Early Stress, Parental Motivation, and Reproductive Decision-Making: Applications of Life History Theory to Parental Behavior

Tomás Cabeza de Baca

Bruce J. Ellis*

Abstract

This review focuses on the impact of parental behavior on child development, as interpreted from an evolutionary-developmental perspective. We employ psychosocial acceleration theory to reinterpret the effects of variation in parental investment and involvement on child development, arguing that these effects have been structured by natural selection to match the developing child to current and expected future environments. Over time, an individual's development, physiology, and behavior are organized in a coordinated manner (as instantiated in "life history strategies") that facilitates survival and reproductive success under different conditions. We review evidence to suggest that parental behavior (1) is strategic and contingent on environmental opportunities and constraints and (2) influences child life history strategies across behavioral, cognitive, and physiological domains.

Introduction

The determinants of child behavior are multi-faceted and complex. Here we focus on the effects of parental behavior on child development, and we present evolutionary-developmental models of how these effects vary within and between households. Models of child development that are not explicitly informed by evolutionary theory are often agnostic to functional or ultimate interpretations of behavior. Applying an evolutionary framework to the effects of parental behavior on child development allows us to examine these effects as potential *adaptive responses* (whether conscious or unconscious) to ecological constraints and opportunities. From this perspective, value labels derived from WEIRD ideals (Western, Educated, Industrialized, Rich, and Democratic [1]) on what is “good” or “bad” parenting are not useful [2,3]. Rather, the value of different parenting styles is relative and contingent on the environment in which the individual resides (regardless of ideals about parenting). Well-intentioned interventions designed to reduce “problematic” behaviors tend to be based on WEIRD values that may be mismatched to high-adversity contexts and strip individuals of the very tools and behaviors that facilitate success in such contexts (as in “declawing the cat”[4]).

The present review expands on current work by synthesizing evolutionary-developmental research and emphasizing the integrative nature of this approach. Our review is broken down into three main sections: (a) brief primer of a foundational evolutionary model of human social development (psychosocial acceleration theory), (b) evaluation of psychosocial acceleration theory in terms of major tests and theoretical extensions, and (c) implications for future research.

Psychosocial Acceleration theory: A Primer

The major strengths of applying Darwinian thinking toward parenting and development are two-fold: First, it integrates and organizes proximal-level theories and their findings (e.g., social learning theory, attachment theory, etc.) into a cohesive framework. Second, it reframes variation in parenting and child development as strategies that were shaped by natural selection to maximize survival and reproduction under different environmental conditions. Taken together, these contributions facilitate generation of novel hypotheses and reinterpretation of existing literature.

Belsky, Steinberg, and Draper [2] integrated traditional developmental theories, such as attachment theory and social learning theory, with life history theory [5,6] to advance an evolutionary model of child socialization—*psychosocial acceleration theory*—which substantially influenced subsequent evolutionarily-oriented models of social development. Figure 1 outlines the ontogenetic pathways and key developmental domains posited by Belsky and colleagues [2] and extended by follow-up research and theory. Psychosocial acceleration theory posits that the first five to seven years of a child's life, when attachment to a primary caregiver is labile, is a sensitive time to gauge the predictability and accessibility of resources present in the environment, the level of cooperation and mutualism between individuals, and the durability and stability of romantic relationships. Children who reside in high-stress households characterized by poor access to resources and increased psychosocial stressors will be more likely to orient development in a manner that prioritizes reproductive output over investment in health and stable pair bonds, producing a cascade of downstream effects on psychological, physiological, reproductive, and health domains. These tradeoffs, which begin during prenatal

development and continue over the life course, constitute intra-individual calibrations across physiology, morphology, brain and behavior.

Over time, these tradeoffs generate an organized constellation of traits and behaviors known as *life history strategies*. Life history strategies reside on a continuum from slow to fast, whereby fast life history strategists prioritize investment in mating, emphasizing offspring quantity (see Figure 1). Slow life history strategists conversely prioritize investment in somatic maintenance and parental-nepotistic effort, emphasizing offspring quality. Differential investment between these facets of development is guided by both heritable [7] and ecological forces [2,8]. As Belsky and colleagues [2] emphasized, the model should be conceptualized less as a series of sequential pathways and more as a “cumulative-conditional-probability” model (p. 650). This means greater or lesser exposure to harsh conditions that are detected and encoded by the child will increase the probability that their development will be oriented toward a particular end of the life history continuum [8] (as shown in Figure 1).

Important Tests and Extensions of Psychosocial Acceleration Theory

A central prediction of psychosocial acceleration theory is that ecological cues to adult *extrinsic morbidity-mortality* (which is defined as the probability of disability or death resulting from external sources that are relatively insensitive to the organism’s resource-allocation decisions [8]) should orient individuals to pursue faster life history strategies (e.g., [8,9**]). Psychosocial acceleration theory emphasizes that parenting and household contexts provide important cues to the child about levels of extrinsic morbidity-mortality in the larger ecology. Conflictual households denoted by low-quality parenting such as neglect, abuse, low parental monitoring, or father absence indicate to the developing child that the immediate environment is

harsh, unpredictable, and uncontrollable and that the individuals residing in it may not be trustworthy or cooperative (see [10,11]). These household and family cues are hypothesized to regulate development toward prioritizing reproduction over parenting and health-maintaining behaviors. The result is a faster life history strategy, emanating from lifetime developmental trade-offs, spanning across many domains (as shown in Figure 1). Here we briefly review how these processes shape worldviews and cognitions, calibrate peripheral neuroendocrine systems, and regulate sexual development.

In harsh and unpredictable environments, individuals should have highly developed *unpredictability schemas*: a worldview where other people and future outcomes are perceived as unreliable and unpredictable (see Figure 1: Psychological/Behavioral Development). Household and family-level unpredictability is often defined in terms of variability in the ecology of the family (e.g., moving residences and schools, changes in caregivers and/or parental relationships [12–14]). Work focusing on the unpredictability schema has found a link between these family-level indicators of unpredictability and increased perception of unpredictability [15*,16]. Growing up under such household conditions should orient individuals to prioritize mating effort over parental obligations and impact the development of children. Consistent with this view, research examining low-income mothers and their elementary school children found that both decreased parental effort and increased mating effort were associated with a more highly developed child unpredictability schema [15*]. Retrospective examination of family unpredictability designated by inconsistency in discipline/nurturance, family meals, and income was associated with a more developed unpredictability schema in college students [16]. Further, the association between family unpredictability and anxious-depressive symptomology was

mediated by the unpredictability schema, suggesting that maintaining a hypervigilant and uncertain worldview of the ecology and conspecifics may impact mental health as measured by standard instruments. From an evolutionary perspective the development of vigilance in an unpredictable environment is presumed to be an adaptive response because individuals displaying that trait in that context are likely to avoid fitness-damaging outcomes (compared with non-vigilant individuals in the same context), even if being in a vigilant psychological state translates into anxious-depressive symptoms. As shown in Figure 1, parental condition (e.g., mental and physical health; marital stability) is part of the family and ecological context of the child, which shapes quality of parental investment and, through it, child developmental outcomes such as emerging life history strategies. Longitudinal analyses found that maternal depression in early childhood (predicted by lower socioeconomic status and greater household unpredictability in terms of parental and residential changes) was associated with increased household chaos, more parental hassles, harsher parenting at ages 4 to 5 years old, and earlier onset of sexual activity [12,17]. Moreover, other research has shown that exposure to unpredictable conditions in early childhood can impact an individual's approach toward parenting, decreasing supportive parenting mostly in men [18**].

Psychosocial acceleration theory [2] focused on the role of familial and ecological conditions in regulating the development of life history strategies. The Adaptive Calibration Model (ACM [19,20*]) has attempted to extend psychosocial acceleration theory by articulating physiological mediators—autonomic, neuroendocrine, metabolic, and immune—that instantiate these proposed environmental effects (see Figure 1: Autonomic, Adrenocortical, and Immune Signaling). In the ACM, activation of these physiological mediators during childhood provides

crucial information about threats and opportunities in the environment, their type, and their severity. Over time, this information becomes embedded in the parameters—recurring set points and reactivity patterns—of autonomic, neuroendocrine, metabolic, and immune systems. These parameters provide the developing person with statistical “summaries” of key dimensions of the environment. For example, sustained activation of the HPA axis is generated by exposures to danger, unpredictable or uncontrollable contexts, and social evaluation, as well as energetic stress (see [21,22]); thus, the HPA axis tracks the key environmental variables involved in regulation of alternative life history strategies. Immune system parameters also track critical dimensions of environmental stress and support [23,24]. In turn, individual differences in biological stress responses regulate the coordinated development of a broad cluster of life history-relevant traits [19,20*]. Stress response systems further coordinate across other physiological systems (e.g., the gonadal axis) to regulate sexual maturation and reproduction [9**,19,25–27].

Sexual maturation is a precursor to reproduction. As shown in Figure 1, environments characterized by increased harshness and unpredictability can be expected to shorten childhood and accelerate reproduction to maximize fitness opportunities. Research indeed suggests that increased childhood adversity predicts earlier pubertal timing and accelerated sexual behavior and reproduction [28–38]; reviewed in[36]. These psychosocial effects on sexual development and reproduction may, importantly, be moderated by attachment styles. In a landmark study, secure infant attachment to mothers acted as a buffer against environmental harshness (as measured by income-to-needs ratio during the first five years of the child’s life): Insecurely attached girls residing in harsher environments went through puberty earlier, but the association

was not found for securely attached girls [30*]. This moderating effect underscores the key role of parent-child relationships in regulating the development of life history strategies.

Implications for Future Research

Evolutionary developmental psychology has proven to be a productive field in terms of generating novel hypotheses and lines of research across both evolutionary and developmental domains. Many of the pathways shown in Figure 1 are now well established. We must now move beyond establishing associations and focus on examining the underlying genomic and physiological mechanisms. One area that has received much attention is mother-child relationships and the regulation of gene expression. Foundational animal models, which have used a “cross-fostering” paradigm to control for genetic and environmental confounds (reviewed in [39]) have shown that high-quality parenting (indexed by high levels of licking and grooming in rodents) down-regulates autonomic and adrenocortical stress reactivity. This calibration of stress responsivity presumably prepares the developing pup for a relatively safe, stable environment. This calibration is instantiated mechanistically through methylation of glucocorticoid receptors in hippocampal neurons [39]. Human parallels have begun to be studied. Exposure to prenatal or early life stress in the form of maternal depressive symptoms during pregnancy or early childhood maltreatment predicts methylation of human glucocorticoid receptors in the cord blood (of newborns) or buccal cell (of infants), which in turn has been associated with important child outcomes such as internalizing behaviors at 3-5 years [40–42]. This type of epigenetic research has the potential to shed great light on how life history strategies are instantiated under different conditions and how it may impact future health and longevity [43,44].

Another important direction for future research will be examining how and if different life history strategies are actually adaptive in context. Life history theory moves us beyond value judgments about “good” or “bad” parenting and instead emphasizes adaptation in context. From a life history perspective, the child growing up under harsh, unpredictable conditions who develops insecure attachments, an exploitive interpersonal style, matures early, sustains early sexual debut, and engages in a range of antagonistic and risky social behaviors is no less functional than a child who grows up in a safe, stable environment and shows the opposite behaviors and dispositions. For example, Humphreys et al. [45] provides experimental evidence showing that previously institutionalized children pursue exploitative strategies in a decision-making context, resulting in greater success in a restricted task condition in which it paid off to “cash in” early. These data suggest that developmentally-calibrated exploitive strategies may be adaptive in unpredictable environments where future outcomes are uncertain. Research is needed to examine the specific skills and abilities that develop in response to stressful rearing environments (see[46]) and how these skills can be usefully employed in relevant contexts. An example is heightened attention-shifting ability among individuals who grow up in harsh, unpredictable home environments and then are exposed to current states of economic decline and uncertainty [47**]. Heightened attention-shifting ability may facilitate vigilance in a world where threats come without warning.

Finally, we have discussed linkages across cognition, stress reactivity, and sexual maturation. These systems should be investigated in concert and continued to be examined in context[48], consistent with physiologically-oriented models of development [26,46, 49]. Evolutionary-developmental models emphasize linkages across varying levels of experience and

development ranging from familial and ecological stress to psychological/behavioral development to neurobiological mechanisms to reproductive strategies to health (see Figure 1). While this multi-level integration may not happen overnight, such a change would require modification of training programs in human development, emphasizing not only culture and context, but genetics, biology, and evolutionary thought, as well. Proposing these paradigm shifts within these academic spaces may be met with resistance [50].

In conclusion, psychosocial acceleration theory has served as an important foundation and stimulus for evolutionary-developmental work on parenting and its role in regulating life history strategy. The perspective has proven useful in integrating across multiple domains of analysis, highlighting the importance of previously understudied variables (e.g., mortality cues, timing of puberty, time perspective), and placing parenting in a coherent, integrative framework that is functionally organized around variation in life history strategies in relation to ecological context.

References and Recommended Reading

Papers of particular interest, published within the period of review, have been highlighted as:

*of special interest

**of outstanding interest

1. Henrich J, Heine SJ, Norenzayan A: **Most people are not WEIRD**. *Nature* 2010, **466**:29–29.
 2. Belsky J, Steinberg L, Draper P: **Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization**. *Child Dev.* 1991, **62**:647–670.
 3. Cabeza de Baca T, Figueredo AJ, Ellis BJ: **An evolutionary analysis of variation in parental effort: Determinants and assessment**. *Parenting* 2012, **12**:94–104.
 4. Ellis BJ, Del Giudice M, Dishion TJ, Figueredo AJ, Gray P, Griskevicius V, Hawley PH, Jacobs WJ, James J, Volk AA, et al.: **The evolutionary basis of risky adolescent behavior: implications for science, policy, and practice**. *Dev. Psychol.* 2012, **48**:598.
 5. Charnov EL: **Evolution of life history variation among female mammals**. *Proc. Natl. Acad. Sci.* 1991, **88**:1134–1137.
 6. Stearns SC: *The evolution of life histories*. Oxford University Press; 1992.
 7. Figueredo AJ, Vásquez G, Brumbach BH, Schneider SM, Sefcek JA, Tal IR, Hill D, Wenner CJ, Jacobs WJ: **Consilience and life history theory: From genes to brain to reproductive strategy**. *Dev. Rev.* 2006, **26**:243–275.
 8. Ellis BJ, Figueredo AJ, Brumbach BH, Schlomer GL: **Fundamental Dimensions of Environmental Risk: The Impact of Harsh versus Unpredictable Environments on the Evolution and Development of Life History Strategies**. *Hum. Nat.* 2009, **20**:204–268.
 9. Coall DA, Tickner M, McAllister LS, Sheppard P: **Developmental influences on fertility decisions by women: an evolutionary perspective**. *Philos. Trans. R. Soc. B Biol. Sci.* 2016, **371**:20150146.
- **This theoretical paper argues that there is much empirical interest in the association between early adversity and pubertal timing, but that fertility (i.e., number of live births), needs included in these models. They articulate potential psychosocial and physiological pathways for investigation.**
10. Dunkel CS, Mathes EW, Kesselring SN, Decker ML, Kelts DJ: **Parenting influence on the development of life history strategy**. *Evol. Hum. Behav.* 2015, **36**:374–378.

11. Hampson SE, Andrews JA, Barckley M, Gerrard M, Gibbons FX: **Harsh environments, life history strategies, and adjustment: A longitudinal study of Oregon youth.** *Personal. Individ. Differ.* 2016, **88**:120–124.
12. Belsky J, Schlomer GL, Ellis BJ: **Beyond cumulative risk: distinguishing harshness and unpredictability as determinants of parenting and early life history strategy.** *Dev. Psychol.* 2012, **48**:662.
13. Simpson JA, Griskevicius V, Kuo SI, Sung S, Collins WA, others: **Evolution, stress, and sensitive periods: the influence of unpredictability in early versus late childhood on sex and risky behavior.** *Dev. Psychol.* 2012, **48**:674.
14. Matheny AP, Wachs TD, Ludwig JL, Phillips K: **Bringing order out of chaos: Psychometric characteristics of the confusion, hubbub, and order scale.** *J. Appl. Dev. Psychol.* 1995, **16**:429–444.
15. Cabeza de Baca T, Barnett MA, Ellis BJ: **The development of the child unpredictability schema: The correlates of maternal life history tradeoffs on reproductive effort.** *Evol. Behav. Sci.* 2016, **10**:43–55.

*** The article used mother-child reports to examine the impact of maternal parental and mating effort on the child unpredictability schema in a low income sample. Both increased mating effort and decreased parental effort was associated with a more developed unpredictability schema.**

16. Ross LT, Hood CO, Short SD: **Unpredictability and Symptoms of Depression and Anxiety.** *J. Soc. Clin. Psychol.* 2016, **35**:371–385.
17. Shelleby EC, Votruba-Drzal E, Shaw DS, Dishion TJ, Wilson MN, Gardner F: **Income and children's behavioral functioning: A sequential mediation analysis.** *J. Fam. Psychol.* 2014, **28**:936.
18. Szepeswöl O, Simpson JA, Griskevicius V, Raby KL: **The effect of unpredictable early childhood environments on parenting in adulthood.** *J. Pers. Soc. Psychol.* 2015, **109**:1045.

****The article provides evidence to suggest that early unpredictability orients parental behavior in a manner that emphasizes decreased parental quality and increased negativity, with the effect being stronger in men.**

19. Del Giudice M, Ellis BJ, Shirtcliff EA: **The adaptive calibration model of stress responsivity.** *Neurosci. Biobehav. Rev.* 2011, **35**:1562–1592.

20. Ellis BJ, Del Giudice M: **Beyond allostatic load: Rethinking the role of stress in regulating human development.** *Dev. Psychopathol.* 2014, **26**:1–20.

***The Adaptive Calibration Model (ACM) is described, which provides an evolutionary alternative to the Allostatic Load Model (ALM). The Authors argue that both models are complementary, but ACM provides greater integration and a better explanation of individual differences that arise from contextual factors and developmental plasticity.**

21. Dickerson SS, Kemeny ME: **Acute stressors and cortisol responses: a theoretical integration and synthesis of laboratory research.** *Psychol. Bull.* 2004, **130**:355.
22. Gettler LT, McDade TW, Bragg JM, Feranil AB, Kuzawa CW: **Developmental energetics, sibling death, and parental instability as predictors of maturational tempo and life history scheduling in males from Cebu, Philippines: Early life influences on life history.** *Am. J. Phys. Anthropol.* 2015, **158**:175–184.
23. McDade TW, Georgiev AV, Kuzawa CW: **Trade-offs between acquired and innate immune defenses in humans.** *Evol. Med. Public Health* 2016, **2016**:1–16.
24. Slavich GM, Cole SW: **The emerging field of human social genomics.** *Clin. Psychol. Sci.* 2013, **1**:331–348.
25. Cabeza de Baca T, Wahl RA, Barnett MA, Figueredo AJ, Ellis BJ: **Adversity, Adaptive Calibration, and Health: The Case of Disadvantaged Families.** *Adapt. Hum. Behav. Physiol.* 2016, **2**:93–115.
26. Hoyt LT, Falconi AM: **Puberty and perimenopause: Reproductive transitions and their implications for women's health.** *Soc. Sci. Med.* 2015, **132**:103–112.
27. Marceau K, Ruttle PL, Shirtcliff EA, Essex MJ, Susman EJ: **Developmental and contextual considerations for adrenal and gonadal hormone functioning during adolescence: Implications for adolescent mental health.** *Dev. Psychobiol.* 2015, **57**:742–768.
28. Amir D, Jordan MR, Bribiescas RG: **A Longitudinal Assessment of Associations between Adolescent Environment, Adversity Perception, and Economic Status on Fertility and Age of Menarche.** *PloS One* 2016, **11**:e0155883.
29. James J, Ellis BJ, Schlomer GL, Garber J: **Sex-specific pathways to early puberty, sexual debut, and sexual risk taking: Tests of an integrated evolutionary–developmental model.** *Dev. Psychol.* 2012, **48**:687.

30. Sung S, Simpson JA, Giskevicius V, Sally I, Kuo C, Schlomer GL, Belsky J: **Secure Infant-Mother Attachment Buffers the Effect of Early-Life Stress on Age of Menarche.** *Psychol. Sci.* 2016, **27**:667–674.

***This longitudinal study provides further support for psychosocial acceleration theory. It suggests that infant attachment may moderate the association between environmental harshness and pubertal timing.**

31. Anderson KG: **Father Absence, Childhood Stress, and Reproductive Maturation in South Africa.** *Hum. Nat.* 2015, **26**:401–425.
32. Van Brummen—Girigori OJ, Buunk AP: **Does father abandonment have consequences for the reproductive strategies of girls? A study in Curaçao.** *Evol. Mind Behav.* 2015, **13**:19–35.
33. Ryan RM, Mendle J, Markowitz AJ: **Early Childhood Maltreatment and Girls' Sexual Behavior: The Mediating Role of Pubertal Timing.** *J. Adolesc. Health* 2015, **57**:342–347.
34. Negri S, Blankson AN, Trickett PK: **Pubertal Timing and Tempo: Associations With Childhood Maltreatment.** *J. Res. Adolesc.* 2015, **25**:201–213.
35. Culpin I, Heron J, Araya R, Joinson C: **Early Childhood Father Absence and Depressive Symptoms in Adolescent Girls from a UK Cohort: The Mediating Role of Early Menarche.** *J. Abnorm. Child Psychol.* 2015, **43**:921–931.
36. Ellis BJ: **Timing of pubertal maturation in girls: an integrated life history approach.** *Psychol. Bull.* 2004, **130**:920.
37. Ellis BJ, Garber J: **Psychosocial antecedents of variation in girls' pubertal timing: Maternal depression, stepfather presence, and marital and family stress.** *Child Dev.* 2000, **71**:485–501.
38. Belsky J, Ruttle PL, Boyce WT, Armstrong JM, Essex MJ: **Early adversity, elevated stress physiology, accelerated sexual maturation, and poor health in females.** *Dev. Psychol.* 2015, **51**:816.
39. Meaney MJ: **Epigenetics and the biological definition of geneXenvironment interactions.** *Child Dev.* 2010, **81**:41–79.
40. Conradt E, Hawes K, Guerin D, Armstrong DA, Marsit CJ, Tronick E, Lester BM: **The contributions of maternal sensitivity and maternal depressive symptoms to epigenetic processes and neuroendocrine functioning.** *Child Dev.* 2016, **87**:73–85.

41. Parade SH, Ridout KK, Seifer R, Armstrong DA, Marsit CJ, McWilliams MA, Tyrka AR: **Methylation of the glucocorticoid receptor gene promoter in preschoolers: Links with internalizing behavior problems.** *Child Dev.* 2016, **87**:86–97.
42. Romans SE, McDonald J, Svaren J, Pollak SD: **Associations between early life stress and gene methylation in children.** *Child Dev.* 2015, **86**:303–309.
43. Beach SRH, Lei M-K, Brody GH, Kim S, Barton AW, Dogan MV, Philibert RA: **Parenting, Socioeconomic Status Risk, and Later Young Adult Health: Exploration of Opposing Indirect Effects via DNA Methylation.** *Child Dev.* 2016, **87**:111–121.
44. Klengel T, Mehta D, Anacker C, Rex-Haffner M, Pruessner JC, Pariante CM, Pace TWW, Mercer KB, Mayberg HS, Bradley B, et al.: **Allele-specific FKBP5 DNA demethylation mediates gene–childhood trauma interactions.** *Nat. Neurosci.* 2013, **16**:33–41.
45. Humphreys KL, Lee SS, Telzer EH, Gabard-Durnam LJ, Goff B, Flannery J, Tottenham N: **Exploration-exploitation strategy is dependent on early experience.** *Dev. Psychobiol.* 2015, **57**:313–321.
46. Frankenhuis WE, de Weerth C: **Does early-life exposure to stress shape or impair cognition?** *Curr. Dir. Psychol. Sci.* 2013, **22**:407–412.
47. Mittal C, Griskevicius V, Simpson JA, Sung S, Young ES: **Cognitive adaptations to stressful environments: When childhood adversity enhances adult executive function.** *J. Pers. Soc. Psychol.* 2015, **109**:604.

****The following paper presents a series of studies that provide evidence suggesting that early harsh environments may enhance components of executive functioning, such as shifting, while decreasing attention.**

48. Ellis BJ: **The hypothalamic–pituitary–gonadal axis: A switch-controlled, condition-sensitive system in the regulation of life history strategies.** *Horm. Behav.* 2013, **64**:215–225.
49. Obradović J: **Physiological responsivity and executive functioning: Implications for adaptation and resilience in early childhood.** *Child Dev. Perspect.* 2016, **10**:65–70.
50. King AC, Cabeza de Baca T: **The stagnancy of family studies in modern academia: resistances toward the integration of evolutionary theory.** *Evol. Educ. Outreach* 2011, **4**:64–74.

Figure 1. *A modified figure of the Psychosocial Acceleration Theory, originally proposed by Belsky, Steinberg, and Draper (1991) and extended in subsequent work. The figure posits that early childhood experiences (first 5 to 7 years old) will orient a child's development in a manner that creates a cohesive life history strategy. Life history strategies reside on a fast-slow continuum whereby individuals oriented toward a faster life history strategy will emphasize reproduction over health-maintenance and high quality parenting; conversely, individuals oriented toward a slower life history strategy will emphasize investment in health-maintenance and high-quality parenting. Although Psychosocial Acceleration Theory emphasizes environmental causation, the bidirectional arrows highlight the importance of child effects and bidirectional causation more generally. The horizontal arrows indicate that autonomic, adrenocortical, and immune signaling also operate as important moderators of the proposed pathways.*

Fast LH Strategy

Poverty;
Marital instability;
high stress/danger

Harsh, rejecting, insensitive,
inconsistent parenting

Insecure attachment;
Unpredictability schema;
risky/aggressive behavior;
immediate gratification

↑ Sympathetic adrenomedullary
signaling; ↑ glucocorticoid
resistance; ↑ proinflammatory
cytokine gene expression

Develops in manner that
accelerates puberty, sex, and
reproduction

↑ Mating effort
↓ Somatic effort
↓ Mental/physical health

Slow LH Strategy

adequate \$, resources;
Marital harmony/ stability;
safety

Sensitive, supportive,
responsive, positively
affectionate

Secure attachment; inhibitory
control; cooperative
interpersonal style; delay of
gratification

↓ Sympathetic adrenomedullary
signaling; ↑ glucocorticoid
receptor expression; ↑ antiviral
immune response gene
expression

Develops in manner that
delays puberty, sex, and
reproduction

↑ Parental effort
↑ Somatic effort
↑ Mental/physical health

Adapted from Belsky et al., 1991