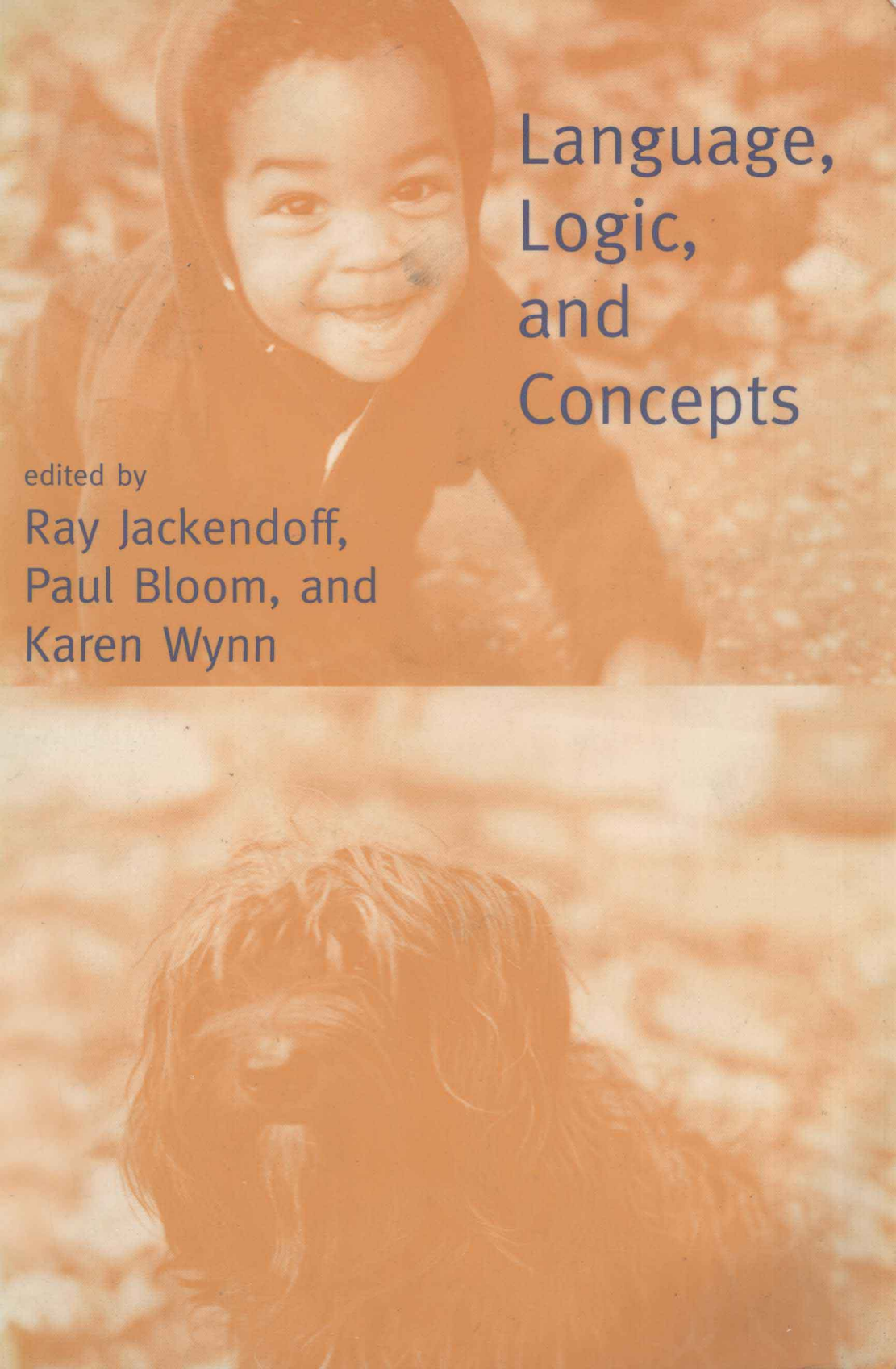

Language, Logic, and Concepts

edited by

Ray Jackendoff, Paul Bloom, and Karen Wynn

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Essays in Memory of John Macnamara

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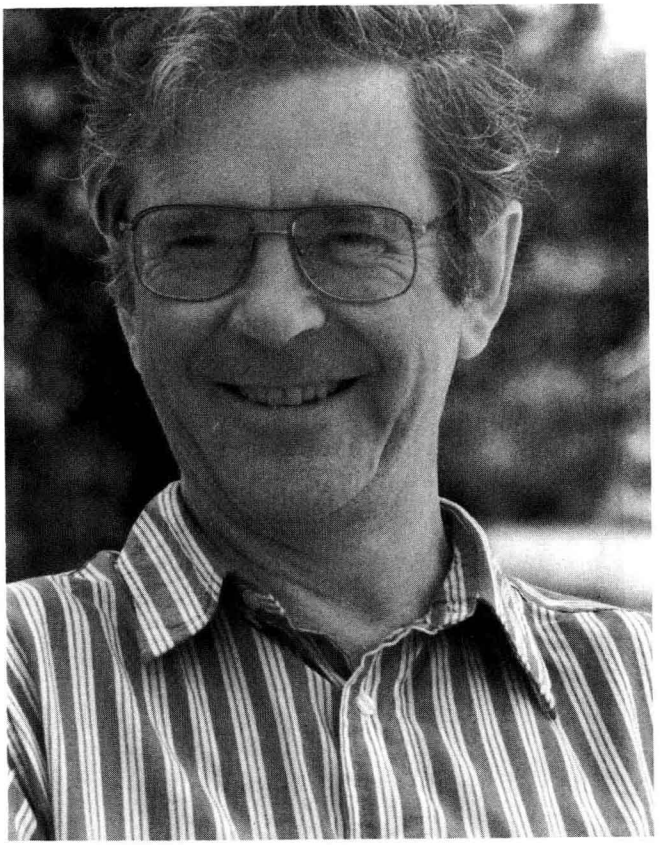

John Macnamara

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Introduction

Ray Jackendoff, Paul Bloom, and Karen Wynn

It is with a deep sense of gratitude and humility that we offer this collection of essays in memory of John Macnamara by his students, colleagues, and friends. The essays speak eloquently to the intellectual influence he had on all of us, but it is seemly that we begin with John himself.

John grew up in County Limerick, Ireland, and spent the early part of his adult life as a member of the Vincentian community. He taught at Castleknock and at St. Patrick's College, Drumcondra. In 1963 he gained a doctorate from the University of Edinburgh. His controversial research findings cast doubt on the value of some of the educational priorities of postindependence Ireland; they were published in a book entitled *Bilingualism and Primary Education*. In 1966 John moved to Canada, where he became Professor of Psychology at McGill University, a post he held till the end of his life in 1996.

John's intellectual impact in the period after he came to McGill was as a scholar in the study of the mind and how it develops. Before reviewing some of the contributions he made in different areas of psychology, it is important to understand his broader intellectual commitments. These pervade his work and are themselves interesting and important.

There is a tendency for psychologists to conclude that the human mind is really quite simple. Psychologists influenced by the ideas of Watson and Skinner have long argued that thinking and learning can be explained through a few basic laws. Some reductionists believe that psychological phenomena can be entirely accounted for in terms of principles of biology

We are grateful to John's wife Joyce for her assistance in writing this introduction. Some paragraphs are adapted from a previously published essay by Paul Bloom. We also wish to thank Albert Bregman for his assistance and encouragement in the initial stages of developing this volume.

and chemistry. Many contemporary scholars are entranced with the idea that the mind works like a computer (according to some, a rather uncomplicated computer). And surely, it is often said, we only need a simple theory to account for the inner workings of a child—who is, after all, a quite simple creature!

In John's writings, one finds the sometimes unfashionable conviction that the mind of the child is extraordinarily rich and complex. He begins his 1982 book *Names for Things* by noting that psychologists typically ignore the complexity of language learning—at the cost of not being able to explain it. His favorite example, as will be seen throughout this volume, was that something as apparently simple as learning the name of a dog requires considerable mental resources. For instance, children must be able to appreciate the intentions of others. The 2-year-old must realize that when an adult uses the name "Freddie" in certain contexts, he or she intends it to refer to the dog and nothing else. Children must also possess certain logical resources. The child has to understand how this new word "Freddie" relates to other parts of speech, such as the common noun "dog" and the adjective "brown," and how it contributes to the meanings of the sentences that it appears in. Perhaps most importantly, children can use words to refer: to a real animal for a proper name like "Freddie," to an abstract kind for a common noun like "dog," and to different kinds of entities altogether when it comes to words like "two" and "Santa Claus." John argued that explaining the child's learning and understanding of language requires a psychology that includes notions such as intentionality, reference, and truth. This means that psychology and philosophy are more related than many would have thought. It also means that a complete theory of the mind cannot be found in the fields of biology and computer science, as such sciences cannot capture these essential properties of our mental life.

The implications of this perspective can be pursued through three related aspects of John's research: his studies of language learning, his contributions to the debate over the nature of child development, and his work on a psychology of ideals—only a minority of his writings. In all the best ways, John had the style of a nineteenth-century intellectual. He wrote about an extraordinary variety of topics, from the nature of free will to the demise of Freudian psychoanalysis to what formal logic has to say about the Holy Trinity. He also did not shy away from disagreement, and he was involved in productive and civil debate with scholars such as the philosopher Mario Bunge and the linguist Noam Chomsky.

Finally, he was one of the very few psychologists who isn't a chore to read. He wrote with style and wit, and most of his work was directed to the educated public; it was not crafted for a small group of fellow scholars.

In 1972 John published a classic article with the title "The Cognitive Basis of Language Learning in Infants." This article presented a proposal that has grown to be highly influential. John suggested that although there are important regards in which language learning is special, distinct from other sorts of learning that children succeed at, it also relies crucially on the child's general understanding of the situations in which sentences are used. He proposed that the child's learning of basic grammar (what is a noun and what is a verb, how words are ordered within a sentence, and so on) requires knowing what words and sentences mean, and how they correspond to the external world. In support of this perspective, John and two colleagues, Nancy Katz and Erika Baker, wrote their 1974 article, "What's in a Name? A Study of How Children Learn Common and Proper Names," which reported an amazing finding. Their experiments found that even 18-month-olds can use subtle linguistic cues, such as the grammatical difference between "This is wug" and "This is a wug," to learn proper names and common nouns. These two articles have had a substantial influence on the study of language, motivating considerable research seeking to better clarify the relationship between children's understanding of meaning and their learning of basic grammar.

After the publication of these articles, most of John's research into language focused on the learning of words. This work was first discussed at length in *Names for Things* and was subsequently elaborated in many articles and in two further books, *A Border Dispute: The Place of Logic in Psychology* (1986) and *The Logical Foundations of Cognition* (1994, edited in collaboration with Gonzalo Reyes). This research, some in collaboration with Gonzalo Reyes and Marie La Palme Reyes, focused on the logical foundation of the learning of proper names and common nouns. Consider again what a child must know in order to understand a proper name. One aspect of this knowledge is that this word follows a single object over time. Even if Freddie were to change color or lose a leg, he would still be Freddie. On the other hand, if he were to have a twin brother that looked just like him, this brother would not be Freddie. The name "Freddie" does not pick out all objects with a certain appearance; it picks out a unique dog, regardless of his appearance. The child must also have some understanding of what changes dogs can go through and still

remain dogs, as well as what events would cause something to cease being a dog. More generally, John and his colleagues argued that understanding a proper name requires an appreciation of the kind that the named object belongs to.

At some level, this is all common sense. Who would doubt that Freddie would still be Freddie if he lost a leg, or that the word "Freddie" refers to the whole dog and not just to the head or the tail? This appreciation of the logic of names comes so naturally to us that it is easy to underestimate the richness of the logical resources required for this understanding. John and his colleagues developed an extensive theory of these resources and argued further that much of the knowledge that underlies the learning of proper names and common nouns cannot itself be learned. Children must be born with it.

This research has implications for a broader debate within developmental psychology. Jean Piaget and his followers argued that the minds of children are very different from those of adults. Whereas adults are capable of complicated logical thought, children are limited to thinking about specific events; they are incapable of abstraction. Adults can take the perspective of others, but children are egocentric and believe that their own perspective on the world is all there is. An adult is a moral being, but a child is a little Attila the Hun, lacking any real understanding of fairness or morality.

John was a central figure in this debate, arguing that this conception of development is mistaken. This is not to deny that children know a great deal less than adults or that they need nurturing and care in order for their moral and intellectual capacities to thrive. But John argued that children possess considerable resources to start with. To see this, one must explore (through logical analysis, supplemented with careful experiments) the sorts of things children are very good at. The learning of proper names has been discussed above; other examples include children's knowledge of logical terms like "some," their ability to understand and manipulate small numbers, their understanding of mental notions like pretending and forgetting, and the rich moral knowledge that is demonstrated in their everyday interactions with their parents and siblings.

For each of these domains, John's research poses the same challenge to developmental psychology. If children are so limited in their capacities, how is it that they know so much? If they have no logic, how can they successfully learn expressions of language that depend so crucially on logical notions? If they are egocentric, how is it that they learn the

meanings of pronouns like "I" and "me," since learning these pronouns requires taking the perspectives of others? If they have no conception of fairness or morality, how is it that they understand a fairy tale like "Cinderella," which is impossible to appreciate without understanding that the stepmother is acting unfairly? All the evidence, John argued, leads to the conclusion that children possess a rich set of cognitive, logical, and moral capacities from the very start.

John also presented more general arguments against the view that children lack an appreciation of logic and morality. He noted that psychologists fond of this view have never explained how children come to acquire such capacities. Followers of Jean Piaget have appealed to "assimilation" and "accommodation," processes through which the child's primitive knowledge becomes more abstract through interaction with the environment. But in a 1976 article entitled "Stomachs Assimilate and Accommodate, Don't They?", John argued that these notions are empty metaphors that explain nothing. Along with the work of Jerry Fodor and Noam Chomsky, John's empirical and theoretical defense of the notion of innate ideas and capacities caused a major shift in the way psychologists think about the mind and its development.

The final aspect of John's work that we wish to mention is his proposal, first outlined in a 1990 article entitled "Ideals and Psychology," that an adequate psychology must explain the human capacity to understand ideals. A good example of this, discussed first by Descartes, lies in the domain of geometry. We all possess the notion of perfect geometric forms, such as a perfect triangle or a perfect point, but no such forms exist in nature and none ever will. Scientific progress is also based on ideals; physics would be nowhere without its frictionless plane and its perfect vacuum. Similarly, we have personal ideals that we aspire to, notions such as humility, friendship, and courage. As John put it, "Idealization is as natural to the mind as breathing to the body." But how is it that we come to appreciate such ideals, given that, by their very nature, they are not to be found in our experience?

In a 1991 article called "The Development of Moral Reasoning and the Foundations of Geometry," John provided a hint of what a psychology of ideals would look like. The article begins with a critical discussion of a well-known stage theory of moral development proposed by Jean Piaget and extended by Lawrence Kohlberg. John argued that this theory seriously underestimates children's knowledge, fails to describe adult moral competence, and does not explain how notions of morality actually de-

velop and how supposedly amoral children grow into moral adults. John then proposed an alternative theory of moral development, based on an intriguing analogy between systems of morality and systems of geometry. In both domains, there exist ideal elements (in geometry, elements such as point and line; in morality, elements such as fair and good) that are related to one another through a system of axioms. John suggested that there are extensive unlearned elements within both geometry and morality. Children start off with an understanding of certain ideals in both domains, and these are the notions that all people share. But psychologists must also explain how new geometric and moral knowledge emerges in adults and children. New geometries have been developed by mathematicians, such as the non-Euclidean geometry proposed by Riemann in the nineteenth century, and new moral ideals have been introduced in the course of history, such as the ideal of chastity introduced by the Christians. How are these learned and understood? The parallel between geometry and morality places the study of moral development in a striking new light. It might be that the child who is coming to grasp a novel moral system is actually acquiring a coherent formal structure, complete with ideals and axioms, in much the same way he or she would learn a new system of geometry, or mathematics, or physics.

This article is not as well known as many of John's other works discussed above. (Perhaps the title scares people away!) But it is hard to think of a better work in developmental psychology. Although it is entirely accessible in style and content, it does not shy away from the hard questions. It is a significant intellectual accomplishment, but also something more, as it displays several properties typical of John's work. There is creativity, intellectual courage, and a strong curiosity about the workings of the world. Most of all, there is respect for its subject matter: the minds of young children and how they develop. It is more than an article about morality; it is itself a highly moral work.

For a closer look into John as a person, we quote from the eulogy by John's friend and collaborator Gonzalo Reyes. The essence that Gonzalo so beautifully evokes here strikes a familiar chord for anyone who knew John.

I first met John ten years ago when he gave a talk in the Mathematics Department at McGill in October 1985. He raised the question of giving a logical account of the phrase "Freddie is a dog" that children learn by the

age of 18 months, claiming that logical theories were unable to account for it. To tell you the truth, I thought that he was mad: how can there be problems with that? But I found his talk so intriguing that I went to discuss it with him at the end. This was the beginning of a collaboration that developed into a close friendship and resulted in one of the most beautiful and rich periods of my life.

This talk at McGill was my first encounter with John's approach to intellectual matters: to ask basic simple questions to test theories or viewpoints and to demand straightforward answers. Of course this Socratic method enraged some people, but it delighted others, especially when he used it masterfully in his talks. He had a robust, realistic, no-nonsense attitude and no patience for idealistic views that he felt did not go to the heart of things. In this respect, he was like a brick, giving a sense of security to all of us. In fact, John was a man of profound convictions: he was deeply religious and deeply realist. Probably the thinker that was closest to his heart was Aristotle. At the beginning of our collaboration, I asked what I should read in psychology, and his answer was "Only *De Anima*."

Another aspect of John's approach to intellectual problems was the unity of his thought. I discovered with bewilderment that behind the dog Freddie stood none other than Plato, and behind the questions that looked so trivial at the beginning stood in fact a formidable problem, Plato's paradox of learning, which still haunts the venerable house of philosophy. And the answer to these questions appeared to John as a first step in creating a cognitive psychology that would be, as he put it, "worthy of its name." His talks were fascinating, with flashes that allowed us to catch a glimpse of this rich web of connections.

John died in a period that burst with creativity. He thought that the time was ripe to study the relations between perception and cognition, and he had started to work on this subject: his last talk was on "The Language of Vision." It is a tragedy (for us) that he did not live to complete at least part of this work. On the other hand, I do not believe that this is necessarily a tragedy for John: he died with lots of projects to realize and with a conviction of the importance of what he had done. He worked until his mind could no longer accompany him. On one occasion, shortly before his illness was discovered, he told me that people had asked him what he would do if he knew that he had only a month to live, and his answer was, "What I have always done." One day before the operation, we had a working session in the hospital. And only one and a half months before his death, John asked Marie Reyes to give him courses in

logic, since he had missed so much of what was going on during his long illness.

It is impossible to talk about John without mentioning the importance that friendship had in his life. On one occasion I quoted a phrase of the great physicist James Clerk Maxwell: "Work is good and reading is good, but friends are better." John approved wholeheartedly. He had a large number of friends, as anybody who walked with him from the Faculty Club to the Psychology Department trying desperately not to miss a lecture can witness. Everybody in the street would stop and say, "Hi, John," and some chat would result. But we would always arrive on time: punctuality was a must with John.

If we ask why he attracted so many friends, part of the answer seems clear: he would welcome anybody who needed a reference or some advice on an academic subject or on a deep human problem. No subject was considered taboo or improper. I cannot forget his words when receiving somebody, either in his office or in his home, where he and Joyce would exert their generous hospitality: "You are most welcome." This renewed reception made us feel wholly accepted once again and we could open our hearts and laugh or cry according to the circumstances.

John was also a great entertainer. An amusing and compulsive talker, he would insert jokes of his own creation, some rather elaborate, about Descartes and other historical figures. He was very proud of them and would celebrate them with gusto, getting mad at the people who didn't laugh with him. He had a talent for reating limericks and he could play the flute and the banjo. He had other talents as well, some quite unexpected. I remember that some friends in Belgium invited us for dinner after John had given a beautiful lecture on Brentano and intentionality. After the dinner our friends' children asked John to play with them. John proposed a game of catching pieces of bread in the mouth, the pieces being thrown by a designated person. John's ability was extraordinary. Afterwards, he told us that he had once beaten a dog at this game (John was rather competitive).

But I believe that part of the explanation for the love he inspired lies also in the richness of his personality, which allowed different people to find different Johns, to find "their John." There was the religious man who shared his faith with Joyce through common readings and travels and by helping those in need. There was, most visibly, the academic John: the university man, sometimes the Herr Professor. On occasions he would take on a very solemn voice and finish off some suggestion of a student or

an alternative theory with the words "This simply cannot be done..." But at the same time, this man who was a Fellow of the Royal Society of Canada would sit down with undergraduates in my course of elementary logic, and would bring his homework to my teaching assistant to fight with him for a better grade. Nothing is so touching for me as the sight of this distinguished man of over sixty going back to school to study logic and category theory because he believed that these were tools that a cognitive psychologist should know. "My" John is also John the student. In this context, I cannot forget his son Kieran's role as John's teacher: John told me how he could appreciate films that were at first foreign to his sensibility thanks to his son's efforts.

But I feel that I cannot enumerate, let alone do justice to, all the Johns that so many people loved and found so fascinating.... John: we will miss you ...

The essays in this volume are grouped roughly along thematic lines. We begin with Richard Kearney's remarks expanding on John's early work on language and ethnicity. This is followed by a series of chapters on the foundations of logic and concepts by Anil Gupta, Michael Makkai, Ray Jackendoff, Storrs McCall, David Olson, and Sandeep Prasada. Then comes an interlude of chapters on more philosophical topics by Steven Davis and Leslie McPherson, after which we turn more directly to the relation between language and conceptualization in chapters by Steven Pinker and Alan Prince, Myrna Gopnik, Paul Bloom, Susan Carey and Fei Xu, Geoffrey Hall, and Yuriko Oshima-Takane. We end with two chapters on mathematical approaches to cognition, one by William Lawvere and the other by John himself and his three dear colleagues Marie La Palme Reyes, Gonzalo Reyes, and Houman Zolfaghari.

This grouping, however, does not bring out the rich interconnections among the chapters and their relation to John's work. We leave the appreciation of these details to the reader.

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