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### Letter to the Editor

Levine, S. H. 2004. Letter to the editor responding to S. Gerson's letter regarding S. H. Levine's (Spring 2003) "Comparing Products and Production in Ecological and Industrial Systems," *Journal of Industrial Ecology* 7(2): 33–42.

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1. It is clearly true that ecosystems involve feedback loops, as do of course industrial systems, but this certainly does not mean that these systems are not bound by cause-and-effect. Feedback loops (as opposed to simpler 'linear' structures) are simply the most interesting cause-and-effect structure and are ultimately what shape the system's dynamic behavior.

2. I am not sure what you mean by "the supply is often an indicator of adequate demand." Adequate for what? And your statement that individuals make food choices not only to sustain themselves but also to sustain the ecosystem is one I would consider as questionable to say the least. While it is true that animals will often vary their diets to some extent to match the supply, carnivores are certainly driven by 'habit' to eat meat, and koala bears to eat only certain type leaves.

3. I am no expert on the eating habits of other animals but if my experience with dogs is any example, given the opportunity, they are at least as prone as humans to overeating and to consuming 'junk' food. I suspect the same is true for many other species as well. From an evolutionary point of view, I suspect overeating has only recently become a major problem (and only for a subset of the human species). Apparently, we are not pre-adapted to avoiding overeating, or to getting fat when we do.

4. Considering interactions two parties at a time is in no way denying that these interactions are imbedded in larger webs. Such two-party interactions are simply part of that web and form a considerable part of its structure. The question you might wish to ask is under what circumstances, if ever, can a multiple party interaction not be reduced to a set of two-party interactions. For instance, if we have a predator, a prey, and a scavenger 'interacting', is this adequately described as a predation interaction (+,-) between the predator and the prey, a competition interaction (-,-) between the predator and the scavenger, and an commensal interaction (+,0) between the scavenger and the prey.

5. My definition of product included the words "exchanged for something of value". Feces may be of value to another organism but this does not imply that an exchange is going on. Nor did I mean to imply that a product (or service) is required for an interaction to be mutualistic (+,+). There are many ways such an interaction can exist, as you imply, when we consider indirect interactions. (See J. Vandermeer, 'Indirect mutualism: variations on a theme by Stephen Levine', *American Naturalist* 116: 441-448, 1980 for a fuller discussion.)

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