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Developing adaptations

David F. Bjorklund *



Department of Psychology, Florida Atlantic University, Boca Raton, FL 33431, USA

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ABSTRACT

The concept of *adaptation* is ubiquitous in psychology and plays a central role in evolutionary psychology. In this article I provide a different way of thinking about adaptations from an evolutionary developmental psychological perspective, more in line with the theorizing of developmental systems perspective than with mainstream evolutionary psychology. Adaptations develop and are based on the highly plastic nature of infants and children's behavior/cognition/brains. The concept of *evolved probabilistic cognitive mechanisms* is introduced, defined as information-processing mechanisms evolved to solve recurrent problems faced by ancestral populations that are expressed in a probabilistic fashion in each individual in a generation, based on the continuous and bidirectional interaction over time at all levels of organization, from the genetic through the cultural. Early perceptual/cognitive/affective biases result in behavior that, when occurring in a species-typical (expectant) environment, produce continuous adaptive changes in behavior (and cognition), yielding stable (and adaptive) outcomes. Examples from two domains, the development of face processing in infancy and prepared fears, are provided illustrating the development of adaptations via evolved probabilistic cognitive mechanisms.

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The concept of *adaptation* is ubiquitous in psychology. At its core is the idea of functional change in response to environmental stimuli, whether the change be in terms of sensory functioning, behavior, cognition, or emotions. Adaptational changes are typically viewed as being beneficial to the organism, enhancing the fit of an individual to its current environment, or possibly to a future one. The concept of adaptation is understandably an important one in the field of evolutionary psychology (Buss, Haselton,

* Department of Psychology, Florida Atlantic University, Boca Raton, FL 33431, USA. Fax: (561) 297-2160.
E-mail address: dbjorklu@fau.edu.

Shackelford, Bleske, & Wakefield, 1998; Tooby & Cosmides, 1992) and its sister discipline, evolutionary developmental psychology (Hernández Blasi & Bjorklund, 2003; Thompson, 2013). Each field applies Darwinian adaptationist reasoning to human psychological functioning, much as Darwin and generations of biologists have applied adaptationist reasoning to biological functioning.

As an evolutionary developmental psychologist, I have written much about adaptations (e.g., Bjorklund, Hernández Blasi, & Ellis, 2015; Bjorklund & Pellegrini, 2000, 2002; Hernández Blasi & Bjorklund, 2003). As a starting point, I adopted a definition of adaptation from mainstream evolutionary psychology: “An adaptation may be defined as an inherited and reliably developing characteristic that came into existence as a feature of a species through natural selection because it helped to directly or indirectly facilitate reproduction during the period of its evolution” (Buss et al., 1998, p. 535). Although this definition can be applied to all stages of the lifespan, it is often useful to make further distinctions for adaptations of infancy and childhood. In particular, three general types of developmental adaptations can be identified: ontogenetic, deferred, and conditional. Briefly, *ontogenetic adaptations* adapt infants and children to their immediate environment and not necessarily to a future one. They facilitate survival during a specific time in life and disappear when they are no longer needed. Many neonatal reflexes fit this description as do other behaviors characteristic of infancy, such as neonatal imitation (to foster infant–mother interaction when babies cannot exert intentional control of their own behavior, Bjorklund, 1987) and aspects of attachment (Bowlby, 1969) that serve to keep infants and young children alive at a time when they are highly dependent on care from others. In contrast, *deferred adaptations* serve to prepare children for adult life, providing children with the experiences that will give them the knowledge or skills to function as competent members in their society. Social play can be thought of as an example of a deferred adaptation, affording children social experiences that will permit them to cooperate and compete with conspecifics in the years ahead. *Conditional adaptations* can be viewed as special types of deferred adaptations and are defined as “evolved mechanisms that detect and respond to specific features of childhood environments and entrain developmental pathways that reliably matched those features during a species’ natural selective history” (Boyce & Ellis, 2005, p. 290). Current environmental conditions serve as a cue to future environments, and children adjust aspects of their development in anticipation of future environments. For instance, Belsky, Steinberg, and Draper (1991) proposed that conditions during the first 5–7 years of life with respect to availability of resources and the warmth and reliability of relationships influence children’s development of either fast or slow life history strategies, affecting their subsequent mating and parenting behaviors.

The concepts of ontogenetic, deferred, and conditional adaptations provide valuable ways of thinking about how natural selection may have operated at different stages in the life cycle and how children today are prepared by natural selection at different points in their development. However, it is important to keep in mind that these adaptations, which have evolved over countless generations, do not arise fully formed but develop. Perhaps the first principle of evolutionary developmental psychology is that all evolutionarily-influenced characteristics in the phenotype of adults develop, and this requires examining not only the functioning of these characteristics in adults, but also their ancient origins and their ontogeny. This is consistent with Tinbergen’s (1963) proposal that scientists must ask four questions in order to understand the behavior of an animal: (1) What is the immediate (proximate) benefit to the animal? (2) What are the immediate causes? (3) How does it develop within the species (ontogeny)? and (4) How did it evolve across species (phylogeny)?

In this paper, I present a way of thinking about adaptations from an evolutionary developmental perspective. In brief, I make the argument that natural selection has shaped the brains of children to be biased to process some information differently than others, and that such biases contribute to the development of adaptive species-typical behavior. However, the development of these adaptations is probabilistic in nature, dependent on children receiving species-typical experiences. Moreover, the plasticity of children’s brains and cognition permits a range of potentially adaptive outcomes, dependent on the specific environments that children experience (Bjorklund & Ellis, 2014; Bjorklund, Ellis, & Rosenberg, 2007).

I begin our discussion of evolutionary developmental perspectives on adaptations with a brief examination of Piaget’s account of adaptation. Piaget’s application of the concept adaptation is the best-known in developmental science, although one that is not typically associated with evolutionary

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