and attending meetings of the city council/school board. In addition, expressing a neighborhood-based environmental dislike and being bothered by air pollution were positively related to taking 2+ actions. Environmental concern (i.e., expressing environmental concerns and concern about the health effects of air pollution) also was significant in this model.

Model Comparisons

In the logistic regression models, significant predictors vary by type of environmental action. The overall strength of the models, as indicated by the rho-squares, also varies by outcome (Table 3). If the models are considered together, the most consistent predictors in each category of the conceptual framework appear to be helping neighbors and environmental group membership (both appearing in five of seven models, including the summary model), neighborhood environmental dislike, number of environmental concerns, air pollution concern, attendance at meetings, and language spoken in the home (each figuring in four of seven models, including the summary model), and mistrust of government (which figures in three of seven models, but not in the summary model). It appears that although sociodemographic/individual characteristics figure as predictors of product refusal and recycling (i.e., personal change), these predictors tend not to figure as often in the models of individual civic actions, and hardly at all in group civic action. Lack of trust in government, however, figures as an important factor in group civic action. Area of residence was not retained in any model as a significant predictor of action, but this is not surprising given that

the most pertinent characteristics of the areas themselves (e.g., variations in exposure) were captured in other measures.

Discussion and Conclusion

The results of the case study lend credence to the conceptual model outlined earlier in the article. Individual, exposure, and social network variables all proved to be important predictors of environmental action-taking. Indicators of predisposition (e.g., environmental concern) also emerged as important. This supports previous research suggesting that concern is an important facilitator of environmental action (Elliott and others 1999). Indicators of capacity (e.g., perceived self-efficacy) were not generally important to action-taking, although more sensitive measures of capacity may be needed.

In the case study, varying sets of determinants predict the different outcomes of interest. This likely reflects important, real differences between environmental actions. For example, boycotting products may be more common for women because of their continuing responsibility for domestic tasks (Perkins and Demeis, 1994), and the levels of commitment (e.g., of time) required for attending protests likely demand greater levels of predisposition and capacity. This finding suggests that greater respect must be paid to the differences between actions, and that action types cannot easily be conflated, an important caution for future research. Findings also show that the contribution of individual-level variables decreases as the level of commitment necessary to undertake an action increases. This has important implications for theorizing that civic action (and indeed, activism) is distinct from individual behavior change.

The results of this analysis underscore the relative contribution of composition, context, and collective to behavior. That is, although individual characteristics (e.g., language spoken) were important in facilitating environmental actions, contextual factors (e.g., exposure characteristics) and collective resources (e.g., local social networks) often were of even greater importance. Although the contribution of these variables was not uniform (e.g., recycling was only minimally influenced by social network characteristics), their presence in the final models suggests that contextual and collective factors should be taken into greater account in attempts to account for (or encourage) public participation in environmental planning and management. In addition, this research emphasizes the importance of considering environmental and social factors in tandem, highlighting the utility of perspectives, such as environmental justice and political ecology, that explicitly try to bridge the artificial gap between these two spheres.

This study presents a cross-sectional picture of environmental action-taking in a single community. Additional research is needed to enhance understanding about the contributions of composition, context, and collective to environmental action across both space and time through both longitudinal and comparative analyses. In addition, comparisons of different communities would allow exploration of the important role that broader systems of regulation and service provision could play in environmental action. Continued research in this area is central, as many jurisdictions come to rely on voluntary participation to guide decision making and manage public sector initiatives.

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