How the Mind Grows from Conception to College

WELCOME TO YOUR CHILD'S BRAIN

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Chapter 6

BORN LINGUISTS

AGES: BIRTH TO EIGHT YEARS

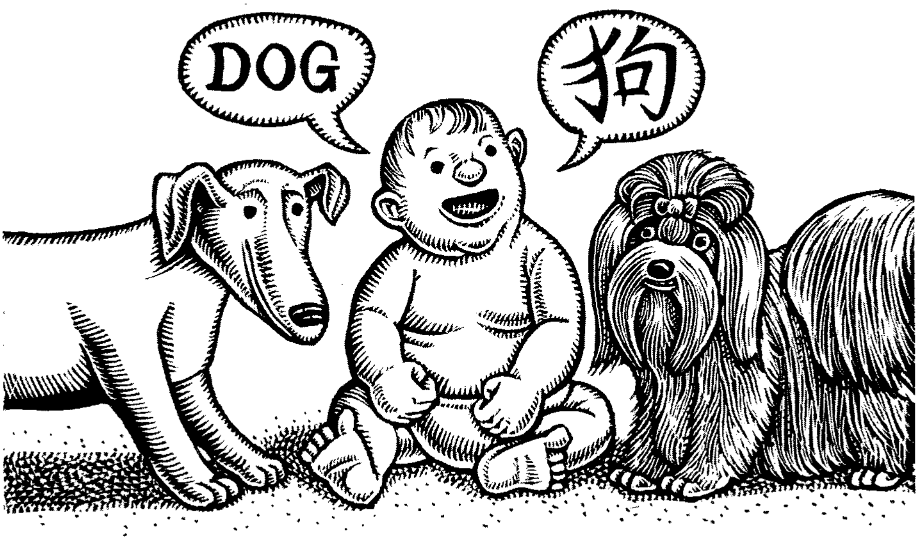
Complex skills require deep foundations. Babies start to learn language a long time before they are able to speak, preferentially focusing their attention on speech from birth—or even earlier, as hearing becomes functional during the third trimester of pregnancy (see chapter 11). Because babies do not have the motor abilities to express all the knowledge that they have obtained, though, you may not realize how much language they understand at a given age.

Newborn babies already prefer their mother's voice over other female voices, their native language over other languages, and speech over other sounds that have the same acoustic properties, including speech played backward. They can also detect a variety of vocal cues, including acoustic characteristics, stress patterns, and the rhythms of different languages. From early in life, your infant absorbs the huge amounts of information that will make him an expert in his native language, learning about its cadences, its sounds, the structures of its words, and the grammar of its sentences. As we discussed in chapter 3, most adults instinctively speak to infants in motherese, which is slower than normal language and contains exaggerated versions of consonant and vowel sounds.

Young infants can distinguish and categorize the sounds of all languages of the world, though adults often confuse the sounds of a foreign language. For example, the *r* and *l* of English sound the same to Japanese adults, but different to Japanese infants. As they acquire experience with speech, babies begin to specialize in the sounds (called *phonemes*) of their own language (or languages). By six months of age (for vowels) or ten months (for consonants), babies become better at identifying the phonemes of their native language and worse at identifying the phonemes of other languages. In other words, experience with language shapes the categories into which babies place sounds, determining which variations in sound characteristics are meaningful (reflecting different phonemes) and which should be ignored (reflecting different speakers or other unimportant variations).

As we would expect, their neural activity reflects this phoneme learning. In older infants, the patterns of electrical signals in the brain recorded from electrodes on the scalp, termed *event-related potentials*, show that babies distinguish between a pair of sounds from the native language, while failing to distinguish two confusable foreign sounds. In younger infants, event-related potential patterns distinguish both foreign- and native-language sound pairs. This brain specialization is important for future language learning. Babies whose brains discriminate native sounds well (and foreign sounds poorly) at seven and a half months go on to learn language earlier than babies who show the less mature pattern of distinguishing all sounds equally well. The more discriminating babies learn words more quickly, produce more words and more complex sentences at twenty-four months, and produce longer phrases at thirty months than the less discriminating babies. So even though your baby isn't talking back, he is absorbing the patterns of your talk.

Social interaction is one cue that babies use to determine which sounds they should be learning. Nine-month-old infants who hear a brief tape recording or video of someone speaking a new language do not learn its sounds, but the same



amount of speech from a live person is sufficient to allow the babies to discriminate phonemes in the new language. (Under some circumstances, babies can learn from tape or video, but it takes longer than learning from a live person.) Indeed, certain measures of social interaction with a language teacher (including a parent) predict how well individual infants will remember the sounds of the new language. The preference for social interaction may be part of the reason that autistic children (see chapter 27), who do not interact well with other people (and do not prefer the sounds of motherese), have difficulty learning language.

The timing of speech production is determined by maturation of the brain regions that control movement. Forming understandable sounds requires considerable fine motor control and apparently a lot of practice. Babies first attempt to talk at around two months, when they begin cooing vowels, the least complicated speech sounds to produce. Some consonant sounds follow around five months, when babbling begins. Early babbling sounds the same in all babies, regardless of their native language. Around the end of the first year, babbling starts to include language-specific phonemes.

Responding with a comment or a touch to your baby's best attempts to communicate seems to encourage continued efforts to improve these skills.

Word learning also starts long before babies can produce words of their own. Six-month-old infants know their own names and will look at a picture of their *mommy* or *daddy* when they hear the word. As we discussed in chapter 1, infants can listen to a string of nonsense syllables and determine which of them are most commonly heard together as "words." They apply this talent to identifying words in normal speech, where words tend to run together without pauses. (To understand this phenomenon, think of the way a foreign language sounds; you can't guess where one word ends and the next begins.) Later, their brains learn about the regularities of sentence structure that constitute the rules of grammar in their native language. By nine months, familiar and unfamiliar words trigger noticeably different event-related potentials. By the first half of baby's second year, these potentials are different for words whose meaning the child does or doesn't understand. Babies' brains also respond differently to made-up words depending on whether or not they obey the rules for which syllable should be stressed in the baby's native language. Stress patterns appear to be another tool that babies use to determine which groups of sounds are words.

In the second year, as children learn more words and become able to say many of them, they become better at distinguishing similar words, like *bear* and *pear*. Babies at fourteen months will direct their gaze toward an object even when its name is mispronounced, suggesting that their brain does not yet represent the sounds in known words with complete accuracy. Similarly, at this age, brain activity does not distinguish between familiar words and similar-sounding nonsense words. This changes at around twenty months. The relationship between learning words and learning sounds seems to be bidirectional, so that learning sounds makes it easier to learn words, but learning more words also helps babies improve their ability to distinguish sounds.

Sentences add new layers of complexity to language learning. Again, children can comprehend sentences and grammatical connecting words before they're able to use them in speech. To understand a sentence, your child must know not only the meanings of the individual words (called *semantic information*) but also how they relate to each other within the sentence (*syntactic information*). The brain represents these two types of information separately.

For almost everyone (excepting some left-handers), the left hemisphere is dominant for language production. Similar regions in the right hemisphere are responsible for *prosody*, the tone and rhythm of speech that conveys much of its emotional content. (For example, prosody tells you when someone is being sarcastic or making a joke.) Laterality of language representations seems to be part of the basic pattern of brain connections laid down by genes before sensory experience becomes effective (see chapter 2) because it is apparent by two or three months of age and even occurs in deaf infants. If the dominant speech regions are damaged in childhood, though, especially before the age of five, the other side of the brain can take over their function, leaving language skills relatively normal. If the same damage occurs after puberty, it severely impairs communication abilities.

When we hear something that sounds "wrong," event-potentials in our brains reveal whether we're reacting to syntactic or semantic violations. "The boy walked down the flower" is an example of a semantic violation, while "The boy walk

PRACTICAL TIP: TEACH FOREIGN LANGUAGES EARLY IN LIFE

From the perspective of neuroscience, it's absurd to wait until high school to begin studying a foreign language. By adolescence, students must work much harder to learn a new language, and most of them will never master it completely. If you want your child to speak another language fluently, by far the best approach is to start early in life.

In one study, researchers tested the English grammar proficiency of Chinese or Korean immigrants who had arrived in the U.S. at various ages and stayed at least five years. The test required participants to identify whether there were grammatical errors in sentences like "Tom is reading book in the bathtub" or "The man climbed the ladder up carefully." The test was simple enough that native English speakers could ace it by the age of six, but the immigrants who began learning English after age seventeen missed many of these simple questions. Only people who came to the U.S. before age seven performed at the level of native speakers. Everyone in the group who arrived at eight to ten years of age did a bit worse, and those who arrived at eleven to fifteen were still less proficient.

Between ages eight and fifteen, researchers found a strong relationship between age of exposure and performance on the test. But in adulthood, individual variability in performance was not connected to age. No matter whether they'd started learning English at eighteen or forty, few adults learned perfectly. (Some later researchers found that language learning in adulthood also declines with age—that is, young adults learn better than older adults—but everyone agrees that young children learn better than older people.)

The take-home message for parents and schools is clear: take advantage of young children's superior language learning abilities by beginning instruction in elementary school or earlier. When it comes to language, there's no substitute for an early start.

down the road" is syntactic. In small children, these mistake-detection responses develop slowly, starting as children transition from two-word phrases to their first full sentences, around thirty months of age. Brain responses gradually become faster and more precisely localized through childhood and into the early teens.

There seem to be at least two sensitive periods for language learning. We already discussed the sensitive period for phonemes, in the first year or two of life, when babies' brains become specialized for representing the sounds of their native language(s). There is also a sensitive period for learning about grammar. Children's ability to acquire syntax rules declines gradually after age eight, and adults are worse than children at learning languages (see *Practical tip: Teach foreign languages early in life*).

Some adults manage to learn a second language to a high level of proficiency. Most of us, though, no matter how hard we study in adulthood, will always have a foreign accent and make minor grammatical errors. In contrast, there does not appear to be a sensitive period for semantic learning, as new vocabulary words can be acquired equally well at any age. The event-related potential signal for semantic violations looks the same for both native and second languages, even in people who learned their second language late in life.

Children can learn more than one native language if they are exposed to both languages early enough, but their brains appear to represent the languages at least somewhat separately. Bilingual children reach language milestones at the same age and have the same risk of language impairment as monolingual children, though the details of their language development are somewhat different. So if your household is bilingual, the research indicates that this is not a disadvantage for your child's language learning. (Indeed, it may be an advantage for cognitive development; see *Practical tip: Learning two languages improves cognitive control*, p. 118.) Learning a second language also changes the brain. A region in the left inferior parietal cortex is larger in people who speak more than one language, and it is largest in those who learned the second language when they were young or speak it fluently.

Infants quickly learn to identify different languages by their rhythms, their characteristic phonemes, and other cues. Bilingual children do sometimes mix languages in their speech, but they seem to do so for the same reasons and in the same situations as adult bilinguals, for instance, substituting a word from one language when they don't know the word for that concept in the other one. Though bilingual children have a smaller vocabulary in a particular language than monolingual children of the same age, bilingual children know more words in total if you count both languages.

Children who hear more words while interacting with their parents in the first two years of life learn language faster than children who hear fewer words. These differences in home environments tend to fall along socioeconomic class lines. In one study, the poorest children heard 600 words an hour, working-class children heard 1,200 words, and children of professionals heard 2,100 words. These major differences in children's language environment correlate with their later language development and IQ scores—though the finding that highly verbal parents raise highly verbal children may be partly due to genetic factors or the many other advantages of growing up in a professional household (see chapter 30).

Later research has shown that you can improve your children's language skills by responding rapidly to their vocalizations, mimicking the turn-taking of conversation even before your baby is capable of forming words. Responding with a comment or a touch to your baby's best attempts to communicate seems to encourage continued efforts to improve these skills. So talk to your baby and put up a good show of understanding what she's saying. It's fun for both of you, and it will help her language skills to develop more quickly.

Chapter 30

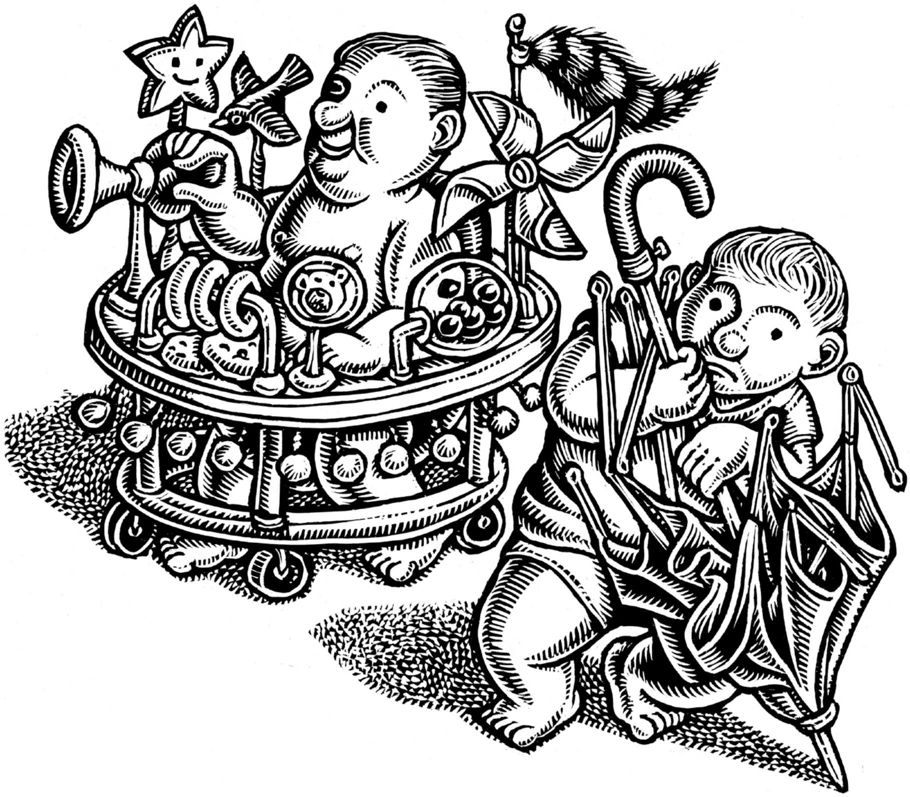
A TOUGH ROAD TO TRAVEL: GROWING UP IN POVERTY

AGES: CONCEPTION TO EIGHTEEN YEARS

Growing up under conditions of deprivation can damage children's brains. This is an exception to the general principle we have expressed throughout this book that most children are resilient, and that variations in normal ("good enough") parenting do not appear to have a strong influence on how they turn out as adults. This chapter is about the other side of the coin: what happens to children whose developing brains match themselves to an environment that does not encourage them to express their full potential. After all, even dandelions can't grow in the desert.

Where your children grow up is one of the most critical factors in their development. When you move to a new house or apartment—or another country—you're determining not only your children's schools but also their neighborhood and the characteristics of the group from whom your children will select their friends. Children learn a lot from other kids and from the culture by which they are surrounded (see chapters 17 and 20). It's hard to raise children to reject the attitudes and assumptions of their peers, as parents have discovered everywhere from religious communities to inner-city neighborhoods. This is one of the many reasons that children start life at a disadvantage when they grow up in places with high unemployment, unsafe streets, and poor education.

Poverty itself isn't exactly the problem, unless children are actually starving, which is rare in developed countries. The risks instead come from conditions that are made more likely by poverty, in particular growing up in a chronic state



of fear and/or stress. Poverty is stressful due to a combination of economic insecurity (inadequate living conditions, frequent moves), disorganized households and harsh parenting (common side effects of parental stress or addiction), and social subordination (being treated as inferior because of social class and/or race). Heightened fear and anxiety can result from living in a high-crime neighborhood, food insecurity, and parental mistreatment (again more common when parents are stressed).

Inadequate parenting can and does occur in any segment of society, of course. Indeed, the middle class, because it is the biggest economic group in many countries, typically contains the largest number of chronically stressed or threatened children, as well as the largest number of children with behavioral problems. In addition, some especially resilient people who grow up in very difficult conditions become highly successful and happy adults. Even so, poor children grow up in environments that statistically increase their risk of a variety of disorders. Indeed, some of these "problems," such as chronic anxiety or early reproduction, may actually constitute adaptive responses to insecure living conditions (see chapter 26).

Socially and economically disadvantaged people are much more likely than middle-class people to suffer from medical, emotional, cognitive, and behavioral problems. *Socioeconomic status* (*SES*) is an umbrella term for the resources that people have available to them relative to others in their society. At minimum, it includes income, occupation (with associated prestige), and education, each of which can be broken down into more detailed measures. Across a variety of countries with different social systems, lower SES predicts substantially increased risk of a broad range of medical problems, including heart disease, respiratory disease, diabetes, and psychiatric conditions. As family SES decreases, children have increased risk of low birth weight, premature birth, infant mortality, injury, asthma, and various chronic conditions, including behavioral disorders. Community SES also influences child outcomes in studies that control for family SES.

People who are satisfied with their standard of living and feel financially secure are healthier, regardless of their actual income, occupation, and education, than people who are unsatisfied and anxious about the future.

Health and SES vary together across the full range of SES; the relationship is not merely a consequence of very poor health at the bottom of the scale. Overall, the lower people's SES, the earlier they are likely to die, with a difference of decades in some countries between the highest- and lowest-SES groups. The gradient is steepest at the bottom, though, with the biggest step between poor and working-class groups. These differences are large. In the U.S., adults with the lowest SES are about five times more likely to report having "poor" or "fair" health than the highest-SES adults.

SES is closely connected with health even in countries with equal access to health care and for diseases that medical care cannot prevent, such as juvenile diabetes and rheumatoid arthritis. So it is not primarily due to differences in medical care—though such differences can make the problem worse. Only part of this discrepancy (about one third, in one study of British government workers) can be explained by lifestyle differences, such as high rates of smoking and drinking, poor diet, and infrequent exercise among low-SES groups. Lung cancer is still more prevalent in low-SES than high-SES groups even when comparing people who smoke the same number of cigarettes, so there must be some problem beyond lifestyle choices.

The relationship between SES and health may be attributable to the effects of stress, which can damage the brain and the rest of the body (see chapter 26). In many species, life at the bottom of the dominance hierarchy involves chronic stress and a poorly functioning biological stress response system. You could imagine that animals with poor stress responses are just more likely to become subordinate, but researchers found that social subordination occurs first and causes poor stress responsiveness, and not the other way around.

It can be most stressful to be a high-ranking animal in some species or under special circumstances, for instance, when dominance can be maintained only by fighting a lot. But in people, it's usually the low-ranking members of society who experience the most stress. Social status is so important to people that reducing the power or status of middle-SES adults in an experimental situation decreases their ability to concentrate, ignore distractors, and inhibit inappropriate behavior. We speculate that chronically low social status may have a similar effect on low-SES children. In one study, by age ten, children in Montreal already showed a sharp relationship between SES and cortisol, with blood levels twice as high in the lowest-SES children as in the highest-SES children.

How we interpret the circumstances of our lives also has a strong effect on our stress responses (see chapter 26)—often stronger than the effects of our actual economic circumstances. Low-SES people not only experience more chronic stresses and negative life events, but also experience ambiguous events as being more stressful, compared to higher-SES people. When people are asked to give their own position in society on a drawing of a ten-rung ladder, their ranking is a stronger predictor of health than their actual SES. People who are satisfied with their standard of living and feel financially secure are healthier, regardless of their actual income, occupation, and education, than people who are unsatisfied and anxious about the future. Along the same lines, countries, states, or cities with greater income inequality have steeper gradients of SES versus health. This may be because income inequality interferes with the feeling of community, which provides many types of social support to counteract stress. Increased crime also correlates with income inequality—again, better than with absolute poverty. So the existence of strong inequality in society may be a major driver of stress.

Which parts of children's brains are damaged by deprivation? We know from animal studies that chronic stress can cause structural changes in the hippocampus and amygdala (see chapter 26). In people, low subjective SES and other sources of chronic stress are linked to reduced hippocampal volume. Long-term memory, which depends on hippocampal function, is impaired in low-SES populations. In experimental animals, chronic stress can cause neurons to die, prevent new neurons from being born or surviving, and cause dendrites to become less complex (a change that is reversible) in the hippocampus. Scores on a variety of language tests also vary strongly with SES, perhaps due to the less complex language environment provided by low-SES parents (see chapter 6).

In people, the perception of low SES is associated with stronger activity in the amygdala in response to threats. That's understandable; if you believe that you are low on the totem pole, it's natural to feel vulnerable and therefore respond strongly to danger. Indeed such increased vigilance may reflect a sensible reaction to real dangers in the environment. The amygdala is important for rapid processing of events that induce fear and other emotions (see chapter 18), and it is extensively interconnected with the stress response system.

Across the life span, from infants to adults, low SES predicts decreased executive function, perhaps because the environment offers fewer opportunities to strengthen these abilities through practice. The medial prefrontal cortex (including the anterior cingulate and orbitofrontal regions) is an important inhibitor of the stress system. In experimental animals and people, chronic stress reduces the size of the prefrontal cortex. This brain region is involved in working memory and planning and organizing behavior (aspects of executive function), and it is also necessary for learned suppression of fearful reactions to situations that are no longer dangerous. People who perceive themselves as having low SES have reduced volume in one part of the anterior cingulate cortex. One promising intervention for low-income preschool children, Tools of the Mind, focuses on promoting behaviors that depend on the prefrontal cortex (see *Practical tip: Imaginary friends, real skills*, p. 117).

The causes and possible solutions to the SES-health gradient are hotly debated, within the scientific community as well as in society. The key problem for research is that people aren't randomly assigned to be poor, so we can't draw conclusions about causality by comparing the characteristics of low-SES and high-SES people (see *Did you know? Epidemiology is hard to interpret*, p. 262).

Do people develop problems because they're disadvantaged? Or do they become (or remain) disadvantaged due to poor health or other problems? There is evidence in favor of both positions. The health of adopted children is best predicted by their adopted parents' income, not their biological parents' income, suggesting that family income can influence health independently of genetics. Along the same lines, childhood SES predicts adult health, as we discuss below. On the other hand, the adult income and (particularly) education of adopted children does depend partly on their biological parents' characteristics.

The existence of strong inequality in society may be a major driver of stress.

It's important to remember that these two classes of explanations aren't mutually exclusive. Indeed, the most likely relationship between poverty and achievement is a vicious cycle, in which starting life with few resources leads children to develop a variety of problems, which then make their life situation worse, reducing their resources (and their children's resources) still further.

Some of the relationship between SES and cognitive achievement may be attributable to exposure to environmental hazards, more common in poor neighborhoods, that can cause substantial, lasting impairment in brain function. Children exposed to lead before or during elementary school age have lower IQs and impulse control, as well as higher aggression and delinquency, compared with children of the same SES. All these problems persist through adulthood. Mercury exposure also reduces IQ, along with attention, memory, and language development.

Children who live in noisy environments, such as near airports or highways, are delayed in learning to read compared with other children of the same SES. Chronic noise exposure also causes deficits in attention and long-term memory, perhaps because it is known to increase stress hormone levels. Crowded or chaotic environments (at home or at school) impair cognitive development and academic

DID YOU KNOW? EPIDEMIOLOGY IS HARD TO INTERPRET

The tools of epidemiology, appropriately, are best suited to the study of epidemics, which are caused by a single factor (a germ). The same tools are increasingly used to study conditions like heart disease, which have far more complex causes. Epidemiological studies of this kind are far more difficult to interpret and should be approached with a skeptical eye.

In a typical epidemiology study, scientists collect data on a large group of people for years and then attempt to correlate risk factors, such as excessive drinking, with health outcomes, such as deaths due to injury. Studies of this sort have serious limitations, which are rarely taken into account in your local newspaper or when health agencies make lifestyle recommendations based on their findings.

It is almost impossible to draw reliable conclusions about cause and effect from correlation data. One pitfall is reverse correlation. For instance, obesity is correlated with poverty. Does poverty lead to poor diet and lack of exercise, which then cause obesity, as is commonly assumed? Or might obesity cause poverty due to wage discrimination against fat people? Another pitfall is that an additional (unstudied) factor might cause both parts of the correlation. Harsh parenting is correlated with later antisocial behavior. Does that mean harsh parenting causes antisocial behavior? Or could it be that some parents pass along a genetic tendency to antisocial behavior to their children, who then are likely to misbehave, evoking harsh parenting, even from adoptive parents? We did not invent these two examples. In both cases, there is good evidence for the second interpretation, at least as a partial explanation of the observed correlations (see p.151 for more information on the effects of harsh parenting).

Making interpretation even more difficult, risk factors tend to travel in packs. Postmenopausal women taking hormone replacement therapy have fewer heart attacks than other women, but they are also less likely to die from homicide or accidents—effects that are unlikely to be caused by hormones. The explanation is that women who take hormone replacement therapy typically have a variety of healthy characteristics: compared to other women, they pay more attention to their health, exercise more, and

are richer, more educated, and thinner. When the risk factors are correlated with each other, it becomes very difficult to sort out causes from accidental "bystander qualities," even if the observed correlations are strong.

Epidemiology can be very useful. The link between cigarette smoking and lung cancer was established through this technique because the correlation is large (heavy smokers have twenty or thirty times more risk than nonsmokers) and the rate of lung cancer in nonsmokers is low. Many side effects of approved drugs have also been identified by epidemiology. But most lifestyle effects are small to moderate, and most of the common diseases in developed countries are influenced by multiple factors. Under those conditions, epidemiology can only generate hypotheses that must be tested by other means. Such studies should be interpreted with care and caution.

performance and increase psychological distress in both parents and children, again independent of SES. These environmental conditions are all common in the lives of low-SES children and often occur together.

Growing up in a low-SES family predicts poor health even for children whose SES improves in adulthood. For example, in a group of nuns who had been living together since early adulthood, disease risk and longevity still varied depending on their education (whether or not they had gone to college). For more than fifty years, the nuns had shared meals, housing conditions, and a very similar lifestyle, but the traces of their early experiences were still substantial, with educated sisters living an average of 3.28 years longer than less educated sisters. In general, people whose SES improves later in life gain less advantage from the change than people whose SES improves in childhood.

Children whose families move out of poverty improve in some areas but not others. One study followed 1,420 poor children in North Carolina from 1993 (at ages nine to thirteen) through 2000. American Indian families were more than twice as likely as non-Indian families to be below the poverty line when the study began. In 1996, a casino opened and began to distribute some of its profits to every person on the reservation. Children whose families moved above the poverty line showed a 40 percent decrease in antisocial behaviors during the study, while children whose families remained poor showed no change in antisocial behaviors.

In contrast, moving out of poverty had no effect on symptoms of depression and anxiety, though children who had never been poor had fewer symptoms than always-poor or ex-poor children.

If indeed poverty leads to a vicious cycle like the one we've described, it should be easiest to break that cycle in young children, before they fall too far behind their peers. Intensive preschool enrichment programs can have positive effects that last into adulthood, substantially increasing the odds of a poor child graduating from high school, finishing college, getting a skilled job, and owning a home. These programs can also reduce the likelihood that a child will need special education or repeat a year of school.

Mostly these effects do not depend on increasing children's IQs. Instead the positive outcomes seem to stem from improvements in social competence, including perseverance and motivation (see chapter 13) and emotional well-being. The programs that produce these results tend to be extensive, long-lasting interventions, which require a considerable commitment from both families and funding agencies. These programs are often still cost-effective for society in the long run if they reduce the likelihood that children will need special education or repeat a year of school or that they will receive welfare payments as adults.

Intervention is difficult for exactly the same reason that it is important: because it requires interrupting the developing brain's strong tendency to match itself to the local environment. As we've discussed throughout this book, evolution has made that matching process resilient and hard to disrupt. If a child's environment is toxic, though, it can do more harm than good. Fortunately, the reward for intervening is also large—turning that child into an adult who can function successfully in a safe and productive world, like the one we all want for our children.

NOTES

CHAPTER 1 The Five Hidden Talents of Your Baby's Brain

cats versus dogs: Quinn 2002
syllable boundaries: Saffran, Aslin, and Newport 1996
mobile and ribbon: Rovee-Collier and Barr 2001
properties of objects and agents: Spelke and Kinzler 2007
surprised the object was not solid: Baillargeon, Spelke, and Wasserman 1985
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thirty-four to thirty-seven-week births, elective induction of labor: Fuchs and Wapner 2006; Engle and Kominiarek 2008

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sibling study of breast-feeding and intelligence: Der, Batty, and Deary 2006
another study of sibling pairs: Evenhouse and Reilly, 2005; the authors claim to have found an effect of breast-feeding on cognitive function, but they use an unusually lenient measure of statistical significance ($p < 0.1$). The effect is not significant at $p < 0.05$, the typical scientific standard.
mothers randomly assigned to breast-feeding support program: Kramer et al. 2008
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practice accelerates motor development: Adolph, Karasik, and Tamis-LeMonda 2009
American nouns versus Korean verbs: Gopnik and Choi 1990
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children who hear more words learn language faster: Hart and Risley, 1995

CHAPTER 7 Beautiful Dreamer

suprachiasmatic nucleus and circadian rhythms: Welsh, Takahashi, and Kay 2010
development of sleep patterns: Roffwarg, Muzio, and Dement 1966; Dement 1974
sleep enhances neural plasticity: Frank, Issa, and Stryker 2001
sleep disorders: Garcia, Rosen, and Mahowald 2001
maternal drinking and sleep: Mennella and Gerrish 1998
getting your baby to sleep: Mennella and Gerrish 1998; Weissbluth 2003
what children dream about: Foulkes 1999; Nir and Tononi 2009
night terrors and tonsillectomy: Guilleminault et al. 2003
naps and learning: Mednick et al. 2002; Mednick and Ehrman 2006

CHAPTER 8 It's a Girl! Gender Differences

a phase of intense adherence to a sex role: Best and Williams 1993
statistic called *d-prime*: http://www.leeds.ac.uk/educol/documents/00002182.htm
girls have more sensitive hearing: Kei et al. 1997, d' of 0.26 for infants on a measure of peripheral auditory responsiveness used to assess hearing loss; other reports found a variety of small gender differences or none at all. Note that many of the studies cited to support this idea in popular books were done in adults, not children.
toy preference in three-year-olds: Servin, Bohlin, and Berlin 1999; many others
formation of gender identity: Maccoby 1998
monkey toy preferences: Alexander and Hines 2002 in vervet monkeys; Hassett, Siebert, and Wallen 2008 in rhesus monkeys (showed male preference for trucks; dolls were not tested)
cross-gender play and homosexuality: Bailey and Zucker 1995, meta-analysis
encouraging boyish behavior has no effect: Green 1985
boys are more active than girls: Eaton and Enns 1986, meta-analysis
boys are more physically aggressive: Card et al. 2008, meta-analysis
male monkeys engage in more rough-and-tumble play: Alexander and Hines 2002 in vervet monkeys; Wallen 2005 in rhesus monkeys; many others
CAH girls are more aggressive and more active: Pasterski et al. 2007
mental rotation in infants: Moore and Johnson 2008; Quinn and Liben 2008
mental rotation in children and adults: Voyer, Voyer, and Bryden 1995, meta-analysis
mental rotation predicts math SAT scores: Casey et al. 1995
SES and mental rotation: Levine et al. 2005
video games improve spatial skills: Subrahmanyam and Greenfield 1994, *Marble Madness* in fifth graders; Okagaki and Frensch 1994, *Tetris* in college students; De Lisi

and Cammarano 1996, *Blockout* in college students; De Lisi and Wolford 2002, *The Factory* or *Stellar 7* in third graders; Feng, Spence, and Pratt 2007, *Medal of Honor* in college students, gains lasted five months; Cherney 2008, *Antz* or *Tetris* in college students

athletes and spatial ability: Ozel, Larue, and Molinaro 2004

gender segregation: Maccoby and Jacklin 1987

girls get better grades: Linn and Kessel 1996

girls' brain volume peaks earlier: Lenroot et al. 2007

girls are better at inhibitory control: Else-Quest et al. 2006, meta-analysis

girls' advantage for language: Kovas et al. 2005

boys lag at fine motor control: Kimura 2000

writing disadvantage persists through high school: Hedges and Nowell 1995

middle-class versus poor: U.S. Department of Education, Office of Educational Research and Improvement, http://nces.ed.gov/pubs98/98041.pdf

no difference in high school math performance: Hyde et al. 2010 (more boys than girls above the ninety-ninth percentile, but only among whites, not among Asian Americans)

185 women for every 100 men with a college degree: U.S. Bureau of Labor Statistics, http://www.bls.gov/news.release/nlsyth.t01.htm

men take more time to graduate: Thomas 1981; Bank 1995

SATs and grades: Kessel and Linn 1996, meta-analysis; Leonard and Jiang 1999

girls more likely to express negative emotions: Maccoby 1998

moral reasoning differences: Jaffee and Hyde 2000, meta-analysis

differences in identifying emotions: McClure 2000, meta-analysis

risk taking: Byrnes, Miller, and Schafer 1999, meta-analysis

masturbation: Petersen and Hyde 2010, meta-analysis

self-esteem: Kling et al. 1999 (peak at fifteen to eighteen years of age), meta-analysis

body image: Feingold and Mazzella 1998, meta-analysis

body image linked to progressively thinner standards: Grabe, Ward, and Hyde 2008, meta-analysis

teasing, obesity, and anorexia: Neumark-Sztainer et al. 2007

dieting increases risk of obesity: Field and Colditz 2001

CHAPTER 9 Adolescence: It's Not Just About Sex

a time of near limitless possibility: Luciana 2010

adolescent behavior: Smetana, Campione-Barr, and Metzger 2006

brain appears nearly finished in late childhood: Caviness et al. 1996

human synapse development: Huttenlocher 1990; Glantz et al. 2007

monkey synapse development: Rakic, Bourgeois, and Goldman-Rakic 1994

gray matter and white matter development: Gogtay and Thompson 2010
brain growth and intelligence: Shaw et al. 2006a
differences in the balance between impulse and restraint: Casey, Duhoux, and Cohen 2010
Iowa Gambling Task in adolescence: Steinberg 2010
reward and the ventral striatum: Casey, Duhoux, and Cohen 2010
puberty and the adolescent brain: Sisk and Foster 2004
circadian rhythms set time to wake up and sleep: Duffy, Rimmer, and Czeisler 2001
adolescent day-night cycle: Carskadon et al. 1999; Carskadon, Acebo, and Jenni 2004
sleep duration in children and adolescents: Iglowstein et al. 2003
survey of sleep habits in girls: Frey et al. 2009
social jetlag: Wittmann et al. 2006
stress and the adolescent brain: Romeo and McEwen 2006
dopamine and novelty seeking: Spear 2010
oxytocin and parental love: Gordon et al. 2010

CHAPTER 10 Learning to See

motion: Braddick and Atkinson 2009
heritability of myopia: Hornbeak and Young 2009
increasing prevalence of myopia: Rose et al. 2001
myopia in Israel: Dayan et al. 2005
outdoor activity and myopia: Jones et al. 2007; Rose et al. 2008a; Rose et al. 2008b
contrast: Brown and Lindsey 2009
figure (what babies see): data from Salomão and Ventura 1995; Adams and Courage 2002
face processing: de Schonen et al. 2005
sensitive periods: Lewis and Maurer 2009
effects of sensory deficits: Lewis and Maurer 2009
advantage in distinguishing own- versus other-race faces: Kelly et al. 2007
corrective glasses for amblyopia: Moseley, Fielder, and Stewart 2009

CHAPTER 11 Connect with Your Baby Through Hearing and Touch

how hearing works: Kandel, Schwartz, and Jessell 2000
development of vestibular system: Nandi and Luxon 2008
prenatal risks to hearing and vestibular system: Eliot 1999
babies can hear before they're born: Hepper and Shahidullah 1994
newborns prefer mother's voice: DeCasper and Fifer 1980
newborns prefer mother's language: Mehler et al. 1988
cochlear implant timing: Harrison, Gordon, and Mount 2005
neural development of hearing and touch: Meisami and Timiras 1988, cited in Eliot 1999
processing speed: Görke 1986; Müller, Ebner, and Hömberg 1994

somatosensory cortex map: Kandel, Schwartz, and Jessell 2000
noise and hearing loss: Daniel 2007; http://www.caohc.org/updatearticles/spring07.pdf
neural pathway for pleasant touch: Olausson et al. 2002; Löken et al. 2009
for more on touch deprivation experiments in monkeys: Blum 2002

CHAPTER 12 Eat Dessert First: Flavor Preferences

newborns distinguish mother by smell: Winberg and Porter 1998
mothers distinguish newborns by smell: Kaitz et al. 1987
baby's preferences for amniotic fluid and Mom's unwashed breast: Sullivan 2000
prenatal development of olfactory brain: Schaal 1988
what toddlers eat: Fox et al. 2004
how to get kids to like broccoli: Capaldi 1996, chapter 3
organization of taste system: Yarmolinsky, Zuker, and Ryba 2009
development of taste buds: Mistretta and Bradley 1984; Witt and Reutter 1996
nucleus solitarius: Rolls 2006
morphine replacing sweet receptor: Zhao et al. 2003
learning food preferences: Mennella, Jagnow, and Beauchamp 2001
rabbits learn food preferences: Bilkó, Altbäcker, and Hudson 1994
inadequate nutrition in low-fat diets for children: Nicklas et al. 1992; Milner and Allison 1999
prevalence of eating disorders: Hoek 2006
longitudinal predictors of obesity and eating disorders: Neumark-Sztainer et al. 2007
morning sickness and salt preference: Crystal and Bernstein 1998
infant flavor preferences last for years: Mennella and Beauchamp 2002
soy or hydrolysate versus milk formula: Beauchamp and Mennella 2009
cheese versus body odor labeling: de Araujo et al. 2005

CHAPTER 13 The Best Gift You Can Give: Self-control

preschool delay times and later success: Shoda, Mischel, and Peake 1990; Duckworth and Seligman 2005; Blair and Razza 2007
self-control of emotion; development of attention and effortful control: Bell and Deater-Deckard 2007
brain circuits for self-control: Posner and Rothbart 2007
marshmallow task strategy: Peake, Hebl, and Mischel 2002
Tools of the Mind: Diamond et al. 2007; Blair and Diamond 2008
executive function in bilingual children: Bialystok 2009; Kovács and Mehler 2009
theory of mind in bilingual children: Goetz 2003
training willpower in adults: Baumeister et al. 2006
computerized attention training: Tang and Posner 2009

CHAPTER 14 Playing for Keeps

animal play: Fagen 1974; Burghardt and Sutton-Smith 2005
brain size and play: Iwaniuk, Nelson, and Pellis 2001
octopus play: Mather and Anderson 1999
learning and stress: Joëlsa et al. 2006
video games: Gentile and Stone 2005
play in mammals: Vanderschuren, Niesink, and van Ree 1997
culture and play: Tamis-LeMonda et al. 1992

CHAPTER 15 Moving the Body and Brain Along

emotional benefits of exercise in children: Bailey 2006
cognitive benefits of exercise in children: meta-analysis Sibley and Etnier 2003; Hillman, Erickson, and Kramer 2008; Pontifex et al. 2011
cognitive benefits of exercise in adults: Hillman, Erickson, and Kramer 2008
brain changes with exercise in children: Chaddock et al. 2010; Chaddock et al. 2011
chronic traumatic encephalopathy: McKee et al. 2009
football and concussion: Guskiewicz et al. 2005; Guskiewicz et al. 2007
concussions in children: Halstead et al. 2010

CHAPTER 16 Electronic Entertainment and the Multitasking Myth

video games and attention in college students: Green and Bavelier 2003; Dye, Green, and Bavelier 2009b; Li et al. 2009
recent decline in empathy: http://www.ns.umich.edu/htdocs/releases/story.php?id=7724
video games and attention in children: Dye, Green, and Bavelier 2009a; Dye and Bavelier 2010
infants and TV: Christakis 2009; Bavelier, Green and Dye 2010
costs of switching, role of prefrontal cortex: Marois and Ivanoff 2005
distractibility in multitasking college students: Ophir, Nass, and Wagner 2009
Dora the Explorer versus *Teletubbies*: Linebarger and Walker 2005

CHAPTER 17 Nice to Meet You: Temperament

temperament and personality: Caspi 2000; Rothbart, Ahadi, and Evans 2000
high-reactive babies: Fox et al. 2005
personality traits and stability: McAdams and Olson 2010
your kids have different environments: Plomin et al. 2001
temperament and parenting in development of conscience: Kochanska and Aksan 2006
children with a specific receptor sensitive to parenting style: Sheese et al. 2007
negative feedback on antisocial behavior: Reiss and Leve 2007; Dodge and McCourt 2010

children learn from their peers: Berndt and Murphy 2002
birth order and personality: Harris 1998 (pp. 365–78); Townsend 2000
Chinese versus Canadian mothers and behavioral inhibition: Chen et al. 1998
rat grooming and pup behavior: Zhang and Meaney 2010
high-reactive monkeys are more vulnerable: Suomi 1997

CHAPTER 18 Emotions in the Driver's Seat

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left/right brain and emotions: Wager et al. 2003
self-control and empathy: Posner and Rothbart 2007
development of emotion regulation: Eisenberg, Spinrad, and Eggum 2010

CHAPTER 19 Empathy and Theory of Mind

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insula: Craig 2009
older siblings and theory of mind: Ruffman et al. 1998
social brain: Adolphs 2003
mirror neurons: Rizzolatti and Sinigaglia 2010
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CHAPTER 20 Playing Nicely with Others

parent-infant synchrony: Feldman 2007
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joint attention in infants: Parlade et al. 2009
attachment and day care: Friedman and Boyle 2008; Bohlin and Hagekull 2009
attachment, 5-HTT, and self-control: Kochanska, Philibert, and Barry 2009
development of peer interactions: Rubin, Bukowski, and Parker 2006
cultural effects on socialization: Chen and French 2008
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social withdrawal: Rubin, Coplan, and Bowker 2009

CHAPTER 21 Starting to Write the Life Story

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toddlers navigate by landmarks: Wang, Hermer, and Spelke 1999
habituation in the brain: Colombo and Mitchell 2009
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formation and breakage of synapses: Chklovskii, Mel, and Svoboda 2004
conversion to long-term memory: Squire and Zola-Morgan 1991; Wang and Morris 2010
babies forget faster than older children: Rovee-Collier and Barr 2001
memories appear to be rewritten: Wang and Morris 2010

CHAPTER 22 Learning to Solve Problems

beliefs about intelligence predict performance: Blackwell, Trzesniewski, and Dweck 2007
social rejection and IQ: Baumeister, Twenge, and Nuss 2002
predicting infant IQ from habituation: Kavšek 2004
heritability of IQ in poverty: Turkheimer et al. 2003
IQ in adopted children: van IJzendoorn, Juffer, and Klein Poelhuis 2005
genetic influences on intelligence and brain: Shaw 2007; Green et al. 2008; Deary, Penke, and Johnson 2010
children's brains and abstract reasoning: Ferrer, O'Hare, and Bunge 2009
Flynn effect and modern life: Dickens and Flynn 2001
interventions to improve intelligence: Buschkuehl and Jaeggi 2010
working memory training improves intelligence: Jaeggi et al. 2008

CHAPTER 23 Take It from the Top: Music

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early rhythm learning: Gerry, Faux, and Trainor 2010
auditory discrimination in preschool children: Jensen and Neff 1993
rhythm perception in deaf children with cochlear implants: Nakata et al. 2006
key and harmony perception: Corrigall and Trainor, 2009; Hannon and Trainor 2007
Heschl's gyrus in musicians: Schneider et al. 2002
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practice and long-distance connections: Zatorre, Chen, and Penhune 2007
brain changes from keyboard lessons: Hyde et al. 2009
corpus callosum in children receiving musical training: Schlaug et al. 1995

CHAPTER 24 Go Figure: Learning About Math

Mickey doll becomes two Mickeys: Dehaene 1999

subitization, numerosity, and addition in animals: Dehaene 1999
children temporarily lose numerosity: Mehler and Bever 1967
mental number line and brain regions that process number: Nieder and Dehaene 2009
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Mundurukú: Pica et al. 2004
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CHAPTER 25 The Many Roads to Reading

brain activity in adults during reading: Dehaene 2009
neurons that represent objects: Desimone et al. 1984
car recognition: Gauthier et al. 2000
right inferior temporal cortex and mirror confusion: Gross and Bornstein 1978
left-right discrimination and readiness to read: Fisher, Bornstein, and Gross 1985
monkeys with damage to inferior temporal cortex: Holmes and Gross 1984
brain activity in children during reading: Turkeltaub et al. 2003
brain activity during phonological tasks: Wagner et al. 1997
reading at home: Whitehurst et al. 1988
potential causes of dyslexia: Ramus et al. 2003
survey of students at Göteborg University: Wolff and Lundberg 2002
Chinese children learn to read by writing: Tan et al. 2005
brain activity during reading in Chinese speakers: Siok et al. 2008
prevalence of dyslexia in English and Chinese speakers: Yin and Weekes 2003
Chinese dyslexics learning English: Ho and Fong 2005

CHAPTER 26 Hang in There, Baby: Stress and Resilience

children exposed to a moderate amount of stress: Power 2004
maternal separation in monkeys: Suomi 2006
maternal separation in rats: Zhang and Meaney 2010
psychological development of coping in children: Skinner and Zimmer-Gembeck 2007
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parents regulate children's physiological stress responses: Gunnar and Quevedo 2007
effects of early life stress are similar in people: Haglund et al. 2007; Feder, Nestler, and Charney 2009
maternal effects on rat stress responses: Cameron et al. 2005; Zhang and Meaney 2010
peer-raised monkeys: Suomi 2006
longitudinal study in New Zealand: Caspi et al. 2003

serotonin transporter interaction with environmental trauma: Uher and McGuffin 2010, meta-analysis
dandelion and orchid children: Boyce and Ellis 2005; Ellis, Jackson, and Boyce 2006; related ideas in Belsky, Bakermans-Kranenburg, and van IJzendoorn 2007
one prospective study of high-stress families: Boyce et al. 1995
experimental study with rhesus monkeys: Suomi 1997

CHAPTER 27 **Mind-Blindness: Autism**

characteristics of autism: Frith 2003
factors that account for rise in diagnosis: Wazana, Bresnahan, and Kline 2007; Hertz-Picciotto and Delwiche 2009; Nassar et al. 2009
feral children: McCarthy 1925; Williams 2003
early signs of autism: Volkmar, Chawarska, and Klin 2005; Karmel et al. 2010
changes in amygdala, cerebellum, and neocortex in autism: Palmen et al. 2004; Amaral et al. 2008
prematurity, cerebellar injury, and autism: Limperopoulos 2010
cerebellum and tickling: Blakemore, Wolpert, and Frith 1998
Temple Grandin quote: Grandin 1995
L. H. Willey quote: Willey 1999
half of children receiving intensive behavioral therapy can enter regular education: Sallows and Graupner 2005
UCLA model of therapy: Cohen, Amerine-Dickens, and Smith 2006
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therapy for Catherine: Green, Brennan, and Fein 2002
very early intervention: Dawson et al. 2010
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CHAPTER 28 **Old Genes Meet the Modern World: ADHD**

estimates of ADHD prevalence: Castellanos and Tannock 2002; Elia et al. 2010
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white and gray matter growth in ADHD: Shaw et al. 2006b
discovery of Ritalin: Shorter 2008
EEG rhythms in ADHD: Barry, Clarke, and Johnstone 2003
no evidence for sweeping claims about movement exercises: Bishop 2007
warning signs of quackery: Hyman and Levy 2000; Jacobson, Foxx, and Mulick 2005
meta-analysis of neurofeedback studies: Arns et al. 2009
functional imaging is not a reliable diagnostic tool: Bush, Valera, and Seidman 2005

differences in caudate nucleus, basal ganglia: Mink 1996; Redgrave, Prescott, and Gurney 1999; Tripp and Wickens 2009
Amen Clinics evaluated: http://www.quackwatch.org/06ResearchProjects/amen.html and http://www.salon.com/life/mind_reader/2008/05/12/daniel_amen/.
Amen's books offer what most psychiatrists would do: Leuchter 2009
Amen has declined the opportunity to test his diagnostic tools: Adinoff and Devous 2010
by age eighteen, symptoms have subsided: Mannuzza et al. 1991
Ritalin does not increase risk of substance abuse: Mannuzza et al. 2008
brain differences reflect a delay in development: Shaw et al. 2007; Castellanos et al. 2002

CHAPTER 29 Catch Your Child Being Good: Behavior Modification

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CHAPTER 30 A Tough Road to Travel: Growing Up in Poverty

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stress and the health effects of SES: Sapolsky 2005; McEwen and Gianaros 2010; but see Matthews, Gallo, and Taylor 2010 for a contrary view
brain effects of deprivation: Hackman and Farah 2009; McEwen and Gianaros 2010
language environment provided by low-SES parents: Hart and Risley 1995
adopted children and biological parents' SES: Rowe and Rodgers 1997
likely relationship between poverty and achievement is a vicious cycle: Conger and Donnellan 2007
exposure to toxins: Evans 2006
epidemiology interpretation: Taubes 2007
nun study: Snowdon et al. 1989
people whose SES improves later in life: Cohen et al. 2010
children who move out of poverty: Costello et al. 2003; Kawachi, Adler, and Dow 2010
intensive preschool enrichment: Knudsen et al. 2006

GLOSSARY

For further introduction to technical terms: Bear, Connors, and Paradiso 2006

REFERENCES

Adams, R. J., and Courage, M. L. Using a single test to measure human contrast sensitivity from early childhood to maturity. *Vision Research* 42:1205–10 (2002).

Adinoff, B., and Devous, M. Scientifically unfounded claims in diagnosing and treating patients. *American Journal of Psychiatry* 167:598 (2010).

Adolph, K. E., Karasik, L. B., and Tamis-LeMonda, C. S. Motor skill. In *Handbook of Cultural Developmental Science*, ed. M. H., Bornstein, 61–88. New York: Psychology Press, 2009.

Adolphs, R. Cognitive neuroscience of human social behaviour. *Nature Reviews Neuroscience* 4:165–78 (2003).

Alexander, G. M., and Hines, M. Sex differences in response to children's toys in nonhuman primates (Cercopithecus aethiops sabaeus). *Evolution and Human Behavior* 23:467–79 (2002).

Amaral, D. G., Schumann, C. M., and Nordahl, C. W. Neuroanatomy of autism. *Trends in Neurosciences* 31:137–45 (2008).

Ananth, C. V., Joseph, K. S., Oyelese, Y., Demissie, K., and Vintzileos, A. M. Trends in preterm birth and perinatal mortality among singletons: United States, 1989 through 2000. *Obstetrics and Gynecology* 105:1084–91 (2005).

Arai, J. A., Li, S., Hartley, D. M., and Feig, L. A. Transgenerational rescue of a genetic defect in long-term potentiation and memory formation by juvenile enrichment. *Journal of Neuroscience* 29:1496–1502 (2009).

Arns, M., de Ridder, S., Strehl, U., Breteler, M., and Coenen A. Efficacy of neurofeedback treatment in ADHD: The effects on attention, impulsivity, and hyperactivity: a meta-analysis. *Clinical EEG and Neuroscience* 40:180–89 (2009).

Bailey, J. M., and Zucker, K. J. Childhood sex-typed behavior and sexual orientation: A conceptual analysis and quantitative review. *Developmental Psychology* 31:43–55 (1995).

Bailey, R. Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health* 76:397–401 (2006).

Baillargeon, R., Scott, R. M., and He, Z. False-belief understanding in infants. *Trends in Cognitive Science* 14:110–18 (2009).

Baillargeon, R., Spelke, E. S., and Wasserman, S. Object permanence in five-month-old infants. *Cognition* 20:191–208 (1985).

Baillargeon, R., and Wang, S. Event categorization in infancy. *Trends in Cognitive Science* 6:85–93 (2002).

Bank, B. J. Gendered accounts: Undergraduates explain why they seek their bachelor's degree. *Sex Roles* 32:527–44 (1995).

Barrett, L. F., Mesquita, B., Ochsner, K. N., and Gross, J. J. The experience of emotion. *Annual Review of Psychology* 58:373–403 (2007).

Barry, R. J., Clarke, A. R., and Johnstone,

S. J. A review of electrophysiology in attention-deficit/hyperactivity disorder: I. Qualitative and quantitative electroencephalography. *Clinical Neurophysiology* 114:171–83 (2003).

Baumeister, R. F., Campbell, J. D., Krueger, J. I., and Vohs, K. D. Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest* 4:1–44 (2003).

Baumeister, R. F., Gailliot, M., DeWall, C. N., and Oaten, M. Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality* 74:1773–1802 (2006).

Baumeister, R. F., Twenge, J. M., and Nuss, C. K. Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology* 83:817–27 (2002).

Bavelier, D., Green, C. S., and Dye, M. W. G. Children, wired: For better and for worse. *Neuron* 67:692–701 (2010).

Bear, M. F., Connors, B. W., and Paradiso, M. A. *Neuroscience*: *Exploring the Brain*. 3rd edition. Philadelphia: Lippincott, 2006.

Beauchamp, G. K., and Mennella, J. A. Early flavor learning and its impact on later feeding behavior. *Journal of Pediatric Gastroenterology and Nutrition* 48:S25–S30 (2009).

Bell, M. A., and Deater-Deckard, K. Biological systems and the development of self-regulation: Integrating behavior, genetics, and psychophysiology. *Journal of Developmental and Behavioral Pediatrics* 28:409–20 (2007).

Belsky, J., Bakermans-Kranenburg, M. J., and van IJzendoorn, M. H. For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science* 16:300–304 (2007).

Berndt, T. J., and Murphy, L. M. Influences of friends and friendships: Myths, truths, and research recommendations. *Advances in Child Development and Behavior* 30:275–310 (2002).

Best, D. L., and Williams, J. E. A cross-cultural viewpoint. In *The Psychology of Gender*, ed. A. E. Beall and R. J. Sternberg, 215–48. New York: Guilford, 1993.

Bialystok, E. Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition* 12:3–11 (2009).

Bilkó, A., Altbäcker, V., and Hudson, R. Transmission of food preference in the rabbit: The means of information transfer. *Physiology and Behavior* 56:907–12 (1994).

Bishop, D. V. M. Curing dyslexia and attention-deficit hyperactivity disorder by training motor co-ordination: Miracle or myth? *Journal of Paediatrics and Child Health* 43:653–55 (2007).

Blackwell, L. S., Trzesniewski, K. H., and Dweck, C. S. Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development* 78:246–63 (2007).

Blair, C., and Diamond, A. Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology* 20:899–911 (2008).

Blair, C., and Razza, R. P. Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development* 78:647–63 (2007).

Blakemore, S. J., Wolpert, D. M., and Frith, C. D. Central cancellation of self-produced tickle sensation. *Nature Neuroscience* 1:635–40 (1998).

Bloom, P. *Descartes' Baby: How the Science of Child Development Explains What Makes Us Human*. New York: Basic Books, 2004.

Blum, D. *Love at Goon Park: Harry Harlow and the Science of Affection*. New York: Perseus, 2002.

Bohlin, G., and Hagekull, B. Socio-emotional development: From infancy to young adulthood. *Scandinavian Journal of Psychology* 50:592–601 (2009).

Bohman, M., Cloninger, R., Sigvardsson, S., and von Knorring, A.-L. Predisposition to petty criminality in Swedish adoptees. I. Genetic and environmental heterogeneity. *Archives of General Psychiatry* 39:1233–41 (1982).

Boyce, W. T., Chesney, M., Alkon-Leonard, A., Tschann, J., Adams, S., Chesterman, B., Cohen, F., Kaiser, P., Folkman, S., and Wara, D. Psychobiologic reactivity to stress and childhood respiratory illnesses: Results of two prospective studies. *Psychosomatic Medicine* 57:411–22 (1995).

Boyce, W. T., and Ellis, B. J. Biological sensitivity to context: I. An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology* 17:271–301 (2005).

Braddick, O. J., and Atkinson, J. Infants' sensitivity to motion and temporal change. *Optometry and Vision Science* 86:577–82 (2009).

Brown, A. M., and Lindsey, D. T. Contrast insensitivity: The critical immaturity in infant visual performance. *Optometry and Vision Science* 86:572–76 (2009).

Burghardt, G. M., and Sutton-Smith, B. *Genesis of Animal Play: Testing the Limits*. Cambridge, MA: MIT Press, 2005.

Buschkuehl, M., and Jaeggi, S. M. Improving intelligence: A literature review. *Swiss Medical Weekly* 140:266–72 (2010).

Bush, G., Valera, E. M., and Seidman, L. J. Functional neuroimaging of attention-deficit/hyperactivity disorder: A review and suggested future directions. *Biological Psychiatry* 57:1273–84 (2005).

Byrnes, J. P., Miller, D. C., and Schafer, W. D. Gender differences in risk taking: A meta-analysis. *Psychological Bulletin* 125:367–83 (1999).

Cameron, N. M., Champagne, F. A., Parent, C., Fish, E. W., Ozaki-Kuroda, K., and Meaney, M. J. The programming of individual differences in defensive responses and reproductive strategies in the rat through variations in maternal care. *Neuroscience and Biobehavioral Reviews* 29:843–65 (2005).

Capaldi, E. D., ed. *Why We Eat What We Eat: The Psychology of Eating*. Washington, DC: American Psychological Association, 1996.

Card, N. A. Antipathetic relationships in child and adolescent development: A meta-analytic review and recommendations for an emerging area of study. *Developmental Psychology* 46:516–29 (2010).

Card, N. A., Stucky, B. D., Sawalani, G. M., and Little, T. D. Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development* 79:1185–1229 (2008).

Carskadon, M. A., Acebo, C., and Jenni, O. G. Regulation of adolescent sleep: Implications for behavior. *Annals of the New York Academy of Sciences* 1021:276–91 (2004).

Carskadon, M. A., Labyak, S. E., Acebo, C., and Seifer, R. Intrinsic circadian period of adolescent humans measured in conditions of forced desynchrony. *Neuroscience Letters* 260:129–32 (1999).

Casey, B. J., Duhoux, S., and Cohen, M. M. Adolescence: What do transmission, transition, and translation have to do with it? *Neuron* 67:749–60 (2010).

Casey, M. B., Nuttall, R., Pezaris, E., and Benbow, C. P. The influence of spatial ability on gender differences in mathematics college entrance test scores across diverse samples. *Developmental Psychology* 31:697–705 (1995).

Caspi, A. The child is father of the man: Personality continuities from childhood to adulthood. *Journal of Personality and Social Psychology* 78:158–72 (2000).

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., McClay, J., Mill, J., Martin, J., Braithwaite, A., and Poulton, R. Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science* 301:386–89 (2003).

Castellanos, F. X., Lee, P. P., Sharp, W., Jeffries, N. O., Greenstein, D. K., Clasen, L. S., Blumenthal, J. D., James, R. S., Evens, C. L., Walter, J. M., Zijdenbos, A., Evans, A. C., Giedd, J. N., and Rapoport, J. L. Developmental trajectories of brain volume abnormalities in children and adolescents with attention-deficit/hyperactivity disorder. *Journal of the American Medical Association* 288:1740–48 (2002).

Castellanos, F. X., and Tannock, R. Neuroscience of attention-deficit/hyperactivity disorder: The search for endophenotypes. *Nature Reviews Neuroscience* 3:617–28 (2002).

Caviness, V. S., Jr., Kennedy, D. N., Richelme, C., Rademacher J., and Filipek, P. A. The human brain age 7–11 years: A volumetric analysis based on magnetic resonance images. *Cerebral Cortex* 6:726–36 (1996).

Chaddock, L., Erickson, K. I., Prakash, R. S., VanPatter, M., Voss, M. W., Pontifex, M. B., Raine, L. B., Hillman, C. H., and Kramer, A. F. Basal ganglia volume is associated with aerobic fitness in preadolescent children. *Developmental Neuroscience* 32:249–56 (2010).

Chaddock, L., Hillman, C. H., Buck, S. M., and Cohen, N. J. Aerobic fitness and executive control of relational memory in preadolescent children. *Medicine and Science in Sports and Exercise* 43:344–49 (2011).

Chen, X., and French, D. C. Children's social competence in cultural context. *Annual Review of Psychology* 59:591–616 (2008).

Chen, X., Hastings, P., Rubin, K. H., Chen, H., Cen, G., and Stewart, S. L. Childrearing attitudes and behavioral inhibition in Chinese and Canadian toddlers: A cross-cultural study. *Developmental Psychology* 23:677–86 (1998).

Cherney, I. D. Mom, let me play more computer games: They improve my mental rotation skills. *Sex Roles* 59:776–86 (2008).

Chklovskii, D. B., Mel, B. W., and Svoboda, K. Cortical rewiring and information storage. *Nature* 431:782–88 (2004).

Christakis, D. A. The effects of infant media usage: What do we know and what should we learn? *Acta Paediatrica* 98:8–16 (2009).

Chugani, H. T. A critical period of brain development: Studies of cerebral glucose utilization with PET. *Preventive Medicine* 27:184–88 (1998).

Cohen, H., Amerine-Dickens, M., and Smith, T. Early intensive behavioral treatment: Replication of the UCLA model in a community setting. *Journal of Developmental and Behavioral Pediatrics* 27:S145–55 (2006).

Cohen, S., Janicki-Deverts, D., Chen, E., and Matthews, K. A. Childhood socioeconomic status and adult health. *Annals of the New York Academy of Sciences* 1186:37–55 (2010).

Colombo, J. The development of visual attention in infancy. *Annual Review of Psychology* 52:337–67 (2001).

Colombo, J., and Mitchell, D. W. Infant visual habituation. *Neurobiology of Learning and Memory* 92:225–34 (2009).

Conger, R. D., and Donnellan, M. B. An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology* 58:175–99 (2007).

Corrigall, K. A., and Trainor, L. J. Effects of musical training on key and harmony perception. *Annals of the New York Academy of Sciences* 1169:164–68 (2009).

Costello, E. J., Compton, S. N., Keeler, G., and Angold, A. Relationships between poverty and psychopathology: A natural experiment. *Journal of the American Medical Association* 290:2023–29 (2003).

Craig, A. D. How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience* 10:59–70 (2009).

Crystal, S., and Bernstein, I. L. Infant salt preference and mother's morning sickness. *Appetite* 30:297–307 (1998).

Daniel, E. Noise and hearing loss: A review. *Journal of School Health* 77:225–31 (2007).

Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., Donaldson, A., and Varley, J. Randomized, controlled trial of an intervention for toddlers with autism: The Early Start Denver Model. *Pediatrics* 125:e17–23 (2010).

Dayan, Y. B., Levin, A., Morad, Y., Grotto, I., Ben-David, R., Goldberg, A., Onn, E., Avni, I., Levi, Y., and Benyamini, O. G. The changing prevalence of myopia in young adults: A 13-year series of population-based prevalence surveys. *Investigative Ophthalmology and Visual Science* 46:2760–65 (2005).

de Araujo, I. E., Rolls, E. T., Valazco, M. I., Margot, C., and Cayeux, I. Cognitive modulation of olfactory processing. *Neuron* 46:671–79 (2005).

De Lisi, R., and Cammarano, D. M. Computer experience and gender differences in undergraduate mental rotation performance. *Computers in Human Behavior* 12:351–61 (1996).

De Lisi, R., and Wolford, J. L. Improving children's mental rotation accuracy with computer game playing. *Jour-*

nal of Genetic Psychology 163:272–82 (2002).

de Schonen, S., Mancini, J., Camps, R., Maes, E., and Laurent, A. Early brain lesions and face-processing development. *Developmental Psychobiology* 46:184–208 (2005).

Deary, I. J., Penke, L., and Johnson, W. The neuroscience of human intelligence differences. *Nature Reviews Neuroscience* 11:201–11 (2010).

DeCasper, A., and Fifer, W. Of human bonding: Newborns prefer their mothers' voices. *Science* 12:305–17 (1980).

Deer, B. How the case against the MMR vaccine was fixed. *British Medical Journal* 342:c5347 (2011).

Dehaene, S. *The Number Sense: How the Mind Creates Mathematics*. New York: Oxford University Press, 1999.

———. *Reading in the Brain: The Science and Evolution of a Human Invention*. New York: Viking, 2009.

Dement, W. C. *Some Must Watch While Some Must Sleep*. San Francisco: W. H. Freeman, 1974.

Der, G., Batty, G. D., and Deary, I. J. Effect of breast feeding on intelligence in children: Prospective study, sibling pairs analysis, and meta-analysis. *British Medical Journal* 333:945–50 (2006).

Desimone, R., Albright, T. G., Gross, C. G., and Bruce, C. Stimulus-selective properties of inferior temporal neurons in the macaque. *Journal of Neuroscience* 4:2051–62 (1984).

Diamond, A., Barnett, W. S., Thomas, J., and Munro, S. Preschool program improves cognitive control. *Science* 318:1387–88 (2007).

Dickens, W. T., and Flynn, J. R. Heritability estimates versus large environmental effects: The IQ paradox resolved. *Psychological Review* 108:346–69 (2001).

Dodge, K. A., and McCourt, S. N. Translating models of antisocial behavioral development into efficacious intervention policy to prevent adolescent violence. *Developmental Psychobiology* 52:277–85 (2010).

Dow, W. H., and Rehkopf, D. H. Socioeconomic gradients in health in international and historical context. *Annals of the New York Academy of Sciences* 1186:24–36 (2010).

Duckworth, A. L., and Seligman, M. E. P. Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science* 16:939–44 (2005).

Duffy, J. F., Rimmer, D. W., and Czeisler, C. A. Association of intrinsic circadian period with morningness-eveningness, usual wake time, and circadian phase. *Behavioral Neuroscience* 115:895–99 (2001).

Dye, M. W. G., and Bavelier, D. Differential development of visual attention skills in school-age children. *Vision Research* 50:452–59 (2010).

Dye, M. W. G., Green, C. S., and Bavelier, D. The development of attention skills in action video game players. *Neuropsychologia* 47:1780–89 (2009a).

———. Increased speed of processing with action video games. *Current Directions in Psychological Science* 18:321–26 (2009b).

Eaton, W. O., and Enns, L. R. Sex differences in human motor activity level. *Psychological Bulletin* 100:19–28 (1986).

Eisenberg, N., Spinrad, T. L., and Eggum, N. D. Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology* 6:495–525 (2010).

Elia, J., Gai, X., Xie, H. M., Perin, J. C., Geiger, E., Glessner, J. T., D'arcy, M., Deberardinis, R., Frackelton, E., Kim, C., Lantieri, F., Muganga, B. M., Wang, L., Takeda, T., Rappaport, E. F., Grant, S. F., Berrettini, W., Devoto, M., Shaikh, T. H., Hakonarson, H., and White, P. S. Rare structural variants found in attention-deficit hyperactivity disorder are preferentially associated with neurodevelopmental genes. *Molecular Psychiatry* 15:637–46 (2010).

Eliot, L. *Pink Brain, Blue Brain: How Small Differences Grow Into Troublesome Gaps and What We Can Do About It.* New York: Houghton Mifflin, 2010.

———. *What's Going on in There? How the Brain and Mind Develop in the First Five Years of Life.* New York: Bantam, 1999.

Ellis, B. J., Jackson, J. J., and Boyce, W. T. The stress response systems: Universality and adaptive individual differences. *Developmental Review* 26:175–212 (2006).

Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H., and Van Hulle, C. Gender differences in temperament: A meta-analysis. *Psychological Bulletin* 132:33–72 (2006).

Emery, N. J., and Clayton, N. S. Comparative social cognition. *Annual Review of Psychology* 60:87–113 (2009).

Engle, W. A., and Kominiarek, M. A. Late preterm infants, early term infants, and timing of elective deliveries. *Clinics in Perinatology* 35:325–41 (2008).

Evans, G. W. Child development and the physical environment. *Annual Review of Psychology* 57:423–51 (2006).

Evenhouse, E., and Reilly, S. Improved estimates of the benefits of breastfeeding using sibling comparisons to reduce selection bias. *Health Services Research* 40:1781–1802 (2005).

Fagen, R. Selective and evolutionary aspects of animal play. *American Naturalist* 108:850–58 (1974).

Feder, A., Nestler, E. J., and Charney, D. S. Psychobiology and molecular genetics of resilience. *Nature Reviews Neuroscience* 10:446–57 (2009).

Feingold, A., and Mazzella, R. Gender differences in body image are increasing. *Psychological Science* 9:190–95 (1998).

Feldman, R. Parent-infant synchrony and the construction of shared timing; physiological precursors, developmental outcomes, and risk conditions. *Journal of Child Psychology and Psychiatry* 48:329–54 (2007).

Feng, J., Spence, I., and Pratt, J. Playing an action video game reduces gender differences in spatial cognition. *Psychological Science* 18:850–55 (2007).

Fernald, A. Meaningful melodies in mother's speech to infants. In *Nonverbal Vocal Communication*, ed. H. Papousek, U. Jurgens, and M. Papousek, 262–82. Cambridge, UK: Cambridge University Press, 1992.

Ferrer, E., O'Hare, E. D., and Bunge, S. A. Fluid reasoning and the developing brain. *Frontiers in Neuroscience* 3:46–51 (2009).

Field, A. E., and Colditz, G. A. Frequent dieting and the development of obesity among children and adolescents. *Nutrition* 17:355–56 (2001).

Field, T., Diego, M., and Hernandez-Reif, M. Depressed mothers' infants are less responsive to faces and voices. *Infant*

Behavior and Development 32:239–44 (2009).

Fisher, C. B., Bornstein, M. H., and Gross, C. G. Left-right coding and skills related to beginning reading. *Developmental and Behavioral Pediatrics* 6:279–83 (1985).

Foulkes, D. *Children's Dreaming and the Development of Consciousness*. Cambridge, MA: Harvard University Press, 1999.

Fox, M. K., Pac, S., Devaney, B., and Jankowski, L. Feeding infants and toddlers study: What foods are infants and toddlers eating? *Journal of the American Dietetic Association* 104:s22–s30 (2004).

Fox, N. A., Henderson, H. A., Marshall, P. J., Nichols, K. E., and Ghera, M. M. Behavioral inhibition: Linking biology and behavior within a developmental framework. *Annual Review of Psychology* 56:235–62 (2005).

Frank, M. G., Issa, N. P., and Stryker, M. P. Sleep enhances plasticity in the developing visual cortex. *Neuron* 30:275–87 (2001).

Frey, S., Balu, S., Greusing, S., Rothen, N., and Cajochen, C. Consequences of the timing of menarche on female adolescent sleep phase preference. *PLoS ONE* 4:e5217 (2009).

Friedman, S. L., and Boyle, D. E. Attachment in US children experiencing nonmaternal care in the early 1990s. *Attachment and Human Development* 10:225–61 (2008).

Frith, U. *Autism: Explaining the Enigma*. Oxford, UK: Wiley-Blackwell, 2003.

Frith, U., and Frith, C. D. Development and neurophysiology of mentalizing. *Philosophical Transactions of the Royal Society of London B* 358:459–73 (2003).

Fuchs, K., and Wapner, R. Elective Cesarean section and induction and their impact on late preterm births. *Clinics in Perinatology* 33:793–801 (2006).

Garcia, J., Rosen, G., and Mahowald, M. Circadian rhythms and circadian rhythm disorders in children and adolescents. *Seminars in Pediatric Neurology* 8:229–40 (2001).

Gauthier, I., Skudlarski, P., Gore, J. C., and Anderson, A. W. Expertise with cars and birds recruits brain areas involved in face recognition. *Nature Neuroscience* 3:191–97 (2000).

Gentile, D. A., and Stone, W. Violent video game effects on children and adolescents. A review of the literature. *Minerva Pediatrica* 57:337–58 (2005).

Gentile, S. Drug treatment for mood disorders in pregnancy. *Current Opinion in Psychiatry* 24:34-40 (2011).

Gergely, G., Bekkering, H., and Király, I. Rational imitation in preverbal infants. *Nature* 415:755 (2002).

Gergely, G., Nádasdy, Z., Csibra, G., and Bíró, S. Taking the intentional stance at 12 months of age. *Cognition* 56:165–93 (1995).

Gerry, D. W., Faux, A. L., and Trainor, L. J. Effects of Kindermusik training on infants' rhythmic enculturation. *Developmental Science* 13:545–51 (2010).

Gervain, J., and Mehler, J. Speech perceptions and language acquisition in the first year of life. *Annual Review of Psychology* 61:191–218 (2010).

Glantz, L. A., Gilmore, J. H., Hamer, R. M., Lieberman, J. A., and Jarskog, L. F. Synaptophysin and postsynaptic density protein 95 in the human prefrontal cortex from mid-gestation into early adulthood. *Neuroscience* 149:582–91 (2007).

Goetz, P. J. The effects of bilingualism on theory of mind development. *Bilingualism: Language and Cognition* 6:1–15 (2003).

Gogtay, N., and Thompson, P. M. Mapping gray matter development: Implications for typical development and vulnerability to psychopathology. *Brain and Cognition* 72:6–15 (2010).

Goldenberg, R. L., Culhane, J. F., Iams, J. D., and Romero, R. Epidemiology and causes of preterm birth. *Lancet* 371: 75–84 (2008).

Goodkin, F. The development of mature patterns of head-eye coordination in the human infant. *Early Human Development* 4:373–86 (1980).

Gopnik, A. How we know our minds: The illusion of first-person knowledge of intentionality. *Behavioral and Brain Sciences* 16:1–14 (1993).

Gopnik, A. *The Philosophical Baby: What Children's Minds Tell Us About Truth, Love, and the Meaning of Life*. New York: Farrar, Straus and Giroux, 2009.

Gopnik, A., Meltzoff, A. N., and Kuhl, P. K. *The Scientist in the Crib: What Early Learning Tells Us About the Mind*. New York: HarperCollins, 1999.

Gopnik, A. S., and Choi, S. Do linguistic differences lead to cognitive differences? A cross-linguistic study of semantic and cognitive development. *First Language* 10:199–215 (1990).

Gordon, I., Zagoory-Sharon, O., Leckman, J. F., and Feldman, R. Oxytocin, cortisol, and triadic family interactions. *Physiology and Behavior* 101:679–84 (2010).

Görke, W. Somatosensory evoked cortical potentials indicating impaired motor development in infancy. *Developmental Medicine and Child Neurology* 28:633–41 (1986).

Gottman, J. M., and Silver, N. *Why Marriages Succeed or Fail: And How You Can Make Yours Last*. New York: Simon and Schuster, 1998.

Grabe, S., Ward, L. M., and Hyde, J. S. The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin* 134:460–76 (2008).

Grandin, T. *Thinking in Pictures: And Other Reports from My Life with Autism*. New York: Doubleday, 1995.

Green, A. E., Munafò, M. R., DeYoung, C. G., Fossella, J. A., Fan, J., and Gray, J. R. Using genetic data in cognitive neuroscience: From growing pains to genuine insights. *Nature Reviews Neuroscience* 9:710–20 (2008).

Green, C. S., and Bavelier, D. Action video game modifies visual selective attention. *Nature* 423:534–37 (2003).

Green, G., Brennan, L. C., and Fein, D. Intensive behavioral treatment for a toddler at high risk for autism. *Behavior Modification* 26:69–102 (2002).

Green, R. Gender identity in childhood and later sexual orientation: Follow-up of 78 males. *American Journal of Psychiatry* 142:339–41 (1985).

Gross, C. G., and Bornstein, M. H. Left and right in science and art. *Leonardo* 11:29–38 (1978). Reprinted in Gross, *A Hole in the Head: More Tales in the History of Neuroscience.* Cambridge, MA: MIT Press, 2009.

Guilleminault, D., Palombini, L., Pelayo, R., and Chervin, R. D. Sleepwalking and sleep terrors in prepubertal children: What triggers them? *Pediatrics* 111:e17–25 (2003).

Gunnar, M., and Quevedo, K. The neurobiology of stress and development. *Annual Review of Psychology* 58:145–73 (2007).

Guskiewicz, K. M., Marshall, S. W., Bailes, J., McCrea, M., Cantu, R. C., Randolph, C., and Jordan, B. D. Late-life cognitive impairment in retired professional football players. *Neurosurgery* 57:719–26 (2005).

Guskiewicz, K. M., Marshall, S. W., Bailes, J., McCrea, M., Harding, H. P., Jr., Matthews, A., Mihalik, J. R., and Cantu, R. C. Recurrent concussion and risk of depression in retired professional football players. *Medicine and Science in Sports and Exercise* 39:903–9 (2007).

Hackman, D. A., and Farah, M. J. Socioeconomic status and the developing brain. *Trends in Cognitive Sciences* 13:65–73 (2009).

Haglund, M. E. M., Nestadt, P. S., Cooper, N. S., Southwick, S. M., and Charney, D. S. Psychobiological mechanisms of resilience: Relevance to prevention and treatment of stress-related psychopathology. *Development and Psychopathology* 19:889–920 (2007).

Halstead, M. E., Walter, K. D., and the Council on Sports Medicine and Fitness. Clinical report—Sport-related concussion in children and adolescents. *Pediatrics* 126:597–615 (2010).

Hannon, E. E., and Trainor, L. J. Music acquisition: Effects of enculturation and formal training on development. *Trends in Cognitive Sciences* 11:466–72 (2007).

Hannon, E. E., and Trehub, S. E. Metrical categories in infancy and adulthood. *Psychological Science* 16:48–55 (2005).

Harris, J. R. The Nurture Assumption: *Why Children Turn Out the Way They Do*. New York: Simon and Schuster, 1998.

Harrison, R. V., Gordon, K. A., and Mount, R. J. Is there a critical period for cochlear implantation in congenitally deaf children? Analyses of hearing and speech perception performance after implantation. *Developmental Psychobiology* 46:252–61 (2005).

Hart, B., and Risley, T. R. *Meaningful Differences in the Everyday Experience of Young American Children*. Baltimore: Paul H. Brookes, 1995.

Hassett, J. M., Siebert, E. R., and Wallen, K. Sex differences in rhesus monkey toy preferences parallel those of children. *Hormones and Behavior* 54:359–64 (2008).

Hedges, L. V., and Nowell, A. Sex differences in mental test scores, variability, and numbers of high-scoring individuals. *Science* 269:41–45 (1995).

Henderlong, J., and Lepper, M. R. The effects of praise on children's intrinsic motivation: A review and synthesis. *Psychological Bulletin* 128:774–95 (2002).

Hepper, P. G., and Shahidullah, B. S. Development of fetal hearing. *Archives of Disease in Childhood* 71:81–87 (1994).

Hertz-Picciotto, I., and Delwiche, L. The rise in autism and the role of age at diagnosis. *Epidemiology* 20:84–90 (2009).

Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., and Golding, J. Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): An observational cohort study. *Lancet* 369:578–85 (2007).

Hillman, C. H., Erickson, K. I., and Kramer, A. F. Be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews Neuroscience* 9:58–65 (2008).

Ho, C. S.-H., and Fong, K.-M. Do Chinese dyslexic children have difficulties learning English as a second language? *Journal of Psycholinguistic Research* 34:603–19 (2005).

Hoek, H. W. Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry* 19:389–94 (2006).

Holden, C., and Mace, R. Phylogenetic analysis of the evolution of lactose digestion in adults. *Human Biology* 69:605–28 (1997).

Holmes, E. J., and Gross, C. G. Effects of inferior temporal lesions on discrimination of stimuli differing in orientation. *Journal of Neuroscience* 4:3063–68 (1984).

Hood, B. M., Willen, J. D., and Driver, J. Adult's eyes trigger shifts of visual attention in human infants. *Psychological Science* 9:131–34 (1998).

Hornbeak, D. M., and Young, T. L. Myopia genetics: A review of current research and emerging trends. *Current Opinion in Ophthalmology* 20:356–62 (2009).

Howard, J. S., Sparkman, C. R., Cohen, H. G., and Stanislaw, H. A comparison of intensive behavior analytic and eclectic treatments for young children with autism. *Research in Developmental Disabilities* 26:359–83 (2005).

Huttenlocher, P. R. Morphometric study of human cerebral cortex development. *Neuropsychologia* 28:517–27 (1990).

———. Synaptic density in human frontal cortex—developmental changes and effects of aging. *Brain Research* 163:195–205 (1979).

Huttenlocher, P. R., and Dabholkar, A. S. Regional differences in synaptogenesis in human cerebral cortex. *Journal of Comparative Neurology* 387:167–78 (1997).

Hyde, J. S., Lindberg, S. M., Linn, M. C., Ellis, A. B., and Williams, C. C. Gender similarities characterize math performance. *Science* 321:494–95 (2010).

Hyde, K. L., Lerch, J., Norton, A., Forgeard, M., Winner, E., Evans, A. C., and Schlaug, G. Musical training shapes structural brain development. *Journal of Neuroscience* 29:3019–25 (2009).

Hyman, S. L., and Levy, S. E. Autism spectrum disorders: When traditional medicine is not enough. *Contemporary Pediatrics* 17:101–16 (2000).

Iglowstein, I., Jenni, O. G., Molinari, L., and Largo, R. H. Sleep duration from infancy to adolescence: Reference values and generational trends. *Pediatrics* 111:302–7 (2003).

Iwaniuk, A. N., Nelson, J. E., and Pellis, S. M. Do big-brained animals play more? Comparative analyses of play and relative brain size in mammals. *Journal of Comparative Psychology* 115:29–41 (2001).

Jablonka, E., and Raz, G. Transgenerational epigenetic inheritance: Prevalence, mechanisms, and implications for the study of heredity and evolution. *Quarterly Review of Biology* 84:131–76 (2009).

Jacobson, J. W., Foxx, R. M., and Mulick, J. A., eds. *Controversial Therapies for Developmental Disabilities: Fad, Fashion, and Science in Professional Practice*. Mahwah, NJ: Psychology Press, 2005.

Jaeggi, S. M., Buschkuehl, M., Jonides, J., and Perrig, W. J. Improving fluid intelligence with training on working memory. *Proceedings of the National Academy of Sciences U.S.A.* 105:6829–33 (2008).

Jaffee, S., and Hyde, J. S. Gender differences in moral orientation: A meta-analysis. *Psychological Bulletin* 126:703–26 (2000).

Jain, A., Concato, J., and Leventhal, J. M. How good is the evidence linking breastfeeding and intelligence? *Pediatrics* 109:1044–53 (2002).

Jensen, J. K., and Neff, D. L. Development of basic auditory discrimination in preschool children. *Psychological Science* 4:104–7 (1993).

Joëlsa, M., Pua, Z., Wiegerta, O., Oitzlb, M. S., and Kruger, H. J. Learning under stress: How does it work? *Trends in Cognitive Sciences* 10:152–58 (2006).

Johnson, J. S., and Newport, E. L. Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology* 21:60–99 (1989).

Johnson, M. H., Dziurawiec, S., Eills, H., and Morton, J. Newborn's preferential tracking of face-like stimuli and its subsequent decline. *Cognition* 40:1–19 (1991).

Jones, J. L., Anderson, B., Schulkin, J., Parise, M. E., and Eberhard, M. L. Sushi in pregnancy, parasitic diseases—obstetrician survey. *Zoonoses and Public Health*. doi: 10.1111/j.1863-2378.2009.01310.x (2009).

Jones, L. A., Sinnott, L. T., Mutti, D. O., Mitchell, G. L., Moeschberger, M. L., and Zadnik, K. Parental history of myopia, sports and outdoor activities, and future myopia. *Investigative Ophthalmology and Visual Science* 48:3524–32 (2007).

Kagen, J. Biology, context, and developmental inquiry. *Annual Review of Psychology* 54:1–23 (2003).

Kaitz, M., Good, A., Rokem, A. M., and Eidelman, A. I. Mothers' recognition of their newborns by olfactory cues. *Developmental Psychobiology* 20:587–91 (1987).

Kandel, E. R., Schwartz, J. H., and Jessell, T. M. *Principles of Neural Science*. 4th edition. New York: McGraw-Hill, 2000.

Karmel, B. Z., Gardner, J. M., Meade, L. S., Cohen, I. L., London, E., Flory, M. J., Lennon, E. M., Miroshnichenko, I., Rabinowitz, S., Parab, S., Barone, A., and Harin, A. Early medical and behavioral characteristics of NICU infants later classified with ASD. *Pediatrics* 126:457–67 (2010).

Kavšek, M. Predicting later IQ from infant visual habituation and dishabituation: A meta-analysis. *Applied Developmental Psychology* 25:369–93 (2004).

Kawachi, I., Adler, N. E., and Dow, W. H. Money, schooling, and health: Mechanisms and causal evidence. *Annals of the New York Academy of Sciences* 1186:56–68 (2010).

Kazdin, A. E., and Rotella, C. *The Kazdin Method for Parenting the Defiant Child: With No Pills, No Therapy, No Contest of Wills*. New York: Houghton Mifflin Harcourt, 2009.

Kei, J., McPherson, B., Smyth, V., Latham, S., and Loscher, J. Transient evoked otoacoustic emissions in infants: Effects of gender, ear asymmetry and activity status. *Audiology* 36:61–71 (1997).

Kelly, D., Quinn, P., Slater, A., Lee, K., Ge, L., and Pascalis, O. The other-race effect develops during infancy: Evidence of perceptual narrowing. *Psychological Science* 18:1084–87 (2007).

Kessel, C., and Linn, M. C. Grades or

scores: Predicting future college mathematics performance. *Educational Measurement: Issues and Practice* 15:10–14 (1996).

Keuroghlian, A. S., and Knudsen, E. I. Adaptive auditory plasticity in developing and adult animals. *Progress in Neurobiology* 82:109–21 (2007).

Khashan, A. S., Abel, K. M., McNamee, R., Pedersen, M. G., Webb, R. T., Baker, P. N., Kenny, L. C., and Mortensen, P. B. Higher risk of offspring schizophrenia following antenatal maternal exposure to severe adverse life events. *Archives of General Psychiatry* 65:146–52 (2008).

Kimura, D. *Sex and Cognition*. Cambridge, MA: MIT Press, 2000.

Kinney, D. K., Miller, A. M., Crowley, D. J., Huang, E., and Gerber, E. Autism prevalence following prenatal exposure to hurricanes and tropical storms in Louisiana. *Journal of Autism and Developmental Disorders* 38:481–88 (2008).

Kling, K. C., Hyde, J. S., Showers, C. J., and Buswell, B. N. Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin* 125:470–500 (1999).

Knops, A., Thirion, B., Hubbard, E. M., Michel, V., and Dehaene, S. Recruitment of an area involved in eye movements during mental arithmetic. *Science* 324:1583–85 (2009).

Knudsen, E. I. Sensitive periods in the development of brain and behavior. *Journal of Cognitive Neuroscience* 16:1412–25 (2004).

Knudsen, E. I., Heckman, J. J., Cameron, J. L., and Shonkoff, J. P. Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences* 103:10155–62 (2006).

Kochanska, G., and Aksan, N. Children's conscience and self-regulation. *Journal of Personality* 74:1587–1618 (2006).

Kochanska, G., Philibert, R. A., and Barry, R. A. Interplay of genes and early mother-child relationship in the development of self-regulation from toddler to preschool age. *Journal of Child Psychology and Psychiatry* 50:1331–38 (2009).

Kovács, Å. M., and Mehler, J. Flexible learning of multiple speech structures in bilingual infants. *Science* 325:611–12 (2009).

Kovas, Y., Hayiou-Thomas, M. E., Oliver, B., Dale, P. S., Bishop, D. V., and Plomin, R. Genetic influences in different aspects of language development: The etiology of language skills in 4.5-year-old twins. *Child Development* 76:632–51 (2005).

Kramer, M. S., et al. Breastfeeding and child cognitive development: New evidence from a large randomized trial. *Archives of General Psychiatry* 65:578–84 (2008).

Kuhl, P., and Rivera-Gaxiola, M. Neural substrates of language acquisition. *Annual Review of Neuroscience* 31:511–34 (2008).

Laland, K. N., Odling-Smee, J., and Myles, S. How culture shaped the human genome: Bringing genetics and the human sciences together. *Nature Reviews Genetics* 11:137–48 (2010).

LaPlante, D. P., Brunet, A., Schmitz, N., Ciampi, A., and King, S. Project ice storm: Prenatal maternal stress affects cognitive and linguistic functioning in 5 ½-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry* 47:1063–72 (2008).

Lee, K., Lim, Z. Y., Yeong, S. H. M., Ng, S. F., Venkatraman, V., and Chee, M. W. L. Strategic differences in algebraic problem solving: Neuroanatomical correlates. *Brain Research* 1155:163–71 (2007).

Lenroot, R. K., Gogtay, N., Greenstein, D. K., Wells, E. M., Wallace, G. L., Clasen, L. S., Blumenthal, J. D., Lerch, J., Zijdenbos, A. P., Evans, A. C., Thompson, P. M., and Giedd, J. N. Sexual dimorphism of brain developmental trajectories during childhood and adolescence. *NeuroImage* 36:1065–73 (2007).

Leonard, D. K., and Jiang, J. Gender bias and the college predictions of the SATs: A cry of despair. *Research in Higher Education* 40:375–407 (1999).

Leppänen, J. M., and Nelson, C. A. Tuning the developing brain to social signals of emotions. *Nature Reviews Neuroscience* 10:37–47 (2009).

Leuchter, A. F. Review of *Healing the Hardware of the Soul* by Daniel Amen. *American Journal of Psychiatry* 166:625 (2009).

Levi, D. M. Perceptual learning in adults with amblyopia: A reevaluation of critical periods in human vision. *Developmental Psychobiology* 46:222–32 (2005).

Levine, S. C., Vasilyeva, M., Lourenco, S. F., Newcombe, N. S., and Huttenlocher, J. Socioeconomic status modifies the sex difference in spatial skill. *Psychological Science* 16:841–45 (2005).

Lewis, T. L., and Maurer, D. Effects of early pattern deprivation on visual development. *Optometry and Vision Science* 86:640–46 (2009).

Li, R., Polat, U., Makous, W., and Bavelier, D. Enhancing the contrast sensitivity function through action video game training. *Nature Neuroscience* 12:549–51 (2009).

Limperopoulos, C. Extreme prematurity, cerebellar injury, and autism. *Seminars in Pediatric Neurology* 17:25–29 (2010).

Linebarger, D. L., and Walker, D. Infants' and toddlers' television viewing and language outcomes. *American Behavioral Scientist* 48:624–45 (2005).

Linn, M. C., and Kessel, C. Success in mathematics: Increasing talent and gender diversity among college majors. *Issues in Mathematics Education* 6:101–44 (1996).

Löken, L. S., Wessberg, J., Morrison, I., McGlone, F., and Olausson, H. Coding of pleasant touch by unmyelinated afferents in humans. *Nature Neuroscience* 12:547–48 (2009).

Luciana, M. Adolescent brain development: Current themes and future directions. Introduction to the special issue. *Brain and Cognition* 72:1–5 (2010).

Maccoby, E. E. Parenting and its effects on children: On reading and misreading behavior genetics. *Annual Review of Psychology* 51:1–27 (2000).

———.*The Two Sexes: Growing Up Apart, Coming Together*. Cambridge, MA: Harvard University Press, 1998.

Maccoby, E. E., and Jacklin, C. N. Gender segregation in childhood. *Advances in Child Development and Behavior* 20:239–87 (1987).

Mannuzza, S., Klein, R. G., Bonagura, N., Malloy, P., Giampino, T. L., and Addalli, K. A. Hyperactive boys almost grown up: V. Replication of psychiatric status. *Archives of General Psychiatry* 48:77–83 (1991).

Mannuzza, S., Klein, R. G., Truong, N. L., Moulton, J. L., III, Roizen, E. R., and

Howell, K. H. Age of methylphenidate treatment initiation in children with ADHD and later substance abuse: Prospective follow-up into adulthood. *American Journal of Psychiatry* 165:604–9 (2008).

Marois, R., and Ivanoff, J. Capacity limits of information processing in the brain. *Trends in Cognitive Sciences* 9:296–305 (2005).

Mather, J. A., and Anderson, R. C. Exploration, play and habituation in octopuses (Octopus dofleini). *Journal of Comparative Psychology* 113:333–38 (1999).

Matthews, K. A., Gallo, L. C., and Taylor, S. E. Are psychosocial factors mediators of socioeconomic status and health connections? A progress report and blueprint for the future. *Annals of the New York Academy of Sciences* 1186:146–73 (2010).

McAdams, D. P., and Olson, B. D. Personality development: Continuity and change over the life course. *Annual Review of Psychology* 61:517–42 (2010).

McCarthy, E. S. Greek and Roman lore of animal-nursed infants. Papers of the Michigan Academy of Science, Arts, and Letters 4:15–40 (1925).

McClure, E. B. A meta-analytic review of sex differences in facial expression processing and their development in infants, children and adolescents. *Psychological Bulletin* 126:424–53 (2000).

McEwen, B. S., and Gianaros, P. J. Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences* 1186:190–222 (2010).

McGlone, M. S., and Aronson, J. Stereotype threat, identity salience, and spatial reasoning. *Journal of Applied Developmental Psychology* 27:486–93 (2006).

McKee, A. C., Cantu, R. C., Nowinski, C. J., Hedley-Whyte, E. T., Gavett, B. E., Budson, A. E., Santini, V. E., Lee, H. S., Kubilus, C. A., and Stern, R. A. Chronic traumatic encephalopathy in athletes: Progressive tauopathy after repetitive head injury. *Journal of Neuropathology and Experimental Neurology* 68:709–35 (2009).

Mednick, S., and Ehrman, M. *Take a Nap! Change Your Life*. New York: Workman, 2006.

Mednick, S. C., Nakayama, K. Cantero, J. L., Atienza, M., Levin, A. A., Pathak, N., and Stickgold, R. The restorative effect of naps on perceptual deterioration. *Nature Neuroscience* 5:677–81 (2002).

Mehler, J., and Bever, T. G. Cognitive capacity of very young children. *Science* 158:141–42 (1967).

Mehler, J., Jusczyk, P., Lambertz, G., Halsted, N., Bertoncini, J., and Amiel-Tison, C. A. Precursor of language acquisition in young infants. *Cognition* 29:143–78 (1988).

Meisami, E., and Timiras, P. S., eds. *Handbook of Human Growth and Developmental Biology*. Vol. I, part B. Boca Raton, FL: CRC Press, 1988.

Mennella, J. A., and Beauchamp, G. K. Flavor experiences during formula feeding are related to preferences during childhood. *Early Human Development* 68:71–82 (2002).

Mennella, J. A., and Gerrish, C. J. Effects of exposure to alcohol in mother's milk on infant sleep. *Pediatrics*, 101:e2 (1998).

Mennella, J. A., Jagnow, C. P., and

Beauchamp, G. K. Prenatal and postnatal flavor learning by human infants. *Pediatrics* 107:e88 (2001).

Mesman, J., van IJzendoorn, M. H., and Bakermans-Kranenburg, M. J. The many faces of the Still-Face Paradigm: A review and meta-analysis. *Developmental Review* 29:120–62 (2009).

Milner, J. A., and Allison, R. G. The role of dietary fat in child nutrition and development: Summary of an ASNS workshop. *Journal of Nutrition* 129:2094–2105 (1999).

Mink, J. W. The basal ganglia: Focused selection and inhibition of competing motor programs. *Progress in Neurobiology* 50:381–425 (1996).

Mistretta, C. M., and Bradley, R. M. Taste and swallowing in utero: A discussion of fetal sensory function. *British Medical Bulletin* 31:80–84 (1984).

Mondloch, C. J., Lewis, T. L., Budreau, D. R., Maurer, D., Dannemiller, J. D., Stephens, B. R., et al. Face perception during early infancy. *Psychological Science* 10:419–22 (1999).

Moore, D. S., and Johnson, S. P. Mental rotation in human infants. *Psychological Science* 19:1063–66 (2008).

Moseley, M. J., Fielder, A. R., and Stewart, C. E. The optical treatment of amblyopia. *Optometry and Visual Science* 86:629–33 (2009).

Moster, D., Lie, R. T., and Markestad, T. Long-term medical and social consequences of preterm birth. *New England Journal of Medicine* 359:262–73 (2008).

Müller, K., Ebner, B., and Hömberg, V. Maturation of fastest afferent and efferent central and peripheral pathways: No evidence for a constancy of central conduction delays. *Neuroscience Letters* 166:9–12 (1994).

Nakata, T., Trehub, S. E., Mitani, C., and Kanda, Y. Pitch and timing in the songs of deaf children with cochlear implants. *Music Perception* 24:147–54 (2006).

Nandi, R., and Luxon, L. M. Development and assessment of the vestibular system. *International Journal of Audiology* 47:566–77 (2008).

Nassar, N., Dixon, G., Bourke, J., Bower, C., Glasson, E., de Klerk, N., and Leonard, H. Autism spectrum disorders in young children: Effect of changes in diagnostic practices. *International Journal of Epidemiology* 38:1245–54 (2009).

Neumark-Sztainer, D. R., Wall, M. M., Haines, J. I., Story, M. T., Sherwood, N. E., and van den Berg, P. A. Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventive Medicine* 33:359–69 (2007).

Newport, E. L., Bavelier, D., and Neville, H. J. Critical thinking about critical periods: Perspectives on a critical period for language acquisition. In *Language, Brain, and Cognitive Development: Essays in Honor of Jacques Mehler*, ed. E. Dupoux, 481–502. Cambridge, MA: MIT Press, 2001.

Nicklas, T. A., Webber, L. S., Koschak, M. L., and Berenson, G. S. Nutrient adequacy of low fat intakes for children: The Bogalusa heart study. *Pediatrics* 89:221–28 (1992).

Nieder, A., and Dehaene, S. Representation of number in the brain. *Annual Review of Neuroscience* 32:185–208 (2009).

Nir, Y., and Tononi, G. Dreaming and the brain: From phenomenology to neurophysiology. *Trends in Cognitive Sciences* 14:88–100 (2009).

Okagaki, L., and Frensch, P. A. Effects of video game playing on measures of spatial performance: Gender effects in late adolescence. *Journal of Applied Developmental Psychology* 15:33–58 (1994).

Oken, E., Radesky, J. S., Wright, R. O., Bellinger, D. C., Amarasiriwardena, C. J., Kleinman, K. P., Hu, H., and Gillman, M. W. Maternal fish intake during pregnancy, blood mercury levels, and child cognition at age 3 years in a US cohort. *American Journal of Epidemiology* 167:1171–81 (2008).

Olausson, H., Lamarre, Y., Backlund, H., Morin, C., Wallin, B. G., Starck, G., Ekholm, S., Strigo, I., Worsley, K., Vallbo, Å. B., and Bushnell, M. C. Unmyelinated tactile afferents signal touch and project to insular cortex. *Nature Neuroscience* 5:900–904 (2002).

Ophir, E., Nass, C., and Wagner, A. D. Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences USA* 106:15583–87 (2009).

Ozel, S., Larue, J., and Molinaro, C. Relation between sport and spatial imagery: Comparison of three groups of participants. *Journal of Psychology* 138:49–63 (2004).

Palmen, S. J. M. C., van Engeland, H., Hof, P. R., and Schmitz, C. Neuropathological findings in autism. *Brain* 127:2572–83 (2004).

Parlade, M. V., Messinger, D. S., Delgado, C. E. F., Kaiser, M. Y., Van Hecke, A. V., and Mundy, P. C. Anticipatory smiling: Linking early affective communication and social outcome. *Infant Behavior and Development* 32:33–43 (2009).

Pasterski, V., Hindmarsh, P., Geffner, M., Brook, C., Brain, C., and Hines, M. Increased aggression and activity level in 3- to 11-year-old girls with congenital adrenal hyperplasia (CAH). *Hormones and Behavior* 52:368–74 (2007).

Peake, P. K., Hebl, M., and Mischel, W. Strategic attention deployment for delay of gratification in working and waiting situations. *Developmental Psychology* 38:313–26 (2002).

Petersen, J. L., and Hyde, J. S. A meta-analytic review of research on gender differences in sexuality: 1993 to 2007. *Psychological Bulletin* 136:21–38 (2010).

Pica, P., Lemer, C., Izard, V., and Dehaene, S. Exact and approximate arithmetic in an Amazonian indigene group. *Science* 306:499–503 (2004).

Plomin, R., Asbury, K., Dip, P. G., and Dunn, J. Why are children in the same family so different? Nonshared environment a decade later. *Canadian Journal of Psychiatry* 46:225–33 (2001).

Pontifex, M. B., Raine, L. B., Johnson, C. R., Chaddock, L., Voss, M. W., Cohen, N. J., Kramer, A. F., and Hillman, C. H. Cardiorespiratory fitness and the flexible modulation of cognitive control in preadolescent children. *Journal of Cognitive Neuroscience* 23:1332–45 (2011).

Posner, M. I., and Rothbart, M. K. Research on attention networks as a model for the integration of psychological science. *Annual Review of Psychology* 58:1–23 (2007).

Power, T. G. Stress and coping in childhood: The parents' role. *Parenting: Science and Practice* 4:271–317 (2004).

Preston, S. D., and de Waal, F. B. M. Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences* 25:1–72 (2002).

Quinn, P. C. Beyond prototypes: Asymmetries in infant categorization and what they teach us about the mechanisms guiding early knowledge acquisition. *Advances in Child Development and Behavior* 29:161–93 (2002).

Quinn, P. C., and Liben, L. S. A sex difference in mental rotation in young infants. *Psychological Science* 19:1067–70 (2008).

Quirk, G. J., and Mueller, D. Neural mechanisms of extinction learning and retrieval. *Neuropsychopharmacology* 33:56–72 (2008).

Rakic, P., Bourgeois, J.-P., and Goldman-Rakic, P. S. Synaptic development of the cerebral cortex: Implications for learning, memory, and mental illness. *Progress in Brain Research* 102:227–43 (1994).

Ramus, F., Rosen, S., Dakin, S. C., Day, B. L., Castellote, J. M., White, S., and Frith, U. Theories of developmental dyslexia: Insights from a multiple case study of dyslexic adults. *Brain* 126:841–65 (2003).

Redgrave, P., Prescott, T. J., and Gurney, K. Is the short-latency dopamine response too short to signal reward error? *Trends in Neuroscience* 22:146–51 (1999).

Reid, V. M., and Striano, T. Adult gaze influences infant attention and object processing: Implications for cognitive neuroscience. *European Journal of Neuroscience* 21:1763–66 (2005).

Reiss, D., and Leve, L. D. Genetic expression outside the skin: Clues to mechanisms of genotype × environment interaction. *Development and Psychopathology* 19:1005–27 (2007).

Rice, G. E., and Gainer, P. "Altruism" in the albino rat. *Journal of Comparative and Physiological Psychology* 55:123–25 (1962).

Rizzolatti, G., and Sinigaglia, C. The functional role of the parieto-frontal mirror circuit: Interpretations and misinterpretations. *Nature Reviews Neuroscience* 11:264–74 (2010).

Roffwarg, H. P., Muzio, J. N., and Dement, W. C. Ontogenetic development of the human sleep-dream cycle. *Science* 152:604–19 (1966).

Rohrer, D., and Pashler, H. Recent research on human learning challenges conventional instructional strategies. *Educational Researcher* 39:406–12 (2010).

Rolls, E. T. Brain mechanisms underlying flavour and appetite. *Philosophical Transactions of the Royal Society B* 361:1123–36 (2006).

Romeo, R. D., and McEwen, B. S. Stress and the adolescent brain. *Annals of the New York Academy of Sciences* 1094:202–14 (2006).

Rose, K., Smith, W., Morgan, I., and Mitchell, P. The increasing prevalence of myopia: Implications for Australia. *Clinical and Experimental Ophthalmology* 29:116–20 (2001).

Rose, K. A., Morgan, I. G., Ip, J., Kifley, A., Huynh, S., Smith, W., and Mitchell, P. Outdoor activity reduces the prevalence of myopia in children. *Ophthalmology* 115:1279–85 (2008a).

Rose, K. A., Morgan, I. G., Smith, W., Burlutsky, G., Mitchell, P., and Saw, S.-M. Myopia, lifestyle, and schooling in students of Chinese ethnicity in Singapore and Sydney. *Archives of Ophthalmology* 126:527–30 (2008b).

Rothbart, M. K., Ahadi, S. A., and Evans, D. E. Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology* 78:122–35 (2000).

Rovee-Collier, C., and Barr, R. Infant

learning and memory. In *Blackwell Handbook of Infant Development*, ed. G. Bremner and A. Fogel, 139–68. Malden, MA: Blackwell, 2001.

Rowe, D. C., and Rodgers, J. L. Poverty and behavior: Are environmental measures nature and nurture? *Developmental Review* 17:358–75 (1997).

Rubin, K. H., Bukowski, W., and Parker, J. G. Peer interactions, relationships, and groups. In *Handbook of Child Psychology*, vol. 3, *Social, Emotional, and Personality Development*, ed. N. Eisenberg, 571–645. New York: Wiley, 2006.

Rubin, K. H., Coplan, R. J., and Bowker, J. C. Social withdrawal in childhood. *Annual Review of Psychology* 60:141–71 (2009).

Ruffman, T., Perner, J., Naito, M., Parkin, L., and Clements, W. A. Older (but not younger) siblings facilitate false belief understanding. *Developmental Psychology* 34:161–74 (1998).

Rutter, M. Gene-environment interdependence. *Developmental Science* 10:12–18 (2007).

Saffran, J. R., Aslin, R. N., and Newport, E. L. Statistical learning by 8-month-old infants. *Science* 274:1926–28 (1996).

Sallows, G. O., and Graupner, T. D. Intensive behavioral treament for children with autism: Four-year outcome and predictors. *American Journal of Mental Retardation* 110:417–38 (2005).

Salomão, S. R., and Ventura, D. F. Large sample population age norms for visual acuities obtained with Vistech–Teller acuity cards. *Investigative Ophthalmology and Visual Science* 36:657–70 (1995).

Sanes, D. H., Reh, T. A., and Harris, W. A. *Development of the Nervous System*. 2nd edition. New York: Academic Press, 2005.

Sapolsky, R. M. The influence of social hierarchy on primate health. *Science* 308:648–52 (2005).

———. *Why Zebras Don't Get Ulcers*. 3rd edition. New York: Holt, 2004.

Saxe, R., Carey, S., and Kanwisher, N. Understanding other minds: Linking developmental psychology and functional neuroimaging. *Annual Review of Psychology* 55:87–124 (2004).

Schaal, B. Olfaction in infants and children: Developmental and functional perspectives. *Chemical Senses* 13:145–90 (1988).

Schellenberg, E. G. Music and cognitive abilities. *Current Directions in Psychological Science* 14:317–20 (2005).

Schlaug, G., Jäncke, L., Huang, Y., Staiger, J. F., and Steinmetz, H. Increased corpus callosum size in musicians. *Neuropsychologia* 33:1047–55 (1995).

Schneider, P., Scherg, M., Dosch, H. G., Specht, H. J., Gutschalk, A., and Rupp, A. Morphology of Heschl's gyrus reflects enhanced activation in the auditory cortex of musicians. *Nature Neuroscience* 5:688–94 (2002).

Servin, A., Bohlin, G., and Berlin, L. Sex differences in 1-, 3-, and 5-year-olds' toy-choice in a structured play-session. *Scandinavian Journal of Psychology*, 40:43–48 (1999).

Shaw, P. Intelligence and the developing human brain. *BioEssays* 29:962–73 (2007).

Shaw, P., Eckstrand, K., Sharp, W., Blumenthal, J., Lerch, J. P., Greenstein, D., Clasen, L., Evans, A., Giedd, J., and Rapoport, J. L. Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. *Proceedings of the National Academy of Sciences USA* 104:19649–54 (2007).

Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N., Evans, A., Rapoport, J., and Giedd, J. Intellectual ability and cortical development in children and adolescents. *Nature* 440:676–79 (2006a).

Shaw, P., Lerch, J., Greenstein, D., Sharp, W., Clasen, L., Evans, A., Giedd, J., Castellanos, F. X., and Rapoport, J. Longitudinal mapping of cortical thickness and clinical outcome in children and adolescents with attention-deficit/hyperactivity disorder. *Archives of General Psychiatry* 63:540–49 (2006b).

Sheese, B. E., Voelker, P. M., Rothbart, M. K., and Posner, M. I. Parenting quality interacts with genetic variation in dopamine receptor D4 to influence temperament in early childhood. *Development and Psychopathology* 19:1039–46 (2007).

Shoda, Y., Mischel, W., and Peake, P. K. Predicting adolescent cognitive and self-regulatory competencies from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology* 26:978–86 (1990).

Shorter, E. *Before Prozac: The Troubled History of Mood Disorders in Psychiatry*. New York: Oxford University Press, 2008.

Sibley, B. A., and Etnier, J. L. The relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science* 15:243–56 (2003).

Singer, T. The neuronal basis and ontogeny of empathy and mind reading: Review of literature and implication for future research. *Neuroscience and Biobehavioral Reviews* 30:855–63 (2006).

Siok, W. T., Niu, Z., Jin, Z., Perfetti, C. A., and Tan, L. H. A structural-functional basis for dyslexia in the cortex of Chinese readers. *Proceedings of the National Academy of Sciences USA* 105:5561–66 (2008).

Sisk, S., and Foster, D. L. The neural basis of puberty and adolescence. *Nature Neuroscience* 7:1040–47 (2004).

Skinner, E. A., and Zimmer-Gembeck, M. J. The development of coping. *Annual Review of Psychology* 58:119–44 (2007).

Smetana, J. G., Campione-Barr, N., and Metzger, A. Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology* 57:255–84 (2006).

Snowdon, D. A., Ostwald, S. K., Kane, R. L., and Keenan, N. L. Years of life with good and poor mental and physical function in the elderly. *Journal of Clinical Epidemiology* 42:1055–66 (1989).

Sohn, M.-H., Goode, A., Koedinger, K. R., Stenger, V. A., Fissell, K., Carter, C. S., and Anderson, J. R. Behavioral equivalence, but not neural equivalence—neural evidence of alternative strategies in mathematical thinking. *Nature Neuroscience* 7:1193–94 (2004).

Spear, L. P. *The Behavioral Neuroscience of Adolescence.* New York: W. W. Norton, 2010.

Spelke, E. S., and Kinzler, K. D. Core knowledge. *Developmental Science* 10:89–96 (2007).

Squire, L. R. *Memory and Brain*. New York: Oxford University Press, 1987.

Squire, L. R., and Zola-Morgan, S. M. The medial temporal lobe memory system. *Science* 253:1380–85 (1991).

Steinberg, L. A behavioral scientist looks at the science of adolescent brain development. *Brain and Cognition* 72:160–64 (2010).

Strand, P. S. A modern behavioral perspective on child conduct disorder: Integrating behavioral momentum and matching theory. *Clinical Psychology Review* 20:593–615 (2000).

Subrahmanyam, K., and Greenfield, P. M. Effect of video game practice on spatial skills in girls and boys. *Journal of Applied Developmental Psychology* 15:13–32 (1994).

Sullivan, R. M. Review: Olfaction in the human infant. *Sense of Smell Institute White Paper* (July 2000). http://www.senseofsmell.org/papers/Sullivan_olfaction_baby.pdf.

Suomi, S. J. Early determinants of behaviour: Evidence from primate studies. *British Medical Bulletin* 53:170–84 (1997).

———. Risk, resilience, and gene × environment interactions in rhesus monkeys. *Annals of the New York Academy of Sciences* 1994:52–62 (2006).

Tamis-LeMonda, C. S., Bornstein, M. H., Cyphers, L., Toda, S., and Ogino, M. Language and play at one year: A comparison of toddlers and mothers in the United States and Japan. *International Journal of Behavioral Development* 15:19–42 (1992).

Tan, L. H., Spinks, J. A., Eden, G. F., Perfetti, C. A., and Siok, W. T. Reading depends on writing, in Chinese. *Proceedings of the National Academy of Sciences USA* 102:8781–85 (2005).

Tang, Y.-Y., and Posner, M. I. Attention training and attention state training. *Trends in Cognitive Sciences* 13:222–27 (2009).

Tau, G. Z., and Peterson, B. S. Normal development of brain circuits. *Neuropsychopharmacology* 35:147–68 (2010).

Taubes, G. Do we really know what makes us healthy? *New York Times Sunday Magazine*, September 16, 2007.

Thomas, G. E. Student and institutional characteristics as determinants of the prompt and subsequent four-year college graduation of race and sex groups. *Sociological Quarterly* 22:327–45 (1981).

Thompson, B. L., Levitt, P., and Stanwood, G. D. Prenatal exposure to drugs: Effects on brain development and implications for policy and education. *Nature Reviews Neuroscience* 10:303–12 (2009).

Townsend, F. Taking "Born to Rebel" seriously: The need for independent review. *Politics and the Life Sciences* 19:205–10 (2000).

Trainor, L. J., Tsang, C. D., and Cheung, V. H. W. Preference for sensory consonance in 2- and 4-month-old infants. *Music Perception* 20:187–94 (2002).

Tripp, G., and Wickens, J. R. Neurobiology of ADHD. *Neuropharmacology* 57:579–89 (2009).

Turkeltaub, P. E., Gareau, L., Flowers, D. L., Zeffiro, T. A., and Eden, G. F. Development of neural mechanisms for reading. *Nature Neuroscience* 6:767–73 (2003).

Turkheimer, E., Haley, A., Waldron, M., D'Onofrio, B., and Gottesman, I. I. Socioeconomic status modified heritability of IQ in young children. *Psychological Science* 14:623–28 (2003).

Uher, R., and McGuffin, P. The moderation by the serotonin transporter gene of environmental adversity in the etiology of depression: 2009 update. *Molecular Psychiatry* 15:18–22 (2010).

van IJzendoorn, M. H., Juffer, F., and Klein Poelhuis, C. W. Adoption and cognitive development: A meta-analytic comparison of adopted and nonadopted children's IQ and school performance. *Psychological Bulletin* 131:301–16 (2005).

Vanderschuren, L. J. M. J., Niesink, R. J. M., and van Ree, J. M. The neurobiology of social play behavior in rats. *Neuroscience and Biobehavioral Reviews* 21:309–26 (1997).

Volkmar, F., Chawarska, K., and Klin, A. Autism in infancy and early childhood. *Annual Review of Psychology* 56:315–36 (2005).

Voyer, D., Voyer, S., and Bryden, M. P. Magnitude of sex differences in spatial abilities: A meta-analysis and consideration of critical variables. *Psychological Bulletin* 117:250–70 (1995).

Wager, T. D., Phan, K. L., Liberzon, I., and Taylor, S. F. Valence, gender, and lateralization of functional brain anatomy in emotion: A meta-analysis of findings from neuroimaging. *NeuroImage* 19:513–31 (2003).

Wagner, R. K., Torgesen, J. K., Rashotte, C. A., Hecht, S. A., Barker, T. A., Burgess, S. R., Donahue, J., and Garon, T. Changing relations between phonological processing abilities and word-level reading as children develop from beginning to skilled readers: A 5-year longitudinal study. *Developmental Psychology* 33:468–79 (1997).

Wallen, K. Hormonal influences on sexually differentiated behavior in nonhuman primates. *Frontiers in Neuroendocrinology* 26:7–26 (2005).

Wang, R. F., Hermer, L., and Spelke, E. S. Mechanisms of reorientation and object localization by children: A comparison with rats. *Behavioral Neuroscience* 113:475–85 (1999).

Wang, S.-H., and Morris, R. G. M. Hippocampal-neocortical interactions in memory formation, consolidation, and reconsolidation. *Annual Review of Psychology* 61:49–79 (2010).

Wazana, A., Bresnahan, M., and Kline, J. The autism epidemic: Fact or artifact? *Journal of the American Academy of Child and Adolescent Psychiatry* 46:721–30 (2007).

Webster, R. *Why Freud Was Wrong: Sin, Science, and Psychoanalysis*. New York: Basic Books, 1995.

Weissbluth, M. *Healthy Sleep Habits, Happy Child*. 3rd edition. New York: Ballantine Books, 2003.

Welsh, D. K., Takahashi, J. S., and Kay, S. A. Suprachiasmatic nucleus: Cell autonomy and network properties. *Annual Review of Physiology* 72:551–77 (2010).

Werker, J. F., and Byers-Heinlein, K. Bilingualism in infancy: First steps in perception and comprehension. *Trends in Cognitive Sciences* 12:144–51 (2008).

Wheeler, S. C., and Petty, R. E. The effects of stereotype activation on behavior: A review of possible mechanisms. *Psychological Bulletin* 127:797–826 (2001).

Whitehurst, G. J., Falco, F. L., Lonigan, C. J., Fischel, J. E., Debaryshe, D. B., Valdez-Menchaca, M. C., and Caulfield, M. Accelerating language development through picture book reading. *Developmental Psychology* 40:395–403 (1988).

Willey, L. H. *Pretending to Be Normal: Living with Asperger's Syndrome*. London: Jessica Kingsley, 1999.

Williams, P. Cultural impressions of the wolf, with specific reference to the man-eating wolf in England. University of Sheffield, PhD thesis (2003).

Winberg, J., and Porter, R. H. Olfaction and human neonatal behaviour: Clinical implications. *Acta Paediatrica* 87:6–10 (1998).

Witt, M., and Reutter, K. Embryonic and early fetal development of human taste buds: A transmission electron microscopical study. *Anatomical Record* 246:507–23 (1996).

Witter, F. R., Zimmerman, A. W., Reichmann, J. P., and Connors, S. L. In utero beta 2 adrenergic agonist exposure and adverse neurophysiologic and behavioral outcomes. *American Journal of Obstetrics and Gynecology* 201:553–59 (2009).

Wittmann, M., Dinich, J., Merrow, M., and Roenneberg, T. Social jetlag: Misalignment of biological and social time. *Chronobiology International* 23:497–509 (2006).

Wolff, U., and Lundberg, I. The prevalence of dyslexia among art students. *Dyslexia* 8:34–42 (2002).

Wong, C. C. Y., Caspi, A., Williams, B., Craig, I. W., Houts, R., Ambler, A., Moffitt, T. E., and Mill, J. A longitudinal study of epigenetic variation in twins. *Epigenetics* 5:1–11 (2010).

Woodward, A. L. Infants selectively encode the goal object of an actor's reach. *Cognition* 69:1–34 (1998).

Yarmolinsky, D. A., Zuker, C. S., and Ryba, N. J. Common sense about taste: From mammals to insects. *Cell* 139:234-44 (2009).

Yin, W. G., and Weekes, B. S. Dyslexia in Chinese: Clues from cognitive neuropsychology. *Annals of Dyslexia* 53:255–79 (2003).

Zatorre, R. J., Chen, J. L., and Penhune, V. B. When the brain plays music: Auditory-motor interactions in music perception and production. *Nature Reviews Neuroscience* 8:547–58 (2007).

Zhang, T.-Y., and Meaney, M. J. Epigenetics and the environmental regulation of the genome and its function. *Annual Review of Psychology* 61:439–66 (2010).

Zhao, G. Q., Zhang, Y., Hoon, M. A., Chandrashekar, J., Erlenbach, I., Ryba, N. J., and Zuker, C. S. The receptors for mammalian sweet and umami taste. *Cell* 115:255-66 (2003).