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ABSTRACT

The Social Production of Toxic Uncertainty

Based on archival research and on two and one half year long ethnographic fieldwork in an Argentine shantytown with high levels of air, water, and ground contamination, this paper examines the social production of uncertainty about pollution. First, the paper dissects residents' perceptions of contamination and finds widespread doubts and mistakes about the polluted habitat. Second, the paper explains the socio-logical reason for error and uncertainty. Together with the inherent ambiguity of toxic contamination, the generalized confusion about sources and effects of pollution is the result of two factors: 1) the "relational anchoring" of risk perceptions, and 2) the "labor of confusion" generated by powerful outside actors. Two implications are derived from this ethnographic case study: 1) Cognitive psychology and organizational sociology can travel beyond the boundaries of self-bounded communities and laboratory settings in order to understand and explain the collective production and reproduction of ignorance, uncertainty, and error; 2) Research on inequality and marginality in Latin America should begin to pay close attention to the contaminated space where the urban poor live.

INTRODUCTION

Public perceptions of health-threatening environmental contamination have been the object of many detailed research reports. A number of studies that have chronicled the origins, development and outcomes of collective actions organized against the presence of pollutants in several communities in the United States have also examined the views and sentiments of affected residents (Levine 1982; Brown and Mikkelsen 1990; Couch and Bullard 1990; Kroll-Smith 1991; Checker 2005; Lerner 2005; for a recent review of research on and protest against "environmental racism" see Pellow 2005; for discussions on environmental inequality see Anderton et al. 1994; Krieg 1998; Gould 1998; Weinberg 1998; Mitchell, Thomas, and Cutter 1999; Davidson and Anderton 2000; Downey 2005). Although diverging in methodology, analytic depth, and empirical focus, a typical sequence can be extracted from most of these accounts: collective ignorance about the presence and impact of toxins is interrupted when a neighbor or a group of them, in many cases "irate housewives turned into activists" (Mazur 1991: 200; Kaplan 1997), begin to make the connections between their place of residence and the existence of certain illnesses, between illness and toxic hazards, and between his or her individual problems and those of others. Brown and Mikkelsen (1990) coined the term "popular epidemiology" to refer to the process through which victims "detect" a disease pattern (in the case they closely reconstruct, a leukemia cluster in Woburn, Massachussets). The characteristic progression also includes an active process of learning (and a great deal of frustration) in which victims become skilled at playing political games with authorities and at quickly absorbing scientific knowledge (Brown 1991; Cable and Walsh 1991; Brown et al. 2000).

Despite divergent theoretical orientations most of the available accounts seem to share a classical Marxist model of consciousness: physically proximate aggrieved people overcome false beliefs or persistent uncertainties through reflection and interaction. The outcome of process of "loss of innocence" (Levine 1982; Cable and Walsh 1991) is, almost always, a single and determined consensus regarding the problem and its solution – tellingly, the main actor in most of the chronicles is "the community." In emphasizing changes in collective perceptions of legitimacy and mutability of objective conditions,

most works portray – either implicitly or explicitly – a variation of what Doug McAdam terms "cognitive liberation," i.e. the "transformation from hopeless submission to oppressive conditions to an aroused readiness to challenge those conditions" (1982:34). Most of these studies, furthermore, examine risk perceptions as independent variables: beliefs about hazards are used to explain behavioral outcomes (i.e. the collective actions people organize to protect themselves) (Tierney 1999). The sources of such perceptions usually remain under-explored (for an exception, see Beamish 2001; see also Heimer 1988).

In its almost exclusive focus on successful cases (i.e. cases in which communities were either relocated, compensated and/or cleaned) and in its emphasis on the ultimate achievement of a shared consensus regarding sources, effects, and solutions to contamination (communities that "discover" and establish shared knowledge about surrounding toxicity), extant literature remains silent about cases in which there is neither a clear outcome nor a single shared understanding. When confronted not with increasing awareness and/or cognitive liberation but with the reproduction of ignorance, error, disagreement (when there is no single "community" to speak of), and doubts about the origins, extent and effects of toxins, we are at a (analytical and theoretical) loss.

Organizational theory and cognitive psychology have much to offer to scholars seeking to understand the mechanisms and processes involved in the perseverance of uncertainty and mistake. Based on archival research and on a two and one half year long ethnography in Flammable (real name), an Argentine shantytown with high levels of air, water, and ground contamination, this paper focuses on one such case of the perpetuation of risk uncertainty. Taking heed of existing sociological research on risk perception and critically translating the insights of organizational sociology and cognitive psychology for the case of Flammable, we explain the reproduction of uncertainty and confusion about pollution as the product of two processes: 1) the "relational anchoring" of risk perception, and 2) and the "labor of confusion" produced by socially consequential institutions. These two processes are hinted in existing scholarship on lay-public risk assessments but remain empirically unspecified. In providing such empirical specification, our findings offer useful analytical tools to examine the lived experiences in communities exposed to toxic hazards throughout the Americas.

LITERATURE REVIEW

Scholarship on risk perception has significantly expanded during the last two decades (Dietz et al. 1989; Stallings 1990; Clarke and Short 1993; Tierney 1999; Caplan 2000) emphasizing the socially constructed character of the varying ways in which lay persons (Heimer 1988; Beamish 2001), policy-makers (Jasanoff 1986), organizations (Clarke 1989; Vaughan 1990, 2004; Eden 2004), and communities (Erickson 1976; Levine 1982; Brown and Mikkelsen 1990; Couch and Kroll-Smith 1991; Edelstein 2003) understand risk and assess hazards.

Cognitive structures (DiMaggio 1997), schemata (Bourdieu 1977; 1998; 2000), or frames (Vaughan 1998; 2004; Eden 2004) mediate between the hazardous environment and the subjective experiences of it giving form to what people know, think they know, ignore, and/or (mis)interpret about surrounding dangers. A plethora of social influences shape these frames or schemata. Existing sociological research recognizes the roles of organizations (Stallings 1990; Clarke and Short 1993; Perrow 1997), institutional interests (Clarke 1989, 1990; Tierney 1999; Kendall 1991), expert systems (Proctor 1995; Beamish 2001), and the state (Freudenburg 1993; Pollak 1996) in the molding of lay-public "risk frames." The trust (or lack thereof) people have in organizations (governments included) and expert-systems in charge of producing information about risk, those responsible for protecting the public, and the producers of hazards are directly relevant for risk perceptions (Freudenburg 1993; Perrow 1997; Beamish 2001). Extant scholarship agrees that in order to understand and explain the widespread uncertainty and confusion that dominates the lives of people living at risk, empirical research needs not only to delve deep, both synchronically and diachronically, into the frames actors use to perceive their surroundings but also to find out why these frames are what they are (Heimer 1988; Tierney 1999). As Beamish (2001: 11) argues, "historical legacy" and "interpretive context" are central in giving form to perceptions of risk.

Cognitive psychologists have also contributed to our understanding and explanation of the ways in which individuals perceive risk. Through a variety of ingenious laboratory experiments, they documented a series of heuristics on which

individuals rely to simplify the selection and digestion of an overabundance of information under conditions of uncertainty (Kahneman, Slovic, and Tversky 1982; Gilovich, Griffin, and Kahneman 2002). Two of these cognitive heuristics are of particular relevance to the study of risk perceptions: "availability" and "anchoring." "Availability" refers to the tendency individuals have to give excessive importance to information that, for reasons that are logically accidental, grabs their attention. "Anchoring" induces people to give undue weight to an initial value which in turn powerfully affects their subsequent judgments. In other words, people's estimations of risk are affected by the availability of information and by the reference point that frame their cognitive mapping of the situation. Heimer (1988) rightly notes that sociological studies of risk perception should contextualize these inferential shortcuts by specifying a) what factors influence the availability of information, b) where do reference points come from. [1] In this paper, we do so by: a) dissecting the ways in which two powerful actors (state officials and doctors) shape the availability of information about origins and effects of toxic contamination by making striking but contradictory claims about existing hazards; and b) examining the anchoring device in the context of the history of a neighborhood and its daily routines and interactions.

Most of the research conducted on "contaminated communities" (Edelstein 2003) focuses on cases in which everyday life is abruptly dislocated by the uncovering of nearby hazards. The "disruption of the quotidian" (Snow et al. 1998) begins with initial suspicions regarding the existence of dangerous toxins in the vicinity of a residential area and their potential or actual effects on residents' health. These initial qualms are typically followed by a process of discovery through "popular epidemiology" (whereby residents detect a disease pattern and are able to trace it back to a toxic origin) and accompanied by a shared consensus regarding sources of (and solutions to) the problem –i.e. an emerging new frame (Levine 1982; Brown and Mikkelsen 1990; Brown 1991; Clapp 2002). Increasing certainty in turn leads to a process of collective empowerment ("cognitive liberation") which acts as a pre-condition for collective action (Capek 1993; Murphree et al. 1996). Risk frames, in the typical sequence uncovered by existing scholarship, emerge in interaction with other aggrieved parties (some of whom quickly surface as unexpected leaders)[2] and in confrontation with the state and other expert systems (physicians being

prominent among them) which typically either deny, cover up or minimize the actual or potential damage (Levine 1982; Clarke 1989; Brown and Mikkelsen 1990; Bryson et al. 2001; Phillimore et al. 2000; Beamish 2000, 2002; Petryna 2002; Gephart 2004; Lerner 2005).

Collective perceptions of risk have rarely been scrutinized in specific socio-spatial universes such as Flammable where a) daily life is dominated by ignorance, errors, and doubts regarding sources and effects of toxicity, and b) socially consequential actors neither minimize nor deny the existing dangers.[3] In the ensuing analysis we take heed of the call for a radical contextualization of the heuristic devices and frames actors draw upon to make sense of hazards (Heimer 1988, Vaughan 1990, 1998, 1999, 2004; Eden 2004) in order to explain the social production of toxic uncertainty. To foreshadow our argument: During the 70 year long period in which health-threatening pollution has been slowly incubating in the neighborhood, neither a major industrial accident nor a sudden discovery of a disease cluster ever disrupted daily routines. This temporal dispersion of contamination resulted in what we label, combining insights from cognitive psychology and organizational sociology (Eden 2004; Vaughan 2004; Kahneman, Slovic, and Tversky 1982, Gilovich, Griffin, and Kahneman 2002), relational anchoring of risk perceptions. We argue that uninterrupted routines and interactions work smoothly as blinders of the increasing surrounding hazards. During the long time during which contamination was slowly germinating, the actions of the state and other expert systems towards pollution in the neighborhood were less consistent and more contradictory than the denial or underestimation documented in existing literature. These multiple incongruous actions give shape to what we term, combining insights from students of symbolic power and newsmaking (Molotch and Lester 1975; Thompson 1984; Bourdieu 1991), a labor of confusion that has a decisive effect on shared (mis)understandings.

Our analysis of toxic uncertainty in Flammable will establish interesting parallels with Diane Vaughan's (1990, 1999, 2004) detailed examination of the production and normalization of a cultural belief in risk acceptability within NASA. Noting the absence of major disruptions and the gradual increment of seemingly minor problems in the space-shuttle program, she writes (1998:38):

> Had all the changes occurred at once, had damage been occurring on every flight due to a common cause, or had there been a discernable pattern of damage, the work group would have had some strong, clear signals with the potential to challenge the cultural belief in risk acceptability. Instead, the damage occurred incrementally, each incident's significance muted by social context and a learning-by-doing approach that had engineers interpreting each episode as separate and local.

It was, to quote from an informant in Lynn Eden's penetrating (and theoretically close to Vaughan's study) analysis of the ways of thinking about fire damage in American nuclear planning since World War II, a "continuing pileup of things" (Eden 2004: 271). That "continuing pileup of thing" shapes the way planners incorporate (or fail to incorporate) fire effects into standard models of nuclear damage, gives form to the ways in which NASA personnel think about risk, and molds the frames Flammable residents use to think and feel about their environment: in the situated or anchored form that emerges from a long incubation period.

Perceptions about the (toxic) environment should thus be analyzed as products of individual and collective biographies, as sedimentations of actors' previous place-based experiences (Schutz 1962; Bourdieu 2000). Toxic beliefs (or, to put it in phenomenological terms, toxic experiences) are rooted in the interactions and routines that characterize a particular place. But perceptions of hazards are also manipulable, i.e. susceptible of being molded by the practical and discursive interventions of powerful actors (Williams 1977; Thompson 1984; Heimer 1988; Bourdieu 1991; Perrow 1999). The stock of knowledge actors have about their hazardous surroundings at a particular time and place is therefore the joint product of the history of that place, the routines and interactions of its residents, and the power relations in which they are enmeshed.

Besides the case of (mystified) experience in a highly-contaminated setting, what can we learn from the ensuing analysis? This ethnographic case study has both substantive and analytical implications. Most notably, the wretched environment in which the urban poor live remains a marginal – if not absent – issue for students of poverty in Latin America. A recent comprehensive review of sociological studies of poverty and

inequality in Latin America (Hoffman and Centeno 2003) and a symposium on the history and state of the studies of marginality and exclusion in Latin America published in the most prominent journal of Latin American studies (González de la Rocha et al. 2004) makes no mention of environmental factors. With few notable exceptions (Scheper-Hughes 1992; Farmer 2004), ethnographic work on poverty and marginality in Latin America has also failed to take into account one simple, essential, fact: the poor often breathe polluted air, drink polluted water, and play on polluted grounds with dire consequences for their present health and future capabilities. By focusing on the ways in which shantytown dwellers think and feel about their physical surroundings, we seek to explore this missing dimension in the study of poverty in Latin America in the hope that future research focuses its attention on the (contaminated) space where large portions of the urban poor reside.

This case study also has analytical implications. In contemporary ethnographic work, we rarely see individuals hesitating and making mistakes –subjects usually know something that we do not (after all, we rely on "informants" who, presumably, guide our way into the, for us, "unknown"). Uncertainty and ignorance have not been a dominant focus among ethnographers because, as Murray Last (1992: 393) writes, "it is hard enough to record what [subjects] do know." But our ethnography points to the importance of ignorance, uncertainty, and error and makes a case for extending cognitive psychology and organizational sociology beyond the confines of the self-bounded communities and laboratory settings where existing analytical tools and substantive findings originated.

METHODS

This paper is based on twenty formal in-depth interviews with residents of Flammable and, perhaps more importantly, on innumerable informal conversations and direct observation carried out over a two and one half year long period of team ethnographic fieldwork during which one of the authors lived in the neighborhood (May 2004-October 2006). The other author conducted fieldwork during the months of June and July (2004), July and August (2005), and July and August (2006). We conducted half of the interviews with the neighborhood's old-timers (residents who had been living there for more than 25

years) and half with those who arrive recently (see next section for a description of the neighborhood's internal differences). In both groups, half of our interviewees were women and half were men. Our in-depth interviews were tape-recorded, transcribed, and systematically analyzed for their content. Our fieldnotes were coded and analyzed using open and focused coding (Emerson et al 1995). Applying the evidentiary criteria that is normally used for ethnographic research (Becker 1958, 1970; Katz 1982, 2001, 2002) we assign higher evidentiary value to conduct we were able to observe versus behavior reported (by interviewees) to have occurred, individual acts or patterns of conduct recounted by many observers versus those recounted by only one.

Our fieldwork was not restricted to the neighborhood. During two years and one half, we also conducted thirteen formal in-depth interviews with doctors who work in the community health center (2), teachers who are employed at the local school (2), state officials who work in environmental policy at the municipal, state, and federal governments (4), lawyers who are suing some of the companies of the compound on behalf of residents (2), personnel who work in the petrochemical compound (2), and scientists who conducted an epidemiological study in the neighborhood (1) (see next section). In order to examine public officials' announcements and debates about Flammable and the adjacent petrochemical compound, we also analyzed three national media (*Clarín*, *La Nación*, and *Página12*) using their respective search engines for news coverage of Flammable, Dock Sud, and the *Polo Petroquímico* from 1999 to 2006.

BACKGROUND

Pollution and Environmental Hazards in Flammable

Slums, shantytowns, and squatter settlements are, in Argentina and elsewhere, intimately associated with environmental risks and unsanitary living conditions; their deleterious health-effects have been repeatedly noted (Stillwaggon 1998; UN 2003; Davis 2006). A significant proportion of the shantytown growth in Buenos Aires took place along the highly contaminated banks of the *Riachuelo*, the river that flows through the south part of the metropolitan area.[4] A recent count by the Federal Ombudsman office reports that thirteen shantytowns are located on its banks (Defensoría 2003). According to the Pan

American Health Organization (PAHO 1990, cited in Stillwaggon 1998), this river receives "huge amounts of heavy metals and organic compounds owing to the discharge of industrial waste" (see also Merlinsky 2007a). Tons of toxic sludge, diluted solvents (dumped by meat-packing plants, chemical industries, tanneries, and households), cadmium and lead are routinely tossed into the *Riachuelo's* dead stream. The shantytown named Flammable sits right on the southern banks of the mouth of the *Riachuelo* and is surrounded by one of the largest petrochemical compounds in the country (the *Polo Petroquímico y Puerto Dock Sud*), by a hazardous waste incinerator, and by an unmonitored landfill. The soil, air, and water streams of Flammable shantytown are highly polluted with lead, chromium, benzene, and other chemicals (Defensoría 2003; PAE 2003; Dorado 2006).

In 1931, the first Shell Oil refinery opened in what was to become the compound or "polo." Since then, other companies have also moved into the *polo*. Shell refinery is the most important plant there, but the compound also houses another oil refinery (DAPSA), three plants that store oil and its derivatives (Petrobras, Repsol-YPF, and Petrolera Cono Sur), several plants that store chemical products (TAGSA, Antívari, Dow Química, and Solvay Indupa among them), one plant that manufactures chemical products (Meranol), one dock for containers (Exolgan), and one thermo-electrical plant (Central Dock Sud) (Dorado 2006; *Clarín* July 4, 2006).

According to the last available figures, in 2000 there were 679 households in Flammable. This is a fairly new population: 75 percent of the residents have lived in the area for less than 15 years. Moreover, although there is no exact count, municipal authorities, community leaders, and people who live or work in the area (in the petrochemical compound, the school, and health center) told us that in the past decade the population has increased at least fourfold – growth fed by shantytown removal in the city of Buenos Aires and by immigration from other provinces and nearby countries (Perú, Bolivia, and Paraguay). Finally, internal differences separate a small sector composed of old-time, lower-middle-class residents from the majority of newer, low-income dwellers. As we will see later, these internal class differences are crucial to understand the reproduction of mistake and confusion about surrounding contamination.

Flammable shantytown is, in many ways, similar to other poverty enclaves in urban Argentina, deeply affected by the explosive growth of unemployment of the 1990s (Auyero 1999; 2001). Scavenging, state welfare programs, and part-time manual jobs in one of the companies in the compound offer the main source of subsistence in the neighborhood. What distinguishes this poor enclave from others, however, is the particular relationship it has with the compound's main company, Shell-Capsa, and the extent of the contamination that affects the area and its residents.

The brick walls and guarded gates that separate the compound betray the organic connection that, for more than 70 years, Shell-Capsa has had with the community. In the life stories we collected, older residents remember an abundance of work in the area. They also recall the lack of housing close to the compound and their strenuous efforts to build what initially were shacks in the middle of swamps (still, today, there are lowlands in the center of the neighborhood). Filling in the surroundings appears in old timers' narratives as a very important joint activity of those early days – and it still is, according to our interviews and observations. One possible source of contamination is the very material, often packed with toxic waste, that people in the neighborhood have used (and still use) to level their plots. In fact, in the many life histories we collected filling with garbage seems to have been a common strategy in the neighborhood. As Marta, who has been living in Flammable for 25 years, recollects referring to the plot in which her house stands now: "This was a lagoon. We fill it with all sorts of stuff, cement, stones, that black thing… we paid 5 pesos per truck."

There are several elements of the material and symbolic entanglement between the neighborhood and Shell, or *la empresa* as residents call it. Historically, Shell provided formal and informal jobs for men (who worked in the refinery) and women (who did domestic work such as cleaning and baby-sitting for the professional workforce within the compound). Old-timers remember not only working for Shell, but also attending the health center located on the company's premises, obtaining drinkable water from the company, and receiving pipes and other building material from the company. A decade ago, Shell funded the construction of the health center in the neighborhood (a center that employs seven doctors and two nurses and has a 24-hour guard and an ambulance, something that is quite uncommon in poor neighborhoods throughout the country).

Although, after automation of many of its operations, Shell is no longer the main employer in the community, it still provides jobs to residents, young and old. Furthermore, Shell routinely grants funds for the local school in what a company engineer we interviewed defined as a "social performance plan." Among the services the company funds are a nutritional program for poor mothers that includes the distribution of food; computing classes for local students (held inside the Shell compound); windows, paint, and heaters for the school building; the end-of-the-year trip for graduating classes of the local school; t-shirts with the Shell logo for student soccer, volleyball, and handball teams; and toys for the school-kids during the celebration of Children's Day. Through its community relations division the company seeks to follow what a former municipal official calls a "good neighbor policy." Shell's presence undoubtedly distinguishes Flammable from other poor communities.

While Shell and some of the other companies in the compound have created community relations programs in Flammable that do not exist in other poor neighborhoods, their industrial processes have also produced more environmental hazards than those present in other Argentine shantytowns. Flammable is thus different from other destitute neighborhoods throughout Buenos Aires in the extent (and known effects) of its air, water, and soil pollution. Experts (from both the local government and Shell) agree that, given the air quality associated with the compound's industrial activities, the area is unsuitable for human residence, especially as it has also been used as a dumping ground by many nearby companies. It is still used as an open-air waste disposal site for subcontractors who illegally dump garbage in the area (we witnessed several occasions of this during our fieldwork). Many of the pipes that connect homes to the city water supply are plastic; defects in the joints and breaks allow the toxins in the soil to enter the stream of the officially defined "potable water." A nauseating stench often comes from these garbage disposal sites, from putrid waters filled with this same garbage, and from the chemicals stored and processed in the compound.

One epidemiological study compared a sample of children between seven and eleven years old living in Flammable with a control population living in another poor neighborhood with similar socio-economic characteristics but lower levels of exposure to industrial activities (PAE 2003). In both neighborhoods, the study found, children are

exposed to chromium and benzene (both known carcinogens) and to toluene. But lead, "the mother of all industrial poisons… the paradigmatic toxin [linking] industrial and environmental disease" (Markowitz and Rosner 2002:137), distinguishes the children of Flammable from the rest. Fifty percent of the children tested in this neighborhood had higher-than-normal blood levels of lead (against 17 percent in the control population).[5] Not surprisingly, given what we know about the effects of lead in children, the study found lower-than-average IQs among Flammable children and a higher percentage of neurobehavioral problems.[6] The study also found strong statistical associations between frequent headaches and neurological symptoms, learning problems, and hyperactivity in school. Flammable children also reported more dermatological problems (eye irritation, skin infections, eruptions, and allergies), respiratory problems (coughs and bronco-spasms), neurological problems (hyperactivity) and sore throats and headaches.

RESULTS

Toxic Uncertainty

With the black and white smoke coming out from the surrounding smokestacks, with the constant noise of alarms and heavy trucks, with the random odors of gas or other pungent substances, with the surrounding garbage and dirt swamplands, it is hard for anybody in Flammable to deny that, as many a neighbor told us, "there is something here." As we were repeatedly told (and experienced ourselves): "Sometimes you can't be outside, the odor stinks, your throat stings. It smells of gas. Even if we close our doors, it smells…" And yet, when residents have to talk about the specifics of contamination, when they have to put a name to the sources, location, and contents of pollution things get murky. Doubts and mistakes also abound when neighbors speculate out loud about the deleterious health effects of pollution. In this section we describe what we call "toxic uncertainty" and we then seek to explain its sources by drawing upon and translating the insights of cognitive psychology and organizational sociology.

Flammable residents talk extensively about their environment. In analyzing our interviews and informal conversations, we found four types of error or sources of what we call "toxic uncertainty:"

(1) Misinformation – as when residents assume that lead contamination is clustered in the poorest section of the shantytown or when they assert that "lead is produced by the coal processing plant."

(2) Shifted responsibility – as when respondents argue that poor parenting is responsible for high levels of lead contamination.

(3) Denial – as when residents actually challenge existing data showing that environmental pollution has reached toxic levels or when they use their own healthy bodies to deny serious contamination.

(4) Blindness – as when neighbors ignore their own risk perpetuating land-filling practices.

For example, residents say that oil contaminates water streams; they also deem it harmless (the real problem is not oil refinery but, according to many respondents, the nearby storage of chemical substances). Residents believe that the Shell refinery is completely safe ("it is the safest plant in the world"); they also think it is highly contaminating ("Shell is killing us…" "They give presents to cover contamination"). Similarly, they think that the coal processing plant located inside the compound is poisonous ("a cancer factory", "that is where all the lead is coming from") or innocuous ("because nothing is vented into the air"). With lead, however, discrepancies take a different form. Nobody denies that lead is harmful but most respondents displace it elsewhere: it is not located in the neighborhood but in the poorest and newest part of the shantytown; it is not stored in their (or their children's) bodies but in those of the most destitute shanty-dwellers whose "kids play barefoot," who "do not wash their hands," and who "bathe in dirty waters." Rather than the environment itself, permissive mothers are, in this way of reasoning, responsible for exposing children to lead. As Susana, who has been living in the neighborhood for 10 years, told us: "It's their mothers' fault. They allow those kids to play in the garbage, they don't bathe them… that's why they get contaminated."

Thus, for example, García and Irma (who are in their seventies and have lived in Flammable for the last fifty years) and Silvia (who is in her sixties and was born and

raised in the neighborhood) express doubts about the extent and sources of contamination as follows:

> García-I don't know, I don't know what contamination people are talking about. They blame the coal [coke] plant, but the whole [industrial] process is a closed-circuit, nothing is vented into the air. Years ago, the coal was all processed in the open… not even a single coal worker is alive, that was unhealthy… (original emphasis)
> Irma-But not now…
> García-No, not now. Listen, I worked there [at Shell] for 38 years… they used to make gasoline with lead, but not anymore. I worked at the gasoline tanks, and I never got sick… If this were contaminated, imagine: she's been here since 1944, and I have lived here since 1950, but we had no illness from the contamination (*no tuvimos ninguna enfermedad de la contaminación*) […]
>
> Silvia-The lead-poisoned kids are all from there [the newest and most destitute part of shantytown]. None of the kids from here have anything… They [the children] get sick because of all the garbage that they themselves collect.

Still, it is a matter of common knowledge among neighbors that there is "something" in, mostly, the air – there is less certainty or awareness about ground and water pollution. But one thing is what people know (or say they know) and another thing is how people interpret this information (Eden 2004, Vaughan 1990, 1998). On the one hand, one way of thinking and living pollution acknowledges its existence but denies its seriousness. Many adults in Flammable use their own bodies as instruments of denial: after all they "never had any health problems." As old-time neighbor Francisco puts it: "I raised three kids here. I myself have been inside many of the plants and I don't have any [health] problems." Other residents, however, are less certain about what they can learn from their bodies, or as many residents told us: "I don't really know if I am polluted or not… I don't even know what the symptoms are." "So, you don't really know if you have something," says Felisa who has been living in the neighborhood for thirty years.

Confusion sometimes comes together with denial. As Jimena, who has lived in the neighborhood since 1990, asserts:

> The water here is good. Well, that's what we say, we feel it's normal, but it'd be good to have it tested. It's not the same water you drink elsewhere, it's kind of strange… and they say the soil is contaminated. But my kids were playing with lentils, and they threw them there, and a plant grew. So, it cannot be contaminated.

Flammable, many other neighbors believe, might be contaminated, but "we are not" or "we don't yet know" – as if the effects of environmental pollution were a black and white proposition, something that you have or you do not – because "we have not so far been tested."

Some people acknowledge the extent and severity of pollution but, like Silvia (quoted above), they also point at the victims' own behavior as the true source of the contamination. Marga is the president of the local improvement association. Her comments illustrate the generalized uncertainty. As is the case for many others, Marga thinks "contamination is terrible. If you were to think about it and start mulling over it, you'd want to leave this place right away." She thinks of the compound as "a world apart. Most of the time you have no idea what's going on inside" (just as every single person we talked to, she doesn't even know how many plants are located within its grounds). In talking about Flammable's past, Marga is convinced that the small farms that used to abound in the neighborhood disappeared because of all the industrial waste: "the soil was all contaminated, it stopped being useful." However, when speaking about the present, she expresses doubts about both the source and symptoms of lead contamination: "We should not put all the blame in those at the top [i.e. in the government and/or the compound]. Parents are also responsible because they never cared to attend to their children and to see what could be done." "I don't really know if I'm contaminated," she continues, "who knows what the symptoms are?"

How are we to understand and explain this complex combination of error, blindness, denial, and confusion? How come, in the midst of a slow-motion toxic disaster, where children have record levels of lead in their blood-streams, where the air and water

residents breathe and drink is highly contaminated, Flammable dwellers allow themselves to doubt about (or, worse, deny) the "hard facts" of industrial pollution? Two repetitive elements show that there is nothing inherent in the powerlessness of poor communities that in and of itself can explain the widespread toxic uncertainty: a) Some of the most confused and/or mistaken residents are found among the least poor residents of Flammable (those living in the oldest part of the neighborhood), and b) Nearby contaminated communities, which are as powerless and as poverty-stricken as Flammable, have indeed gone through a process of increasing critical awareness (through a version of "popular epidemiology") that evolved into massive protests against toxic assaults (for a recent example of collective action in response to the discovery of a leukemia cluster in a close by poor neighborhood, see Merlinksy 2007b). In other words, although material and symbolic destitution and vulnerability are indeed general features of Flammable, they do not explain the generalized uncertainty about surrounding contamination. In what follows we will argue that the two-fold answer to the above questions lies in the relational anchoring of risk perceptions and in the labor of confusion performed by powerful actors.

Relational Anchoring

Environmental degradation (i.e. increasing pollution of the air, water, and soil) was not suddenly imposed on Flammable residents. Different from other "contaminated communities" (Edelstein 2003) that witness the sudden installation of a landfill, an incinerator, or a toxic industry in their proximity or whose members discover toxic assault through "popular epidemiology" (Brown 1991), contamination in Flammable has been slowly incubating for as long as both the compound and the neighborhood exist. Shell refinery, for example, opened 75 years ago (Nicanor, one of the oldest residents, told us that his family used to live in what are now compound premises and one day they were order to vacate)[7]; other chemical companies have been inside the compound for at least 50 years. This temporal dispersion of pollution is reflected in old-timers' narratives: nobody points to a moment in history when pollution and environmental degradation began. From a past filled with small farms and gardens, with fruits and vegetables that

"smelled delicious," and in which residents spent the weekends in the nearby beach ("one of the most beautiful beaches in the entire country"), accounts move to a dirty present without any transformative events. One day, they stopped going to the beach, on another, they realized that the last farmer was gone.

Catalino has lived in Flammable for more than forty years. His recollections of his first days in the neighborhood illustrate all the things that for him (and for most residents we spoke with) have disappeared: "There were small farms, [they were] beautiful. I enjoyed working on my small plot a lot, I had lots of fruit there [...] It was full of birds, thrushes, caracaras, storks [...] In my plot I planted onions, melons, pumpkins...." Catalino, like many of the old-timers in Flammable, remembers:

> I came here for three months and I'm still here…I became fond of this place (*me encariñe con el lugar*). Things began to work out, I made more friends here. The kids began school, I had my little farm and I got a job. Thank God I always had a job. And then…this was a small neighborhood…we all knew each other, we were like a family. We use to take care of each other. It was beautiful.

The gradual period of incubation of industrial pollution (in which farms slowly disappeared, streams got darker and dirtier, soils became filled with toxic garbage and debris) was lived mainly as a period of attachment to, of taking roots in, the neighborhood through work, family, and friendship networks.[8] As residents' surroundings were slowly changing for the worse, they were building up a family, enjoying their friends, and working, "always working." As the air, water, and soil got filthier, Catalino and his neighbors were busy living his life. As simple as it sounds, the process through which Catalino and most of the old-timers in Flammable went through is crucial for understanding how they think and feel about this (contaminated) place – not as an outsider might but in a way that is thoroughly embedded in history and the routine organization of daily life (Bourdieu 1998; 2000). Perceptions of hazards are thus relationally anchored in everyday routines.

A routine is "a regular course of procedure; a more or less mechanical or unvarying performance of certain acts or duties" (English Oxford Dictionary). Familiar

routines (going to work, sending kids to school, preparing meals, putting babies to sleep) have an ordering effect. They orient and stimulate action. They also have a comforting, almost soothing effect. We can count on routines (and the interactions they involved) to help us navigate difficult, uncertain, moments: we find security in what is familiar to us, in what we can get a hold on; routines, furthermore, help us screen out (or, at least, suspend the thought of) the unpleasant (Heimer 2001). As routines provide us with a known route, with an "objective universe of incitements and indications" (Bourdieu 2000:222), they ground our existence. This latter aspect of routines' cultural work is quite relevant to understand residents' experiences of contamination. In many of the life-stories, in-depth interviews, and informal conversations we had with them, it became quite clear that they had been occupied with the very same tasks that other recent migrants to the city had to engage with when first coming to Buenos Aires (finding work, building a home, forming a family, etc.). As Elsa puts it: "I have lived here since 1955. I grew up here. I got my education here, got married here, had my children here. The people who live here… we were born here, our folks died here and they left us here…"

As Flammable residents constructed their lives and relationships, their land, water, and soil were, little by little, being filled with pollutants. Yet because the process of contamination was slow and gradual, their daily routines were never disrupted: no major accidents occurred, no generalized diseases that could be traced to activities in the compound were discovered (such as cases of leukemia or other types of cancers that incited people to act in other parts of the world). And since continuity was never threatened (if anything, residents were, as Catalino notes, "making progress" or as another neighbor, Rosa, puts it "living our lives"), routines ("working, always working") and relations ("we were all friends") rooted residents in Flammable and, simultaneously, obscured the growing toxic hazards.[9] In other words, the lack of major disturbances contributed to the smooth operation of routines in what they do best: work as horses' blinders, enhancing focus on whatever the task at hand was (building their homes, getting a job, putting children though school) and restricting their vision to the dangers that were increasingly shaping up outside of the immediate environment of their homes.

Residents did not abruptly "discover" that their neighborhood was polluted; no alarm suddenly went off, no warning was signaled, no "tipping point" was reached "when

impressions of what was normal quickly changed" (Beamish 2000:481). Lead, benzene, toluene, and all sorts of chemicals gradually accumulated in the ground, streams, and bodies. In other words, Flammable residents' schemes of perception are, much like those of scientists and other professionals within highly specialized organizations, embodied history; their collective frames are "the active presence of the whole past of which [they are] the product" (Bourdieu 1977:56).

The labor of confusion

Classic and current scholarship (Erikson 1976; Heimer 1988; Petryna 2002; Eden 2004; Vaughan 2004) shows that the sources of confusion and ignorance (about surrounding threats or risks) are not the individuals but the context in which actors live and/or work. In Flammable, as we described above, this context has slowly but steadily changed in the last 70 years. It is also a context filled with a multiplicity of incongruous and puzzling interventions. This section examines the (mis)interventions of state officials and the (mis)understandings of doctors who serve the local population. Together they impact on neighbors' (mis)representations of their toxic surroundings.

State (Mis)Interventions

The layout of the installations (tanks, pipes, etc.) within the petrochemical compound illustrates the almost complete lack of state regulation of industrial facilities in Argentina. As the current Undersecretary of Environmental Policy of Buenos Aires told us while we were touring the compound's premises with him: "See the distribution of tanks, gas tanks close to chemical tanks, pipes crisscrossing the area… It's basically the same thing that happened with urban space at large: it's all completely unregulated."

Companies inside the compound have basically been left to monitor their own installations. As late as March 2004, the Secretary of Production and Environmental Policy of Avellaneda publicly admitted that her office does not directly control the plants inside the compound but relies on their reports on their own operations [see also report published in *La Nación*, March 30, 2004]. If neither the federal, nor the provincial or

municipal states have been able or willing to control activities within the compound, they were certainly unlikely to monitor what went on in its adjacent land which was (and still is) used by plants and individual contractors as a free and unregulated dumping site.

Overall, state actors have neither manifested any concern about pollution as a by-product of activities within the compound nor with the effects of environmental degradation for the people of Flammable. As far as we were able to reconstruct – drawing upon oral histories, published documents on the history of Avellaneda, and newspaper reports – the pernicious health effects of industrial pollutants were not even a public issue until fairly recently –an absence that is consistent with the denial documented in the literature (Levine 1982; Freudenburg 1993; Beamish 2001). Things began to change when a progressive administration took charge of the municipal government in 1999, and notably when, an "unexperienced" official (i.e. new to politics, and to the things one can publicly say and do) became the local Secretary of the Environment. With an academic background in environmental sciences, this neophyte politician slowly began to put the issue of what he called "environmental risk and vulnerability" onto the public agenda – and consequently into the collective consciousness of Flammable residents. On December 2000, at the initiative of the municipal government, an agreement was reached between the national administration, the government of the province Buenos Aires, the government of the city of Buenos Aires, and the municipality of Avellaneda to carry out a monitoring of the air quality in the area surrounding the petrochemical compound. The study was to be funded by the Japanese International Cooperation Agency (hereafter JICA). After much wrangling between the parties involved, JICA provided further funds to conduct an epidemiological study that eventually uncovered the lead contamination cited above.

Both the "air" study and the epidemiological one generated intense community activity in Avellaneda and in Flammable. Meetings were organized by the local municipality to explain the details of both studies and to solicit the cooperation of the local population. Noteworthy was the creation of a committee for environmental control (which lasted for about a year and a half and included representatives from both local and provincial governments, community associations, and compound plants).

While these studies were being conducted and community meetings proliferated, several local schools in Dock Sud (the borough within the district of Avellaneda where Flammable is located) had to be evacuated because of reported "toxic leaks," presumably coming from the nearby compound. These episodes, together with the massive publicity received by the "Japanese study" (as many neighbors still call it) and with the public speeches of both the Mayor of Avellaneda and his young Secretary of Environment calling for better controls of compound activities and emissions (see, for example, *La Prensa*, November 8, 2001), had a stirring effect on the local population. In November 2001, approximately two hundred Dock Sud residents (including some from Flammable) manned a roadblock on the entrance to the compound effectively stopping the circulation of hundreds of trucks for a few hours. One protester in the roadblock summarizes the neighbors' claims: "We are always suffering the consequences of toxic leaks and nobody does anything. They come, they take a look, they listen to us, and they leave" (*Diario Popular*, November 8, 2001).

This protest generated a revealing polemic among government officials: the Mayor of Avellaneda (Laborde) accused the government of Buenos Aires of "protecting and defending the private firms of the compound, when it should be protecting the health of the neighbors of Dock Sud" (*Diario Popular*, November 10, 2001). Mayor Laborde demanded the transfer of the power and the resources to control the compound activities. Buenos Aires government officials swiftly replied that "the municipality already has jurisdiction over the compound… this polemic makes no sense." The mayor, in turn, said that "on the one hand there are the companies that contaminate and on the other the government of Buenos Aires that is not controlling them as it should." We would not be focusing attention in this passing public debate among officials if not for the fact that we think it illustrates the way in which the problem of industrial pollution (and its real-life consequences) is being treated by the state: <u>as a problem whose solution is always someone else's responsibility</u>. A reproach made by a state official to the active secretary of environment when the latter publicized the results of the JICA report summarizes the usual state attitude: "Since you [referring to the official who was broadcasting the JICA report to national media] created the problem, you have to solve it." As the former local secretary of environment told us: "This is how officials see the issue of contamination, as

a problem that some of us create for them…" Not for nothing, this official refers to the JICA report as an "Exocet… a missile capable of making a lot of damage, for other state officials, that is."

A month after the release of the second JICA report, the President of Argentina and the Governor of Buenos Aires signed an agreement to relocate the petrochemical compound. In a public meeting celebrated in one local school that, only two years earlier, had to be evacuated because of toxic leaks, President Kirchner said:

> We want companies to come [to the country] to produce, but we are tired of them coming at any cost… these companies generated a lamentable environmental situation… The environment is part of our riches and part and parcel of our quality of life. [The compound] is an affront to the dignity of all the Argentines… (*Telam*, September 11, 2003)

Neither local officials nor Shell personnel took this agreement or the public announcement that followed seriously: "They didn't sign anything," actors (state officials and Shell personnel) who are usually on opposite sides of the debate told us. When we interviewed the current Secretary of Environment of Avellaneda, she admitted that the agreement for relocation of the petrochemical compound was an "optical illusion." Events seem to prove them right. Since 2003, other than non-compulsory lead-screening for the poisoned children (screenings that were constantly suspended or postponed), nothing has been done to address either the problem of environmental contamination or massive poisoning head-on, notwithstanding the incendiary pronouncements of public officials against the contamination produced by the compound.

On the one hand, state officials raise the issue of contamination, publicly denounce the companies that operate the compound for its health-threatening emissions, push for a thorough study of the extent and effects (though not of the sources) of industrial pollution, and (in the words of none other than the President himself) promise the relocation of the compound. On the other hand, as we witnessed several times during the course of our fieldwork, state officials randomly show up in Flammable talking about relocation (not of the compound, but of the neighborhood) or conducting a census

presumably related to removal. They then disappear without leaving traces of this or that relocation plan. During our 30 months of fieldwork, we also witnessed state officials' push for a thorough lead-screening program which was then surreptitiously suspended and later arbitrarily re-started without explanation. In this way, the state's "averted gaze" (represented in the words and deeds of high and low-level officials) feeds uncertainty and confusion "by its implacable opacity, its refusal to comprehend, and its inability to act responsively to the human suffering that presents itself" (Scheper-Hughes 1992:294). How can residents not be puzzled if state officials, presumably in charge of their well-being, send such a barrage of (confusing and contradictory) messages?

Doctors' (Mis)Understandings

Several times, in the course of formal interviews or informal talks, Flammable residents told us that local doctors advise them that, if they and their children are to be cured, they have to move out of Flammable. Other times, residents report the confused and confusing silence of doctors concerning their complaints or their recourse to an "aspirin prescription" – which residents know fully well "does nothing." Some of them even suspect that since "doctors are paid by Shell" – something that is not true, even if the local center was built with Shell funds – they have to "keep their mouths shut."

In extensive interviews conducted with physicians at the local health center we encounter puzzling responses to our queries regarding the population's precarious health and its connection to environmental contamination. As with residents, among medical personnel denial is mixed with, on the one hand, utter ignorance regarding the documented links between poison and individual health and, on the other hand, with their own suspicions about, in a doctor's own words, "something strange going on here."

In our first visit (July 2004), a team of three doctors and a nurse talked to us about what they saw as a set of common health problems in Flammable. Relying on their experience in other poor areas, however they contended that the pathologies affecting Flammable residents were no different than those affecting other impoverished enclaves. In a diagnosis that separates something that usually comes together (i.e. poverty and environmental degradation), they matter-of-factly said: "Illnesses here are the result of

poverty, not of contamination." Respiratory diseases are not caused by pollution but "by the problems of poverty, such as overcrowding." When asked about the reasons for the uncommon existence of a health center with a 24 hour emergency service, an operating ambulance, and seven working doctors on site, their common reply further accentuated their cognitive dissonance: "Well, yes, to tell you the truth, there's something rare here. But we don't know. Nothing is what appears to be in Flammable."

A year later (July 2005), we interviewed a pediatrician and a clinician who worked at the health center during the morning hours. They also denied the existence of pollution related illnesses that are exclusive to Flammable. They contended that the anemia and allergies in the community are quite common in other poor areas as well: "What you see here is the same thing you treat in [the poverty-ridden district of] Solano." When quizzed specifically about the probable effects of pollution, they told us (in the individualizing logic typical among doctors) that until adequate case studies are conducted any conclusion about toxicity in the environment would be premature. But, at the same time, they added that the local population should be relocated because "this area is uninhabitable" (incidentally, one of the JICA air quality monitors was located at the health center and registered higher than normal concentrations of benzene there). They also told us about two recent cases that clearly undermined their own pronouncements that contamination is not the problem: "A while ago, two women became blind. That might be because of contamination."

These two doctors do not know much about the JICA epidemiological study and think (wrongly) that lead affects only the children of adults who are working with lead. There are no contamination-related diseases here, they repeated several times. And yet, in the course of our conversation, it became apparent that they had little training in the detection and diagnosis of this kind of diseases. In 7 years of study at the school of medicine, they only took one class on environmental health. One of them tried to dispel her own never fully-articulated uncertainties about the situation by having herself tested (for lead, chrome, and toluene). Both doctors added that a former physician left the center because "she claimed she was contaminated with toluene. Apparently this physician was tested again at her new workplace and her levels of toluene were even higher. So," they deduce, "it can't be this place."

Doctors at the local health center are not alone in combining ignorance and suspicions. The Associate Director of the main hospital of Avellaneda (and one of the largest in Buenos Aires) told the Federal Ombusdman office that his hospital did not have the ability "to identify the toxic substances or to conduct studies" on contamination-related illnesses. In his interview with a Federal Ombudsman team this high level functionary said he knew about the JICA study but, he admitted, ignored its findings. Officials from the Federal Ombudsman office found the same lack of factual knowledge among the physicians of two nearby health facilities: the Hospital Ana Goitía (specializing in pregnancies, births, and neonatology) and of the Hospital Cosme Argerich (both hospitals serve the population of Flammable).

Although physicians seem convinced that there are no specific health pathologies in Flammable (and tell us they communicate that to their patients), sometimes their patients heard something different from them. Many residents told us that their doctors advised them to move out of Flammable because their (or their children's) sickness might be related to their place of residence. We have no way of telling whether doctors actually conveyed that to them; what is important however, is what residents sometimes hear from the doctors they trust. The contradictions between physicians' deeds and words and the apparent differences between their public attitude and what they say in the context of individual interactions are sources of confusion. How can local residents not be mystified and mistaken if even local doctors are doubtful and/or wrong about the sources of disease in Flammable?

DISCUSSION AND CONCLUSIONS

Our long-term ethnography captures the collective construction of toxic uncertainty and mistake *in situ*, as it unfolds.[10] We were there at the time neighbors were discussing their individual or collective fate, at the time they were, either jointly or individually, wondering out loud about the possible short-term and long-term effects of air, water, or soil pollution. We were also there at the time when all sorts of simultaneous and oftentimes contradictory material and symbolic interventions were molding people's perceptions of their surroundings: We were there reading the newspaper and watching TV

with residents when news about the relocation of some compound plants were announced and when municipal officials informed the public that "soon" hundreds of families were going to be moved out of the neighborhood "because of the contamination." We were there when children's lead screenings were abruptly suspended and then suddenly re-started (without any official explanation), and when neighbors paid visits to the local doctors in search of some cure to their recurrent allergies. Ours was not a retrospective reconstruction but an embedded form of inquiry in real time and space (Willis and Trondman 2000; Wacquant 2005).

Once we ethnographically tilled the soil of actually-existing meanings and behaviors related to surrounding contamination we found neither the shared critical understandings regarding toxic danger nor the state discourse of denial or minimization described in the literature on risk perceptions and collective action around environmental issues. Instead we uncovered confusions and contradictions. Toxic contamination is "inherently uncertain" (Edelstein 2003): the body's past exposures, the dose-response relationship, synergistic effects, and etiological ambiguity all contribute to the problem of haziness in both toxicology and epidemiology (Brown et al. 2000), even more so when the activities of big companies are involved (Phillimore et al. 2000). In this paper, we took heed of the insights of cognitive psychology and organizational sociology and argued that widespread toxic uncertainty does not solely stem from the intrinsic complexity of environmental contamination but also from the relational anchoring of local residents' perceptions and from the labor of confusion performed by powerful actors.

"Patterns of information obscured problem seriousness," writes Diane Vaughan (2004:331) in her exploration of the ways in which a cultural belief in risk acceptability is produced and normalized within NASA. The identification and correction of problems such as recurring O-ring damage were, she argues, blocked by organizational patterns (1990). These patterns (in NASA's case, autonomy and interdependence) undercut effective discovery and obstructed collective knowledge. The normalization of risk and the perpetuation of mistake do not derive from technological complexity alone but from organizational forms. Lynn Eden (2004) makes a similar argument when analyzing the reasons why predictions of fire damage caused by nuclear blasts were not incorporated

into the organizational routines developed by the U.S government for use in nuclear war planning (see Tilly 2006). In both cases, we see how perceptions are situated in specific social universes; recurrent relations within these universes condition what insiders overlook, fail to note, and/or misinterpret.

The kind of radical contextualization of belief-production that Vaughan and Eden call for can be extended beyond the limits of complex organizations (such as NASA or the U.S. military) and into the less-formalized but equally routine-governed world of a neighborhood.[11] True, the Shuttle program and the office that conducted studies of fire damage were not the dysfunctional and inept organizations responsible for the welfare and health of Flammable shantytown, but the same anchoring of perceptions is apparent. If problems occurred in the shuttle and nuclear programs, one can understand why the dynamics the affect the shantytown could be so much worse.

Risk frames (what people see, what they don't see, what they know, and what they don't know) are socially produced but this production is hardly a cooperative creation. The anchoring of perceptions is a crucial process in the molding of the collective schemes residents use to assess hazards and so are the displays of (material and discursive) power that manipulate risk frames (Heimer 1988). Given that opinions and interventions are endowed with different power (Thompson 1984; Bourdieu 1991; Perrow 1999), what physicians have to say about health in the neighborhood (and what they silence) and what the President or other state official affirm, do, or avoid doing, carry a different weight than what a regular neighbor asserts or does. Future work on other contaminated communities should empirically examine the specific forms that the relational anchoring of risk perception takes and the varying influence of the labor of confusion. This empirical work should certainly include attention to the presence of other (individual and collective) actors that might counteract the reproduction of toxic uncertainty (for work in this direction focused on NGOs, progressive state actors, and social movement activists, see Mello 1998).

Typically, risk frames are used as an independent variable to explain the collective actions people take to protest (and protect themselves) against toxic hazards (Tierney 1999; Brown and Mikkelsen 1990; Beamish 2001; Lerner 2005). Although the general uncertainty that we analyzed might be related to the collective quiescence that is quite

apparent in the neighborhood, this paper did not focus attention on this latter (and analytically different) aspect (for a classic statement on collective inaction and the power mechanisms involved in producing it, see Gaventa 1980). We focused instead on the (confused and mistaken) beliefs people hold about danger as dependent variables inspecting the social origins of these perceptions.

In the scholarship on social movements and contentious politics, there is no generalizable connection between participation and consciousness or, more specifically, collective action and certainty. Protest might be the consequence (but also the cause) of increasing critical awareness or knowledge (for different arguments see Tilly 1978; 2003; McAdam 1982; Snow and Benford 1988; 1992; Tarrow 1998; Mansbridge and Morris 2001). Further research should empirically scrutinize the links between the social production of risk frames and their social outcomes (being protest or quiescence). Such analyses will further our understanding of the connections between perceptions of danger and mobilization and, more generally, of the recursive relationship between collective understandings and joint action.

ENDNOTES

[1] For an illuminating application of cognitive heuristics to the study of policy diffusion, see Weyland (2005). For an illustration of the working of heuristics for the case of toxic poisoning, see Heimer's (1988) interpretation of Clarke (1989) and Levine (1982).

[2] Larry Wilson in Yellow Creek, Key Jones and Kathleen Varady in Pennsylvania, Anne Anderson in Woburn, Margie Richard in Diamond, and the now legendary Lois Gibbs in Love Canal, are the best-known examples of stubborn, almost heroic, leaders of "long and bitter" struggles (Couch and Kroll-Smith, 1991).

[3] For work along these lines, see Francoise Zonabend's (1993) study of risk perceptions among residents living near a nuclear reprocessing plant in Normandy, France.

[4] From 2001 to 2006, the population living in precarious settlements in Greater Buenos Aires almost doubled. According to a study conducted by the geographers at the Universidad de General Sarmiento (*La Nación* July 10, 2006), the population of slums, shantytowns, and squatter settlements went from 638,657 residents living in 385 precarious settlements in 2001 to an estimated of 1,144,500 living in 1000 precarious settlements in 2006.

[5] 10 ug/del (micrograms per deciliter) is now considered to be a normal blood level of lead. On the history of lead epidemiology, see Berney (2000) and Widener (2000). On the history of "deceit and denial" concerning the pernicious effects of lead, see Markowitz and Rosner (2002). See also Warren (2000).

[6] Lead accumulates in the human body (in the blood, in tissues and bones) in proportion to the amount of lead found in the environment. Lead in the environment results from the use of lead in industry. Lead absorption (measured in feces, urine, blood, and other tissues) is the indication of exposure and poisoning (Berney 2000:238). According to the U.S. Environmental Protection Agency, lead "may cause a range of health effects, from behavioral problems and learning disabilities, to seizures and death." Extremely high exposure to lead "cause encephalotpathy and death, lower doses cause severe retardation, and lesser doses lead to school problems, small but significant shifts in IQ, and other measures of central nervous system function" (Berney 2000:205).

[7] Curiously enough, African-American residents in Diamond (Lousiana) tell similar stories about the relocation of original inhabitants forced by Shell. See Lerner (2005).

[8] On the "incubation" of hazards, see Turner (1978).

[9] On the containment of risk through the performance of everyday activities, see Skinner (2000).

[10] For similar calls for ethnographic studies in naturalistic settings, see Vaughan (1998); Wacquant (2005).

[11] For another call for contextualization of risk perceptions, see Beamish (2001).

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Periodicals

Clarín

La Nación

Página12

Diario Popular