Cognition, 39 (1991) 171–172 **Discussion**

Toward a comparative psychology of number

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Garnham (1991) attributes to us three claims about the numerical ability of infants: it is species specific, it comprises a Fodorian module, and it is innate. He argues that these claims are insufficiently supported by available evidence. In contrast, we submit that human knowledge of number comprises a natural domain of cognition, centering on certain principles (notably, one-to-one correspondence) that are innate. We take no position on the species specificity of the set of mechanisms that subserve human knowledge of number early in ontogeny. We will address each claim in turn.

We are puzzled as to why Garnham attributes to us the claim of species specificity. In fact, we and our collaborators have argued that mechanisms that subserve numerical ability are present in nonhuman species (Gallistel, 1990; Klein & Starkey, 1987). A wealth of evidence supports this position, although the nature of specific mechanisms remains in dispute (e.g., Davis & Perusse, 1988; Gallistel, 1990; Klein & Starkey, 1987; Meck & Church, 1983; Rumbaugh, Savage-Rumbaugh, & Hegel, 1987). The claim that a single set of mechanisms underlies the numerical abilities of humans early in ontogeny and of other species is a hypothesis that existing research neither confirms nor refutes. A rigorous test of this hypothesis, however, would entail comparisons of numerical abilities and mechanisms of humans to those of another particular species rather than some superordinate grouping of species.

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We do not claim that the human infant's numerical abilities are subserved by a Fodorian module. Rather, we submit that number is a natural domain of cognition subserved by mechanisms that are still unknown. Although it is possible that the mechanisms by which numerosity is represented are informationally encapsulated, the research needed to address this possibility has not yet been conducted. Garnham appears to conflate modularity with content specificity. As Fodor (1983, part 1) has emphasized, however, cognitive mechanisms can be content specific without being informationally encapsulated. Our claim of content specificity rests on the argument that numerical abilities and the set of mechanisms that underlie them embody principles of number from an early point in human ontogeny.

Garnham correctly attributes to us the claim that early numerical ability is innate; however, his characterization of the effects we observed as small suggests that our claim is based on weak evidence. We argue that the evidence for numerical ability in infants is strong. Cohen (1990) argues that replication of an effect in the same and different settings provides an approach to settling a scientific issue such as this. Evidence for numerical ability in infants has been obtained several times by us and by others using intermodal preference and habituation techniques, visible and audible stimuli, static and moving displays, and in infants from less than 1 month of age to several months of age (e.g., Starkey & Cooper, 1980; van Loosbroek & Smitsman, 1990). This constitutes strong evidence for innate numerical knowledge.

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