

Critical syntheses

The population growth debate in the public sphere

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1. *Introduction*

According to the United Nations the world population in 1990 was 5.29 billion people. A more important statistic to many concerned with the global impact of population, however, is the distribution of population in terms of development. Less developed countries (LDCs) account for 4.09 billion people (about 77% of the total) while the developed countries (DCs) have 1.20 billion people (about 23%). Perhaps the most important figures, at least in terms of prevalence in population discussions, are the annual rates of population growth, which the UN projects as 2.08% (for the LDCs) and 0.48% (for the DCs) from 1990–1995 (UNPF, 1991, p. 39).¹ If these rates remain relatively stable for the next 17 years, and there is reason to believe that they will, the world in the year 2010 will have 7.20 billion people, of which 6.17 billion will live in the LDCs and 1.33 billion in the DCs. ‘So why fret?’, someone might interject. To some this might be an appropriate response, but for others it is an entirely misguided one, and one that could spell disaster for many humans, and soon thereafter all of humanity. In a nutshell, this response and the vigorous attacks on it constitute what is known as ‘the population growth (PG) debate’.

Why should we be concerned? The Earth Summit (officially designated the UN Conference on Environment and Development (UNCED)) held in Rio de Janeiro in June 1992 is just one of many indications that environmental issues are now getting serious attention by the majority of world leaders. International discussion along these lines is growing more complex (i.e. multi-dimensional) by the ever-expanding nature of environmental considerations. Contemporary examples include global warming and biodiversity, as well as the increased visibility, in the West, of ‘non-Western’ perspectives on environmental matters. Inextricably related to these environmental matters is the question of population growth. According to Nafis Sadik, Executive Director of the UN Population Fund, PG issues are central to any discussion of forces impacting upon the environment (UNPF, 1991, p. 3). Although there is wide disagreement on how continued PG might affect the environment (as will

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become clear from the positions presented in this paper), there is general agreement that, outside of an extraordinary technological development in the near future, increasing the size of the population will inevitably require more sacrifice on the part of the environment. At the 1992 Earth Summit, there was general consensus that the PG issue needs to be addressed, despite the hesitations and the difficulties of doing so. Although little more of substance was actually discussed on the subject at the Earth Summit, this relative lack of discourse was counterbalanced by a more lively exchange at the Global Forum, a parallel conference to UNCED attended by about 2000 non-governmental organizations (Holloway, 1992). In short, the international community recognizes that an increasing population requires, at a minimum, increased circumspection (UNFPA, 1985).²

With this motivation, I examine the present state of play in one small but surprisingly conspicuous community discussing the PG question, that of academic scholars.³ All but one of the thinkers I will focus on have been introduced to the public to a significant degree, either by their writings—widely sold books or essays in well-circulated magazines or newspapers—or through their exposure in the political spotlight. They have engaged the PG question from a variety of vantage points, but their accounts are sufficiently interrelated and thorough to allow for what I hope will be a thought-provoking commentary on the PG debate.

In this paper I will be concerned with two aspects of the debate—the form and content of the communications among the major thinkers. Specifically, are the thinkers, who publish numerous tracts in many venues, actively participating in an exchange of ideas with parties who have alternative perspectives? In addition, when the thinkers do interact, what forms the substance of their interactions? In what follows, I attempt to answer these two questions. I will also draw on the conceptual models offered by Douglas (1992) and other thinkers from economics and biology in order to suggest how the PG discussion might proceed more constructively. These recommendations will focus on three areas of PG discourse—*character, content, and domain of argumentation*—and are directed not only to the spokespersons highlighted in this paper, but, more particularly, to those who are most directly engaged in the policy arena. For, it is these individuals who might be in a position to provide incentives for the PG spokespersons to engage each other more directly. While I do not expect that the PG question will be resolved in the near future, my hope is that the spokesperson's arguments can become more focused by being more mutually responsive, and that genuine efforts can be made to establish norms for PG discussion.

The paper will proceed as follows. First, I shall justify the choice of the PG spokespersons who are the central focus of the investigation. Then, I will give a brief introduction to these thinkers, highlighting those aspects of their views that are most relevant. Next, I will discuss the communication patterns found among the thinkers. In particular, I shall concentrate on the following findings: (1) the thinkers use no focused written forum to communicate their ideas; (2) the thinkers communicate publicly with one another in a very inconsistent manner; and (3) their communications, when they do interact, tend to be antagonistic in nature, which prevents them from being purposeful. Then, by examining the thinker's ideologies, assumptions, and omissions found within their works, I will describe the incommensurabilities that are a natural outgrowth of any comparison of their outlooks on PG. Finally, I shall offer a number of ways in which the dialogue among the thinkers might be improved.

2. *Justification of voices*

Before proceeding with the main sections of my paper, let me justify my choice of PG spokespersons. In making the selection, I tried to assemble a group whose members met the following three criteria. First, they ought to be well-known for their work in matters relevant to PG. Second, they ought to provide coherent, detailed, distinct, and relevant arguments on the subject. Finally, they ought to come from a variety of disciplinary backgrounds.

The first criterion selects for prominent spokespersons of PG matters, as indicated by their being cited in recent third-person literature (see Russett and Starr (1985), Repetto (1987), Paehlke (1989), Wagar (1991), Mann (1993)). As way of indicating how 'popular' these gentleman are both in social science as well as science literature, I have presented in two notes, the results of a brief citation analysis of my six PG thinkers.^{4,5}

The second criterion selects for thinkers who discuss germane PG topics (as it concerns policy) but whose views do not overlap too much. Specifically, the thinker's must have tackled the subject of PG at great length. Also, the thinkers' needed to have proffered a coherent literature in order for the substance of their arguments to be sufficiently conspicuous and lucid.

Criterion three selects for thinkers who have different senses of what information is relevant to PG, as this is expected to have considerable influence on a person's outlook (worldview). Although much third-person literature draws on disciplinary distinctions—either biological sciences or economics—for explaining the positions taken in the debate, I think that many of these are too superficial. In fact, understanding the breadth of viewpoints *within* a discipline, is a step more in the direction of understanding the complexity of the issue.

My basis for drawing the playing field for the PG debate in this way is that it roughly corresponds to the way in which it is drawn in many works (including Dunlap (1983), Russett and Starr (1985), Paehlke (1989), Bailey (1990), Boyce (1990), and Mann (1993)). However, my account is a broader and more thorough examination in terms of the number of variables considered, namely, thinkers' ideologies, assumptions, omissions, and communications. A more expanded version of this essay would undoubtedly include a more extensive account of PG thinkers from Third World, feminist, and underprivileged communities, but the positions and arguments of the representative thinkers are more than sufficient to identify many weaknesses in the PG debate.

3. *The voices*

A brief introduction to each of the six thinkers follows (a brief summary of this information can be found in tables 1 and 2).

Julian Simon, a highly controversial and unorthodox thinker of PG, has written extensively on the economic aspects of population.⁶ *Population Matters* (1990b), one of Simon's most comprehensive works, offers the substantive details of most of his important arguments in favor of future PG. Simon (1990b, p. 172) holds that PG is in the long term (i.e. in the next 30–120 years) a positive development. Other self-proclaimed unconventional ideas posited by Simon are the following: (1) raw

Table 1. *The PG thinkers.*

Name	Disciplinary background and position(s) held	Pro/Anti PG [†]
Lester R. Brown	Agricultural Science and Agricultural Economics, President of the Worldwatch Institute (1974–Present), Aspen Institute Fellow (1972–74)	Anti
Barry Commoner	Biology, Environmental Science and Geology, Currently Director of the Center for Biology of Natural Systems at Queens College in New York City	Pro
Paul R. Ehrlich	Biology, Bing Professor of Population Studies at Stanford University (1976–Present), Member of the National Academy of Science	Anti
Garrett Hardin	Ecology, Professor at UC-Santa Barbara	Anti
Robert S. McNamara	Business Administration, President of the World Bank (1968–81), US Secretary of Defense (1961–68), member of Brookings Institute	Anti
Julian L. Simon	Economics, Professor of Business Administration at the University of Maryland	Pro

[†]Anti-PG: those adamantly opposed to PG and consider it a key liability to our future.

Pro-PG: those having a positive regard for PG (Simon) or denying that PG is the root cause of the world's problems (Commoner).

Note: Some have simplified the population debate by describing it as a clash between polar communities; a dichotomous move that I contend only confuses and obfuscates the central issues. First, recent economics shows definite signs of support for the limits-to-growth model, suggesting that disciplinary outlooks change over time. Second, the views of the members of a professional group, such as 'ecologists', 'biologists', or 'social scientists' tend to get treated as if they were uniform, which just isn't the case. Furthermore, divisions made along the lines of disciplinary association (e.g. ecologists/economists (see Simon, 1987) or cornucopians/environmentalists (see Grant, 1983) or ideological stance (e.g. Cassandras/Pollyannas (see Mann, 1993)) tend to underestimate the true continuum of views that exists.

Table 2. *PG thinkers' views.*

Position statements	Brown	Commoner	Ehrlich	Hardin	McNamara	Simon
Continued population growth will wreak havoc on the world.	S	U	S	S	S	R
Population growth is good for the economy.	R	U	R	R	R	S
Resource shortages function as a positive mechanism in the economy.	R	R	R	R	R	S
The proper use of technology in the future will have a tremendous impact on resolving most of society's present maladies.	S	S	R	R	R	S
The world is overpopulated.	U	R	S	S	S	R
Population control assistance from affluent countries to the developing world is required.	S	R	S	S	S	R

Key: S, supports; U, uncertain; R, rejects.

materials and energy are becoming less scarce; (2) the world's food supply is improving; and (3) the US needs more immigrants.

In terms of specific arguments, Simon's thinking on PG is very intriguing. In his account, resource shortages are not to be forestalled, as the following economic mechanism suggests:

PG and increase of income expand the demand for raw materials as well as finished products. The resulting actual and expected shortages force up prices of the natural resource. The

increased prices trigger the search for new ways to satisfy the demand, and sooner or later new sources and innovative substitutes are found. Eventually these new discoveries lead to natural resources that are cheaper than before this process begins, *leaving humanity better off* than if the shortages had not appeared (1990b, p. 2; my emphasis).

Moreover, the use of more resources and the creation of temporary shortages will result in a higher standard of living for those nations supplying these products, often the developing countries. He states, 'the appropriate question is the best way to create resources, and whether it is cheaper to create more resources or to prevent use of resources and require saving of waste' (1990b, p. 7). As regards Malthusian theory,⁷ Simon states that the evidence does not confirm the conventional theory, i.e. 'the more people using a stock of resources, the lower the income of the person, if all else remains equal' (1990b, p. 166). He notes the explosion of population and economic development in Europe from 1650 onwards and the individual countries of Australia, Norway, and France as illustrative examples of how output per capita and PG are not correlated. A fundamental fact of economic growth, which Simon claims has been left out of the standard (i.e. neo-classical) model, is the increase in productivity that results from people's creative powers (1990b, p. 171). Simon also supports the notion of 'economies of scale', i.e. the greater efficiency of larger-scale production. His staunch pro-PG attitude is further exemplified in the following sentiment: the concentration on PG as the major cause of starvation, illiteracy, pollution, supplies of natural resources and slow growth 'has directed our attention away from the factor that we now know is central in a country's economic development, *its economic and political system*' (1990b, p. 174; my emphasis).

Barry Commoner, a biologist currently directing the Center for Biology of Natural Systems at Queens College in New York City, has authored three widely-cited books—*Science and Survival* (1966), *The Closing Circle* (1971), and *Making Peace with the Planet* (1992, first published in 1975). In the latter work Commoner describes the world as broken up into two spheres: the *ecosphere*, comprising the natural things in the world, e.g. air, water, soil, plants and animals; and the *technosphere*, consisting of man-made things, i.e. factories, power plants, automobiles, petrochemicals, etc. It is within this framework that Commoner proceeds with his arguments. To him the central issue that humanity faces is:

not how to facilitate environmental quality by limiting economic development and PG, but how to create a system of production that can grow and develop in harmony with the environment. The question is whether we can produce bountiful harvests, productive machinery, rapid transportation, and decent human dwellings sufficient to support the world population *without despoiling the environment* (1992, p. 148; my emphasis).

Implicit in Commoner's remarks is a support of scientific and technological progress but one within the bounds (or limits) allowed by the environment. He also believes, unlike Simon, that economic growth has limits as well; he writes, 'the ultimate limit on economic growth is imposed by the rate at which renewable, solar energy can be captured and used [which is far higher than anything we can imagine today]' (1992, p. 147).

Central to the Commoner thesis is the belief that the type of production technology employed determines the extent to which the ecosystem is destroyed. Further, PG, here not seen as the root cause of environmental stress (1992, p. 175), tends to wither away as countries accrue wealth and demographic transition occurs, as has been characterized by all industrialized nations (1992, p. 156–157). Similar

to Simon's views, social and economic factors are seen as equally powerful as biological factors (i.e. fertility and contraception) in the determination of PG. Although Commoner warns that the future looks bad because distribution still poses a serious problem and future energy use by developing nations will be enormous, the environment, and, hence, its people, could be spared if 'ecologically sound technologies' were utilized (1992, p. 166). However, the major source of the present overpopulation rests not on scientific choices but political ones. Commoner writes,

the world population, which is the ultimate outcome of the exploitation of poor nations by rich ones, ought to be remedied by returning to the poor countries enough of the wealth taken from them to give their peoples both the reason and the resources voluntarily to limit their own fertility (1992, p. 168)

Paul Ehrlich,⁸ a biologist at Stanford University, has written many books and articles on the subject of PG. His many books include the best-selling *The Population Bomb* (1971) and more recently, its sequel, *The Population Explosion* (1990a, co-authored with his wife, Anne Ehrlich). In these works, Ehrlich attempts to delineate the crisis state that he envisions arriving in the near future. Owing to the ever-expanding global population, he predicted in 1967 that 'sometime between 1970-85 the world [would] undergo vast famines—hundreds of millions of people are going to starve to death' (Hardin, 1985). The resulting tragedy would occur because the population density in many parts of the world would make the available resources and the capacity for the environment insufficient to sustain human activities (Ehrlich and Ehrlich, 1990a). In response to these ominous developments, Ehrlich supports population control and government intervention of many forms.

Concomitant with starvation, problems including flooding, desertification, water shortages, and other stresses on ecosystems, are, in Ehrlich's view, inevitable. Ehrlich states that all nations are overpopulated, and such a condition necessitates the unequal access to wealth and resources that are observed today (1990a, p. 39). Thus, PG isn't seen as a problem of redistribution but rather an overabundance of people, who have reached critical mass, i.e. reached a stage where I , in the equation $I (\text{impact}) = \text{Population} \times \text{Affluence} \times \text{Technology}$,⁹ has become increasingly large (1990a, p. 58).¹⁰ As evidenced by the subject matter of his work, Ehrlich, unlike Simon, is also cognizant of the connections between warfare, environmental deterioration, poverty, racism, sexism, smog, and crime. Further, he makes explicit the need for understanding the world from alternative perspectives: 'we must learn to identify with the plight of our less fortunate fellow on Spaceship Earth if we are to help both them and ourselves survive' (1971, p. 2). However, his unrelenting focus on population as the major source of many of the world's problems has prompted many to pejoratively call him a 'population reductionist' (Swaney, 1991, p. 502; Boyce, 1990).¹¹

Known best perhaps for his short article 'The tragedy of the commons' (1968), Garrett Hardin, an ecologist at the University of California at Santa Barbara, has received much notoriety. As an arch supporter of population control, Hardin has taken controversial positions, as indicated by the following sentiment (in Commoner, 1992, p. 167):

How can we help a foreign country to escape overpopulation? Clearly the worst thing we can do is send food. . . . Atomic bombs would be kinder. For a few moments the misery would be acute, but it would soon come to an end for most of the people, leaving a few survivors to suffer thereafter.

According to Hardin, strict governmental regulations are necessary to curb the world's ever-expanding population.

On numerous occasions Hardin refers to the lifeboat as analogous to the world's current status. Since the lifeboat has a maximum weight above which it will sink, Hardin contends that a sizeable portion of the original passengers [or today's global populace] must be left to drown; 'It is literally beyond our ability to save them all' (Commoner, 1992, p. 156). This severe form of triage is defended without hesitation or remorse and by necessity.

Hardin conceives of PG as problematic in that the 'commoner' following a rational, self-interested logic thinks she is better off if her family grows. Unfortunately, those who, recognizing the limits to which society can exploit the environment, decide to abstain from procreation are the ones who suffer ultimately. They must suffer because the large majority of society continues to overpopulate and thus wreak havoc on the earth. Along these lines, Hardin attacks Adam Smith's concept of 'invisible hand' as ludicrous and unfounded (1968, p. 1244).

Finally, Hardin classifies the population problem as a 'no technical solution problem', i.e. requiring not only change in the techniques of the natural sciences but also change in values and ideas of morality (1968, p. 1243). The necessary reductions in population, the root cause of environmental damage, will therefore require a moral paradigm shift. However, since humans are characterized by their 'persistence and ubiquity of denial' (1969a, p. 47), many of these changes will need to be coercive and limit personal liberty, especially the right to procreate. However, Hardin doesn't see this as so tremendous an alteration of society, stating that 'the tragedy of the commons' has brought about similar regulations, including those on waste disposal and property tax.

Robert S. McNamara, former US Secretary of Defense under Kennedy and Johnson, and former president of the World Bank, contributed a chapter, entitled 'The population problem', in a recent UN Environment Programme publication (Tolba and Biswas, 1991). In this article, McNamara begins with the premise that PG rates have been falling 'significantly' in most developing countries during the 1970s. This observation entails for McNamara, unlike the conclusions drawn by Simon, that more stringent reductions be made before population in many parts of the world grows 'far beyond the limits consistent with political stability and acceptable social and economic conditions' (McNamara, 1991, p. 48).¹²

According to McNamara, inevitable by-products of current PG are 'rising numbers of labour-force entrants, faster-expanding urban populations, pressure on food supplies, ecological degradation, and increasing numbers of "absolute poor" [i.e. people living beneath any reasonable definition of decency]' (McNamara, 1991, p. 56). These expansionary ills, McNamara believes, cannot be adequately dealt with by vigorous improvement in economic growth. Unfortunately, McNamara continues, in the attempt to eliminate the problems associated with PG, brutal, inhumane, and coercive governmental and familial actions have been one of the major solutions. In response to these developments, McNamara thinks that governments must take an active, yet humane, role, in so far as they encourage small families and provide ample means to implement that desire.

Lester Brown, current president of the Worldwatch Institute, has published extensively on issues concerning agriculture, PG, and the environment. In 1974, while at the Aspen Institute, Brown published the book *In the Human Interest*, a thorough examination of PG, to serve as the major backdrop for the historical UN Population

Conference held in Bucharest in August 1974. He has followed up this work with numerous Worldwatch Papers including the broad, yet impressively simple, work 'Twenty-two dimensions of the population problem' (1976, co-authored with Patricia McGrath and Bruce Stokes). Without question, similar to other voices we have heard, Brown has dedicated his life to resolving PG-related questions.

According to Brown, the problems manifested during times of PG will touch all. However, some problems are more likely to affect the developing nations more harshly, e.g. inflation. In order to rectify this predicament, Brown issues a plea for altering values and shifting priorities. In Brown's view, fertility programs (e.g. family planning services) are the most productive way to deal with PG. Secondary, yet still important, are measures that would improve social conditions (e.g. nutrition and literacy) and reshape economic and social policies (e.g. minimum age for marriage and limiting tax deductions for procreators).

4. Communication within the PG community?

In our quest to understand the PG discussion better, it behooves us to look at how, and to what extent, the thinkers are talking to, about, and around each other. Presumably, the interactions discovered will help us to answer the question: 'Does there exist a debate concerning PG, or rather, is the discussion one of fragmentation and avoidance of the real issues?' Although communication does not entail coherence of argument, a lively interchange would be a step in the direction of purposeful discourse. In reading the summaries below it is important to remember that I only consulted published articles and books in my examination of the thinkers' communication patterns, so any unpublished, informal communications between thinkers would therefore have eluded me.

Among the thinkers, Simon introduces the others more often than anyone else. For instance, in *Population Matters* (1990b), he dedicates two rather lengthy sections to direct discussions with opposing views—one is an interchange with Ehrlich and the other a discussion with Hardin, each of whom find their way into his work on a regular basis. On occasion, Simon also refers to the other thinkers, spending more time on Brown and Ehrlich, but does so in an irregular way. However, Simon's lack of any open engagement with Commoner (as noted by only one brief mention of him in three of his most significant works (i.e. Simon and Kahn, 1984; Simon, 1990b, 1992) indicates an unwillingness on his part to become involved with someone who challenges the means of technological production so vehemently; an item so meaningful in Simon's account. Although Simon's inclusion of other's thoughts doesn't generally contribute positively to his discussion, when he publishes longer pieces by the 'challengers' in his works (Simon, 1990b, pp. 369–74, 397–404) they do serve as good counterpoises.

In contrast, Commoner engages only a few thinkers but pays no attention to those outside the scientific community (i.e. McNamara and Simon). When he quotes a thinker (specifically Hardin and Ehrlich), he does so as a springboard to illustrate how considerably different his arguments are from the others; a case in point is found in Commoner (1972) detailing how his technological impact variable far outweighs the variables taken into account by Ehrlich. Finally, Commoner makes no direct mention of McNamara and mentions Brown only sparingly, which is

especially surprising given the public attention garnered recently by Brown's Worldwatch Institute.

Ehrlich, while an author of many books and journal articles, tends not to mention the other PG thinkers very often in his larger works. In these pieces, Brown gets the most citations while Hardin and Simon get mentioned less often. Ehrlich has however published a lengthy review of Simon and Kahn (1984) as well as Cobb and Daly (1989)—Daly being an economist whose outlook is in great opposition to that of Simon.¹³ Ehrlich got into a rather heated debate with Commoner in the early 1970s (Ehrlich and Holdren, 1972), but subsequently Ehrlich has chosen not to refer to Commoner in Ehrlich and Ehrlich (1990a, 1991).

Hardin involves himself with the other thinkers' works to a significant extent. Hardin (1972) dedicates a chapter to Commoner's thoughts and he provides a fairly extensive review of Simon's *The Ultimate Resource* (Hardin, 1981a). He also includes two short pieces by Ehrlich in his edited volume *Population, Evolution, and Birth Control* (1969a). Hardin's comments tend to be less antagonistic and more diplomatic than most.

Except for briefly mentioning Ehrlich, Commoner and Hardin in *State of the World, 1991*, Brown pays little lip service to the thinkers in his writings (1974, 1979, 1981, 1983). Finally, McNamara similarly makes no reference to the other thinkers as his works tends to be self-contained tracts.

To summarize my findings, the thinkers do not, except on a few occasions, directly reference the other voices. When references are made they tend to be minor ones, except for a few more lengthy engagements between Simon/Hardin, Simon/Ehrlich, and Commoner/Ehrlich. The source of this lack of engagement among the thinkers isn't entirely clear. Perhaps these thinkers deliberately avoid including controversial opinions within their work. Unfortunately, such methodological evasion doesn't help to push the discussion in a more commensurable direction. Perhaps the thinkers are motivated to achieve their own identity and thus are disinclined to mention others who take an equally broad look at PG questions. In any case, the communication patterns found do indicate that an interactive, constructive discourse has not manifested itself—a definite weakness among these PG thinkers. In conclusion, my findings suggest that: (1) the thinkers have no focused written forum to exchange their ideas; (2) the thinkers communicate publicly with one another in a very inconsistent manner; and (3) their communications, when they do interact, tend to be antagonistic in nature, which prevents them from being purposeful. Certainly, if these PG thinkers want to enhance the clarity and success of their debate, they will have to make improvements along these lines.

5. Ideologies, assumptions, omissions and commensurability

In my reading of the PG literature, it has become clear that the thinker's outlooks are a conglomeration of a number of components, including catchwords, definitions, ideology, assumptions, goals and omissions. Table 3 provides a synopsis of three of these key components, namely ideology, assumptions and omissions. With this information in mind, I will present evidence for my contention that there exist serious incommensurabilities among the PG thinkers' accounts. Since incommensurabilities may ultimately preclude coherent discussion from occurring, even in the case where

Table 3. PG thinkers' frameworks.

	Ideology	Assumptions	Omissions
Brown	(a) Certain problems will be more taxing for developing nations, e.g. inflation; (b) fertility programs are most effective means of reducing PG; (c) rural-urban balance essential for societal optimization; (d) PG problem simultaneously global, local and individual; (e) national governments are the major players for ameliorating population/resource relationship	(a) Change is generally good; (b) world is comprised of rich/poor; (c) interacting problems amplify one another	(a) New technologies as acceptable solutions; (b) cultural dimensions to population control
Commoner	(a) Countries are due their equitable share; (b) elements of the world can be considered either within the <i>ecosphere</i> or the <i>technosphere</i> ; (c) goal of humanity is harmony with environment and peace among peoples; (d) profit for profit's sake is dangerous	(a) Future energy use of advancing nations enormous; (b) future economic growth not necessarily ecologically damaging; (c) scientific and technological growth tied to progress	(a) Women's role in the human process; (b) communication as a potentially strong link among peoples
Ehrlich	(a) All nations are overpopulated; (b) government intervention key to PG reduction; (c) humans must now learn to control their own evolution; (d) human physiology precludes humans from understanding PG dilemma	(a) Population control only humane way to solve PG problems; (b) demographic transition has a fictional existence; (c) synergistic interactions amplify problems	(a) Powers that control distribution to effects of PG
Hardin	(a) Strict government regulation necessary to curb PG; (b) lifeboat analogy; (c) PG not a technologically soluble problem	(a) Humans will breed too much; (b) competition between people inevitable as people serve self-interests; (c) moral paradigm shift necessary; (d) short-term changes are not just natural fluctuations	(a) Power of nation-state in determining who succeeds; (b) equal distribution as a remedy
McNamara	(a) Economic growth at core of necessary improvements; (b) governments active, yet tempered, role in population control; (c) world (especially First World) must allocate funds for development assistance	(a) 'Inevitable' by-products of PG; (b) PG effects (political, economic, and moral) will be felt throughout world	(a) Ecological economics; (b) pollution as relevant to PG question
Simon	(a) Individual liberty primary; (b) equitable distribution not necessary; (c) aggregate (not individual parts) most important; (d) cost as correct measure of scarcity; (e) conservation as an intrinsic good is unfounded; (f) economies of scale; (g) available resources always changeable in response to human efforts	(a) Intermediate and long-term most important; (b) humans will work for benefit of all; (c) human creative power practically endless; (d) future technological breakthroughs a certainty; (e) life expectancy good measure of society's success	(a) Many people in the world are in no position to 'invent'; (b) ecological externalities; (c) irreversible environmental damage; (d) women's role in the human process

Definitions: 'Ideology' = statements appearing in the thinkers' texts and reflect overt disciplinary and/or political orientations. 'Assumptions' = statements that rarely get explicitly made and are not specific to any discipline or politics.

Information in table was gleaned from the following works: Brown *et al.* (1981), Brown *et al.* (1976), Brown and Postel (1987), Brown and Shaw (1982), Brown (1984, 1981, 1982, 1983, 1988), Brown *et al.* (1991), Commoner (1971, 1972, 1990, 1992), Cook and Bailey (1990), A. Ehrlich *et al.* (1987), P. Ehrlich (1971, 1990), P. Ehrlich and A. Ehrlich (1974, 1988, 1990a, b, 1991), Ehrlich and Halden (1972), Ehrlich and Orstein (1989), Hardin (1983, 1990a, b, 1972, 1981a, b, 1986, 1988), McNamara (1973, 1977, 1991), Simon and Hudson (1982), Simon and Kahn (1984), Simon (1977, 1981a, b, 1983, 1984, 1985, 1987, 1989a, b, 1990a, b, 1992).

the thinkers have taken a more active role in engaging one another, ironing out the substance of them seems a requisite task in the improvement of the PG discussion.

One source of incommensurability is the use, perhaps wittingly, of key terms in different ways. Time and time again, one finds the thinkers employing two or more conflicting connotations for the same word. Sometimes this occurs within the same work, but more often it manifests itself when comparing thinkers' accounts. However, there exists little recognition of this fact within the thinkers' ample literature.¹⁴ Two of the terms that fit the above descriptions particularly well are *limits* and *long term/short term*.

A good starting point for any current reflection about limits is the Club of Rome's often discussed tract *The Limits to Growth* (Meadows *et al.*, 1974). One of the major objectives of this work was 'to gain insights into the limits of our world system and the constraints it puts on human numbers and activity' (1974, p. 185), by way of world simulation modelling on computers.¹⁵ Among its conclusions were that supplies of natural resources are finite (1974, p. 54–59). Simply put, this is a substantial proclamation because Ehrlich, Hardin, McNamara and Brown support the finding and Simon does not. While the former group sees the earth and the sun as the limits to our resource base, Simon states explicitly that there is no need to restrict our stock in that way. Simon writes,

Since 'the more people {being the ultimate resource}, the more minds there are to discover new deposits [of natural resources] and increased productivity', it follows that 'an increase of human beings . . . constitutes a crucial addition to the stock of natural resources' (Dunlap, 1983, p. 59) (my braces).

Simon also suggests in many instances that the universe is the only adequate limit warranting our attention. Alternatively, Ehrlich specifies limits well before the edge of the solar system, noting that copper cannot be made from other metals, a claim of Simon's.¹⁶ However, Ehrlich's limits are also more broad in scope. The changes he foresees in our civilization, environmental as well as political, are 'much too rapid to allow biological or cultural evolutionary processes to adapt people to them' (Ehrlich and Orstein, 1989, p. 28). However, Ehrlich also views 'our species' as 'now living on its capital—a one-time resource bonanza that will not be replaced on a time scale of interest to society' (1984: 381). On an entirely different front, Hardin concludes that interstellar migration cannot allow the limits to be expanded, because those who chose to leave would be the ones interested in protecting the planet while the ones left on earth would continue to decimate it (1985, 1993).¹⁷ Hardin also specifies limits in reference to the fact that ore grade continues to diminish as humans continue to mine the earth. As one can readily see, 'limits' hasn't a limited meaning, pardon the pun.

The concept of long term/short term is also a source of misunderstanding, especially when one takes a deeper look at its usage. Simon stresses that while short term effects of PG may be devastating (for a few), the moderate to long term benefits will be good.¹⁸ Unfortunately, what they, and the spokespersons more generally, mean by long term varies from text to text, and even chapter to chapter. In Simon (1990b), the pertinent trends span a 200-year interval. However, in the same book, he implies that 4500 years is more reliable for making predictions than 180 years, yet 180 years seem to be acceptable. Then again, in the same book, he characterizes the long run as 'both before, and also subsequent to, the year 2000' (1990b, p. 356). Further, he writes, 'It is true that the long run—30 to 70 years—is far from now,

and therefore is of less importance to us than is the short run' (1990b, p. 50). So which is it? Also, since it is the long run that Simon relies on for prosperity, how is it that he says that the short run is of more importance? He can't have it both ways. Hardin debates with Simon specifically on the relevant time interval of our past. Hardin finds more recent trends, having taken place within the last 30 years, as taking precedence to times more distant. The time scale issued by Brown's World-watch Institute before the onset of serious environmental destruction is only 40 years. Given these different perceptions as to the relevant time frame for human concern, it is not surprising that conclusions differ as to what changes need to be made and how to execute them.

Another form of incommensurability arises from positions that are strictly ideological in character. For our purposes, ideological arguments are motivated by a thinker's underlying objective and fit one of the following descriptions: (1) weakly supported by evidence; or (2) strictly an individual's value judgement. Obviously, neither of these offerings on the part of the thinkers' contribute positively to the discussion.

As it concerns the first category, PG thinkers accounts are replete with unsubstantiated claims. For example, Simon holds that PG adds people to the world that are in a position socio-economically, or otherwise, to use the creative powers that they have for productive purposes, a prerequisite for his technological fix-it state that contains few political barriers; Ehrlich states that all nations are overpopulated, as indicated either by the numerous abuses sustained by the environment (now and as expected in the future given present PG trends), a statement that I feel is motivated by his desire for reduction of all populations; Hardin believes that only strict governmental regulations can curb world population. Hardin holds dear the idea that 'rational' humans are bound to serve their self-interests, creating a situation that precludes the possibility of a harmonious global community. Hardin, in somewhat barbaric terms, suggests that in a world where population cannot be adequately controlled,

the allocation of rights based on territory must be defended if a ruinous breeding race is to be avoided. It is unlikely that civilization and dignity can survive everywhere, but better in a few places than in none. Fortunate minorities must act as the trustees of a civilization that is threatened by uninformed good intentions (Commoner, 1971, p. 297).

These remarks are consonant with and, more importantly, underlie his aspiration for government-directed population control. Finally, McNamara, Ehrlich and Brown support the notion that PG-related variables tend to amplify one another and work synergistically to elicit more damage, feelings that are engendered by these gentlemen's urgent desire for speedy recovery attempts.

Also entering into the discussion are individual value judgements. While the following examples are just a sampling, a salient point still comes to the fore. That is, values represent an important source of biases within the PG debate. Simon, holding that personal liberty is his most treasured value, claims that

we need rules that will provide maximum freedom for people to try out new and better ways to take advantage of the opportunity to serve the public and make a *profit* that an environment constraint imposes (1990b, p. 11) (my emphasis).

Clearly Simon has little regard for the *whole* of humanity; 'Who is going to suffer

when someone profits?' and 'And is the public, at large, served?' Also, intimately related to these subjects, Simon relies on what Hardin takes to be the 'invisible hand' to provoke those who seek achievement to promote the public's interest.¹⁹ Perhaps all of these assertions are provoked by Simon's devotion to continued economic growth, a feeling that comes through when he harshly criticizes past structural economic changes that have choked the markets (1990b, p. 356).

Not surprisingly others also contribute value judgements of a similar kind. Commoner thinks that nations, given their ontological status as nations, are deserving of an equal share in the world's wealth. Ehrlich's arguments, like Simon's, are replete with conjectures about human physiology as the source of certain incorrect notions about PG and civilization. For example, he thinks that our evolutionary heritage has endowed us with 'quick reflexes' and not the 'slow reflexes' necessary for emancipating humans from their present frightful course (Ehrlich and Ornstein, 1989, p. 28). Unquestionably, the above opinions could seriously limit a PG thinker's ability to recognize other perspectives as being important.

A third and very important source of incommensurability results from the omission of significant topics from the written works of the PG thinkers. (For a sample of the omissions I have found within the PG thinkers' accounts, see the last column of table 3.) Within the PG debate, as with almost any debate, certain subjects tend to predominate in the discussion. However, some subjects get little recognition by many of the PG thinkers but get a significant portion of attention in other intellectual communities. This, perhaps unavoidable, development sets up two related problems. First, if the PG thinkers fail to incorporate the thoughts and ideas found in other accessible intellectual venues (e.g. political science, feminist accounts of economics and science, and ecological economics) then presumably they are likely to be: (1) ignored by the individuals working in these areas; and (2) accused by others of being insincere in wanting to have a purposeful discussion; neither of which is, of course, a promising situation. Second, individual PG thinkers are likely to estrange the other participants in the debate if they don't 'acknowledge' (rather than just 'take notice') the evolving nature of argumentation and relevant knowledge as introduced by their contemporaries. Without a doubt, no debate can exist without at least two contending views, however a debate must also include engaged participants eagerly searching out new ideas and evidence that tends to corroborate one hypothesis or another. Thus, the incommensurabilities brought about by neglecting topics getting serious attention elsewhere put the PG thinkers in a very precarious position and the entire discussion in continued jeopardy of being illegitimized.

6. *Improving the dialogue*

My comments regarding the improvement of the current PG dialogue will concentrate on three areas within the PG debate that need particular refinement—*character*, *content*, and *domain*. A brief explanation of these is in order.

Character involves the style in which the thinkers discuss the question of PG. How often do the thinkers denigrate others, involve themselves in open debate, or integrate other thinkers' works into theirs? Also, to what extent are agendas and sources made explicit and stressed?

Content represents the substance of the thinkers' argument defense. That is, do

the thinkers rely on ideology, empirical data, 'intuitive' relations, biological predispositions or assumptions for defense of their claims? Also, what is the scope of the elements of interest; for example, are global or national interests given more attention and which humans are considered pertinent to the discussion—northerners/southerners or the affluent/impoverished?

Domain consists of those disciplines in which the spokespersons' thoughts are immersed. Are ecologists making economic-based arguments or are economists telling us how biological mechanisms operate?

In what follows I will bring attention to these concerns and make recommendations as to what adjustments can be made to improve the PG dialogue. Since PG is fundamentally tied to human well-being, we might expect to find the thinkers of PG expressing what they take to be their ideals for human existence—an issue of character. However, rarely are such things included in PG publications. As Swaney (1991, p. 508) notes 'an important question not addressed in this [PG] debate is "in what kind of world do we want to live?"'. Assuming that the thinkers work with such a set of ideals, why should they be so disinclined to state them explicitly? You might have the impression that this is a trivial, or even ridiculous, suggestion. However, let me explain why it is very relevant to the PG debate. Suppose Simon were to state, as he might if given the opportunity, that he holds most dearly the value of human life and the ability of people to grow intellectually, technologically, and economically. What position would he then take if humans were dying in California because harmful pesticides were being sprayed on their food products?; the owner of the grape vineyards benefiting economically, although at the cost of human life. Whose side would Simon take? Thus, he must be more precise when articulating his ideal. Either human life takes precedence or economic growth, but not both; in fact one might attempt to order any number of elements, as long as precedence is established. The key point is whatever the ideals articulated by Simon, he would be held accountable for them, and thus, his pleas for change (or business as usual) must remain consistent with them. Arguably the number of relevant items in the PG debate will complicate matters a bit but again I reiterate that there seems to be no reason for the author not to make her ideals (goals) explicit. Anthropologist Mary Douglas (1992, p. 260) makes a closely-related point when she suggests that sociologists need to partake in a 'little' self-analysis, in order to determine which of the following descriptions they fit most closely: cornucopians, catastrophists or fatalists. According to Douglas, this is a necessary step prior to asking the more important question, 'Does this position "enter into their larger agenda for life and art"'. Her main interest here concerns the apparent lack of reflexivity in the sociology community relative to the contextualized nature of any thinker's viewpoint. Ultimately the offering of ideals and commitments focuses a thinker's attention on her work as well as the topic more generally.

Along similar lines, a thinker ought to be forthright with the major reasons why PG is beneficial, harmful or precarious—an issue of content. If the author fails to distinguish between primary and secondary factors adequately, then the causal relationships become blurred and the major points lose their bite. For instance, Brown has investigated an endless number of elements in search of their relationship to PG. However, despite the fact that his work has undoubtedly established new areas of research, it is still unclear what the 'major' factors are in his view (Brown *et al.*, 1991, p. 15–18); and as it is this that policy people will hear before anything else, these distinctions need to be made. McNamara does a slightly better

job of indicating what are the most relevant relationships, but these are often banally broad, as, for instance, when he notes that current PG rates will cause 'certain regions and countries [to] grow far beyond the limits consistent with political stability and acceptable social and economic conditions' (1991, p. 48). Later in the article he goes into more detail to describe those specific factors that are of greatest significance in bringing about unwanted changes—worsening employment, pressures for food supplies and environmental degradation (1991, p. 54–59). In conclusion, the burying (or clouding) of key relationships with other, less important, relationships has negative consequences especially as the policy-maker is made to squirm from confusion and ambiguity.

Thinkers also unnecessarily blur their comments by offering problems and interjecting solutions at the same time—an issue of character and content. For a given problem, many, few, or no solutions may be available; recall the philosophical cliché 'you can't get an "ought" from an "is"'.²⁰ Thus, thinkers need to separate the *why* (something is a problem) and the *way* (it might be solved). It needs to be stressed that I am not advocating a withdrawal of policy considerations from the thinkers' publications, as I feel strongly that the thinkers have a responsibility to engage themselves in problem solutions as well as problem formulations; particularly in the case of the PG question, which has strong policy implications. Generally a policy-maker must be convinced that something is a problem before attempting to treat it. Thus, if the PG thinker fails to sufficiently disentangle descriptions and prescriptions the policy person may equally fail in understanding the necessity for a solution. Here again, my comments reflect my concern that there is a serious need to simplify communications when possible in order that incommensurability be avoided. This is especially true when PG thinkers are coming from such disparate backgrounds. Ehrlich and Ehrlich (1990a) and Brown (1979) do a fairly good job of separating the descriptive and the normative.

Fundamental to any real debate is the lively interaction of the participants—an issue of character and domain—as touched on before. As noted earlier, the spokespersons engage each other less often than might be expected. Even when a group of PG conscientious biologists and economists were gathered at a recent meeting 'convened with the noble intention of reconciling [their views]', each group 'completely ignored everything the other side said. Then, apparently satisfied, everyone went home' (Mann, 1993, p. 64). Unfortunately, it appears that lack of communication in the PG arena is commonplace.

By contrasting the Commoner/Ehrlich debate of 1972 (Commoner, 1972; Ehrlich and Holdren, 1972) and the Hardin/Simon discussion of 1982 (Simon, 1990b, p. 381–397), one can easily see some potential pitfalls of integrative discussion. In the first instance, the dialogue has many promising attributes, including an even-handed critique followed by a focused and informative rebuttal. Although the passing reader may be distracted by the harshness of the criticisms, the remarks remain within the bounds of reason and are for the most part constructive in nature. Taking a look at the Hardin/Simon (Simon, 1990b) discussion we find a very different picture. Simon and his cohort Ben Wattenberg (who acts as the moderator) dominate the course of the discussion. Hardin is able to make a few points here and there about resource availability and food consumption but is unable to focus the discussion for any length of time. Hence, not much gets accomplished. Thus, although the thinkers' intentions may be sincere, the discussion may still proceed with little vigor or animation. With the above said, I recommend that the thinkers adopt norms of

conduct for conversations (published or otherwise). Certainly many articles and books by the thinkers have been evaluated in one way or another, but most probably have not been sufficiently peer reviewed, as these thinkers tend to publish a great deal in 'popular' literature. This may have contributed to the failure of their writings to internalize alternative perspectives or even to adopt an agreeable tone.

Proposed norms of engagement may also include some of the following. Every effort should be made to avoid generalizing or categorizing along disciplinary lines. All economists do not think alike nor do all ecologists think the same. The thinkers should attempt to integrate their opponents, as well as their allies, into their articles and books. Otherwise it seems as if something is being hidden on purpose. The voices need to be explicit about the scale (global, regional, national, or local) at which their arguments apply. Global concerns tend to yield blanket observations or prescriptions while local matters either get pushed under the table or are undervalued when they do get considered. On a related front, thinkers need to take seriously and make clear the human group(s) that they are considering. There is a tendency either to overlook the suffering of great numbers of people (e.g. Simon and the starving Africans or Asians) or to ignore the rights of others (Hardin and the non-US citizens).

Finally, and perhaps most importantly, the thinkers might gain something by reconsidering the saying, 'better safe than sorry'—fundamentally an issue of content—as this feeling penetrates deeply into the ethos of many people, albeit for different reasons. In other words, wouldn't it be wise for the PG thinkers to think pragmatically about which stance they adopt, given that they do not know with absolute certainty whether they are right? In essence, this would involve PG thinkers giving much more attention to the potential negative consequences of their accounts being wrong. Acting pragmatically, the thinkers would choose to support those accounts that have less dire consequences, following a 'minimax' (i.e. minimize maximum loss) strategy. Let us look at how implementing this principle might pan out in some of the PG thinkers' accounts. For example, Simon may be correct that PG accelerates the technological enterprise's ability to solve the world's problems, in which case, assuming that a consistent policy were followed, many people would be happy in the long term, short term suffering by great numbers notwithstanding. However, he may be wrong, and if his advice were followed, PG could ultimately result in massive starvation, increased frequency of catastrophic pandemics, or escalated political turmoil,²¹ as predicted by Ehrlich in the late 1960s (and even today). If Ehrlich happens to be wrong then at worst we *might* have fewer people starving in the future (as fewer people would have been born as a result of enforcing Ehrlich's population control measures, of course, here assuming that they were successful in reducing human reproduction rates). If we followed Hardin's advice, then we would let the high PG countries fend for themselves, which according to him would exact a heavy price in terms of lives. However, if he were wrong and the present high PG countries did not suffer so greatly, both we, the USA, having not 'wasted money', and the countries in question would be better off. Finally, what about Commoner? If he were right and changing the means of technological production as well as altering the distribution of wealth were sufficient to allay much of the world's suffering, then the majority of human beings would be content. However if he were wrong, PG would remain unaffected by his policies and would take a toll on many of the world's inhabitants. Thus, it appears that the 'minimax' strategy favors pessimistic outlooks (e.g. Hardin and Ehrlich), which

entail that you could cope with being right but would, ironically, actually prefer to be wrong.

Douglas dedicates a chapter of her recent book, *Risk and Blame* (1992), grappling with a very similar model, which she refers to as 'the cultural theory of surprise'. Stirred by what she sees as a lack of commitment on the part of modern sociologists to seek out the 'social component' of worldly matters, Douglas offers the beginnings of an ecological classification of cultural attitudes separated based on four "myths" about nature's predictability, i.e. 'Nature is capricious', 'Nature is fragile', 'Nature is robust', and 'Nature is only robust within limits' (1992, p. 262). This theory comes complete with a nomenclature and a set of non-negotiable allegiances for each ideological position.

The most interesting part of this theory is its methodological dimension—or as Douglas calls it, 'the surprise game'. This segment of the model requires that each participant in the cultural community must 'work out the kinds of surprises that each culture lays up in store for itself' (1992, p. 265). This action on the part of the participant, Douglas contends, is the 'gimmick' necessary to make us aware and appreciative of 'other forms of life' or other forms of argument (worldview). Ultimately Douglas's prescriptive ideal recommends to do what I have hinted at two paragraphs above.²² Not surprisingly she concurs with my sentiments earlier: 'The more self-conscious the awareness of our negotiators, the more hope for conciliatory and strong counsels' (1992, p. 265).

Ecological economist Harman Daly (1986, p. 43) uses a metaphor to illustrate how a failure to come to grips with the changes humanity has wrought on the world may mean the ultimate collapse of our society. In the metaphor a slowly heated frog adjusts to the incremental temperature changes gradually, but eventually 'croaks' because it doesn't come to recognize its true predicament. As the uncertainty in the future track taken by many PG-related developments is particularly high, aren't humans well-advised to proceed with caution? Perhaps prudence is what we need now, at a time when humans are forcing our ecosystems to extents that the earth has not recently encountered. I am not here advocating strong measures to ensure population reductions (or any other strict actions), but rather that we remain open-minded to the multi-faceted nature of PG and enter the discussion with a clear understanding that human life and ecosystem stability may be in a very precarious position and not with a predisposition for (or preoccupation with) economic growth, exclusionist competition, or nationalism.

7. Conclusions

My examination of the current PG debate has convinced me of one seemingly incontrovertible point: the questions pertaining to the future effects of PG, or population more generally, cannot be properly answered without continued purposeful discussion and engagement of the thinkers on the subject. Population cannot remain a 'taboo' subject any longer, as Hardin (1993) has documented. The end of the twentieth century and the turn of the twenty-first century promises to bring ever more people onto the Earth, and dealing with this new, never visited, terrain will require that we talk about the subject at much greater length and in a more co-operative fashion.

In this paper, I have provided evidence for what I have found to be an often disconnected, incommensurable, and even absent, dialogue among academic scholars in the area of population growth. The disconnectedness manifests itself in a variety of ways. Either the thinkers ignore each other in their writings, or they have a strongly antagonistic manner with their intellectual competitors, or when they do engage with their contemporaries they tend to dismiss their remarks too abruptly. Incommensurability characterizes the PG debate in that the thinkers inconsistently appropriate certain terms, promote ideologically-based arguments (as unquestionable), or omit intellectual discourse that is taking place among peripheral, yet highly relevant, subject areas (e.g. feminist scholarship, political science, and ecological economics). I do not find these to be inevitable circumstances but rather ones that are endemic to our post-modern society. In response, I recommend a variety of remedies, all of which revolve around, in one way or another, a more self-critical analysis. Denials that one could possibly be incorrect will not engender an intercourse among the thinkers' that will be beneficial. Here, as in other humanistic enterprises, mutual coexistence and interactive discourse is the key to a purposeful dialogue.

Notes

1. Although the percentage of growth will be over five times greater in the LDCs, there still will be growth in the DCs. Given that people in the DCs have a greater impact on the environment by virtue of their higher energy and material consumption, one should not get the impression that the population growth in the DCs is insignificant.
2. In fact, many of the PG thinkers who will be the focus of this discussion also seem to be very uncomfortable separating the two topics. This appears to be driven by policy considerations. The policies that the PG thinkers want to influence range widely beyond PG *per se*. Thus, it appears that PG acts as a lightning rod for discussing any of a variety of environmental issues. That is, although the PG thinkers appear to be talking about PG, the way they talk about it (i.e. the multifarious contexts in which they locate PG) suggests that they really mean to focus on other issues. So even though PG itself may not be the chief matter of interest of the thinkers I deal with, all the thinkers consider it sufficiently relevant to their more pressing concerns to dedicate a significant portion of their work to discussing it specifically.
3. This work will focus on the arguments and thoughts of the following PG thinkers: Lester Brown, Barry Commoner, Paul Ehrlich, Garrett Hardin, Robert McNamara, and Julian Simon. From this point on, PG thinkers, PG spokespersons, PG voices, etc. will refer to only these six persons.
4. Number of citations, excluding self-citations (in parentheses after the corresponding year(s)): *Social Science Citation Index* (SSCI) (Brown 1976–80 (32), 1981–85 (40), 1990 (28), 1991 (25); Commoner 1976–80 (127), 1981–85 (70), 1990 (10), 1991 (19); Ehrlich 1976–80 (42), 1981–85 (10), 1990 (6), 1991 (17); Hardin 1976–80 (214), 1981–85 (235), 1990 (67), 1991 (82); McNamara 1976–80 (7), 1981–85 (10), 1990 (0), 1991 (0); Simon 1976–80 (17), 1981–85 (105), 1990 (18), 1991 (21)); *Science Citation Index* (SCI) (Brown 1975–79 (7), 1980–84 (7), 1988 (6), 1991 (21); Commoner 1975–79 (52), 1980–84 (21), 1988 (3), 1991 (0); Ehrlich 1975–79 (14), 1980–84 (4), 1988 (1), 1991 (7); Hardin 1975–79 (94), 1980–84 (56), 1988 (9), 1991 (26); McNamara 1975–79 (2), 1980–84 (1), 1988 (0), 1991 (0); Simon 1975–79 (0), 1980–84 (9), 1988 (1), 1991 (6)).
5. A few other methodological comments deserve notice. In my attempt to determine who the major spokespersons of PG were I referred to the Infotrac Expanded Academic Index. This index contains literature, published between January 1980 and February 1993, from a wide range of scholarly (e.g. *African Studies Review*, *American Journal of Physical Anthropology*, *Ecology*, *Soviet Geography*, *American Demographics*, *Far Eastern Economic Review*, *UN Chronicle*, and the *Bulletin of Atomic Scientists*) as well as more popular (*The Atlantic Monthly*, *Science Digest*, *Futurist*) periodicals. Under the heading of 'population growth' there were 250 articles mentioned, only 24 of which I read fully, as the overwhelming majority of the articles focused on the PG question at a micro-level.
6. Simon, while the only trained economist of the PG spokespersons highlighted in this paper, is just one of many economists who have concentrated their efforts in the area of population. Of these individuals, Amartya Sen is definitely one worth mentioning. Native to India, yet trained at

Oxford, Sen concerns himself with welfare economics. Known better in UN circles than in public venues, Sen has taken offense at the traditional indicators of economic success, namely, opulence and financial soundness. In a *Scientific American* article (1993), he outlines a model of national success that focuses solely on the well-being (of the masses). His findings suggest that mortality data can be important indicators of a nation's success.

His model is antithetical to Simon's in that Sen holds that economic success judged in terms of GNP and technological advancement need not be correlated with a small population growth rate. Sen (1993, p. 45) uses the Indian state of Kerala and Sri Lanka as prime examples of low GNP regions (if Kerala were a country it would be the ninth poorest in the world) that have relatively low birth rates. In fact, Kerala's birth rate is about two-thirds that of India as a whole and half that of other low-income countries (Ekins *et al.* 1992, p. 79). It seems that there is more to low PG than economic affluence and mobility.

7. Thomas Robert Malthus (1766–1834) anonymously submitted *An Essay on the Principle of Population* for publication in 1798 (reprinted 1992). In this work, Malthus contends that population increases more quickly than the means of subsistence. Central to this contention is his conception that while population was capable of growing at an exponential rate, subsistence could only be expanded at an arithmetic rate. This formulation has been extremely influential in many noteworthy thinkers' perspectives. For instance, Charles Darwin, upon reading the *Essay*, began to 'appreciate the constancy of the pressure behind the competition for food and space—a constancy essential to his own theory of species selection in nature' (Winch, 1987, p. xi).
8. Ehrlich is Bing Professor of Population Studies at Stanford and member of the National Academy of Science, as well as co-founder (in 1968) and honorary president of ZPG (zero-population growth)—an organization 'that works to achieve a sustainable balance between population, resources, and the environment' (Waddell, 1994, p. 3).
9. The unit of *I*, as given by Ehrlich and Holdren (1972) and Commoner (1972), is the amount of pollution, which is arrived at by multiplying *P* (population), *A* (production (or consumption)/population), and *T* (pollution emitted/production (or consumption)).
10. Paul and Anne Ehrlich are credited with coming up with this equation (UNPF 1991, p. 12), which simply expresses that the major factors contributing to environmental impact are to be multiplied rather than added when accessing total impact. In Ehrlich and Holdren (1972), this equation is discussed at great length in order to discredit Commoner's (1971) account for putting too much emphasis on the impact of technology.
11. In fact, Swaney (1991, p. 505) accuses both Simon and Ehrlich of population reductionism, in that, 'both overemphasize the *number* of people, obscuring the fact that the *behavior* of people matters more'.
12. Eduardo Galeano (1973, p. 16), a Third World historian, takes offense at McNamara's views on population control. Galeano feels that population controls, like those advanced by McNamara and others, aim 'to justify the very unequal income distribution between countries and social classes [and] to convince the poor that poverty is the result of the children they don't avoid having', both of which ignore the real cause of Latin America's poverty, that being, the USAs continual exploitation of its economy and people.
13. To Simon's credit as well, he (1983) responds to a review by Daly.
14. Hardin (1993, p. 14, 16) seems to recognize that the choice and use of words preconditions the response, as indicated by his suggestion that the literate question, 'What are the right words?', is a necessary step in understanding the substance of the PG problem.
15. The Club of Rome's computer model was specifically designed to give an account of five major trends of global interest—'accelerating industrialization, rapid PG, widespread malnutrition, depletion of nonrenewable resources, and a deteriorating environment' (Meadows *et al.* 1974, p. 21).
16. Actually, as Hardin clarifies, one can make copper from other metals but the process is extremely costly, in terms of either energy or money, and thus in no way practicable (Hardin in Simon, 1990b, p. 396).
17. This is also exactly why Hardin thinks a coercive phase of population control is necessary as 'voluntary population control selects [in the Darwinian sense] for its own failure', or in other words 'noncooperators outbreed cooperators' (Paehlke, 1989, p. 63).
18. Simon even goes as far as to write, 'one of the best things ecologists have done for us is to urge us to take a long-range view' (1990b, p. 393).
19. Hardin is so adamantly opposed to this notion because he feels that the direction of population policy rides on its validity (1968, p. 1244).
20. This isn't always the case. As Harding (1991, p. 89) notes, 'in a racist society, "pure descriptions" of racial difference have little chance of functioning as pure information'. Do PG thinkers take this same view, assuming that their accounts are consistent with only one worldview, and thus description entails a specific course of action? No, I don't think they go this far.
21. Simon's account lacks the reflexive moment, one that would make apparent to him the wonderful ability of the humans, *presently* on the earth, to recognize problems *now* and to take '*non-techno-*

logical', preventive steps to avoid certain dangerous activities in the future, such as revamping The West's consumptive materialism.

22. The recommendations of Douglas and myself are by no means identical, but they both call for the expansion of a thinker's frame of mind. Her model's strength comes from its rather thought out classifications, which, independent of whether they represent 'reality', do set a precedence for conceptualizing ecological outlooks.

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