



Infants to Adolescents: Research Update

A Digest of Current Research in the Field of Child and Adolescent Development

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Prenatal Development

Delaying Fatherhood May Be Risky

A team of researchers led by Sukanta Saha recently compared the cognitive outcomes for 33,437 full-term U.S. children born to fathers 14-66 years old and mothers aged 12-48. They report that older dads may have an increased risk of fathering children with cognitive delays.

The older the dad, the less well the child performed on numerous cognitive measures throughout childhood. These included tests of mental ability (8 months), general intelligence, conceptual and perceptual motor ability (age 4), and IQ, reading, understanding sentences, spelling, and computing (age 7). Having an older mom, in contrast, was associated with higher scores on each of those scales.

The authors point out that mutations occur when a sex cell divides. A woman's ova divide 22 times before she is born but then remain in that state until they're fertilized. A man's sperm cells divide throughout his life; 150 times by the time he's 20, on average; 840 times by the time he's 50. With each division, there's another chance for the sperm cell to be compromised. They believe that this may partly explain the differences.

It's important to note that the differences in this study were very small. Nevertheless, current studies have linked advanced paternal age with miscarriages, birth deformities, autism, schizophrenia, and cancer. This one shows that at least through the age of 7, subtle cognitive delays may be another part of the package. [Saha, S., Barnett, A. G., Foldi, C., Burne, T. H., Eyles, D. W., Buka, S. L., & McGrath, J. J. (2009). *PLoS Medicine*, 6, 3100040. e1000040. doi:10.1371/journal.pmed.1000040.]

Fetal Testosterone and Sex-Typed Behavior

There's a long-standing link between male-stereotypical (M-S) behaviors and prenatal exposure to male hormones. This is partly based on a condition called congenital adrenal hyperplasia (CAH), in which abnormally high levels of male hormones are produced before birth. Girls born with CAH are more likely than non-CAH girls to play with boys and to prefer toys and activities that are stereotypically male. Bonnie Auyeung and her colleagues now link M-S behaviors with prenatal hormones in a study with healthy children.

They measured the testosterone in the amniotic fluid of 212 fetuses between 11 and 21 weeks of gestation. When the children were 6-10 years old, their parents completed an inventory describing their children's sex-typical behaviors. Predictably, the boys had higher levels of testosterone in their amniotic fluid than the girls did.

The interesting finding is that the boys with high amniotic testosterone displayed more M-S behavior than those with low amniotic testosterone. The same held true for girls. This is the first study to show that for both sexes, the prenatal level of testosterone is related to later M-S behavior. [Auyeung, B., Baron-Cohen, S., Ashwin, E., Knickmeyer, R., Taylor, K., Hackett, G., & Hines, M. (2009). *Psychological Science*, 20, 144-148.]

Infants and Toddlers

Baby Face

Baby features such as a large forehead, chubby cheeks, and big, low-set eyes are universally perceived by humans as “cute.” Cuteness is thought to trigger nurturing behaviors that help to ensure the survival of helpless infants. But it’s not clear why we should respond this way. Reiner Sprengelmeyer and his research group wondered whether female hormones play a role.

To find out, they compared the cuteness sensitivity of British men and women of various ages. The participants saw pairs of baby faces that had been doctored to differ from the standards of cuteness by small gradations. Their task was to select the cuter face from each pair of photos in the series.

Young (19-26) and older (45-51) women were better able to identify the cuter baby than young (19-26) and older (53-60) men. But 53- to 60-year-old women performed on the same level as the men. Because women in this age range are apt to be menopausal, the researchers decided to test more specifically for this factor.

In a second study, they compared pre- and post-menopausal women. As expected, the postmenopausal women were less able to identify the cuter baby. Thus, there did seem to be hormonal involvement.

To back this up, a final study compared young women (none were mothers) who were or were not taking oral contraceptives. The increased levels of progesterone and estrogen seemed to raise the women’s sensitivity to cuteness.

The authors point out that we experience feelings of affection and warmth toward a cute baby. For women, female hormones may ensure that this response is at its peak during the childbearing years. Understanding this process may help us to develop interventions for premature or malnourished infants who lack the “Cuteness Factor.” [Sprengelmeyer, R. et al. (2009). *Psychological Science*, 20, 149-154.]

Rational Imitation

Imitation is important not only for social interactions; it’s also an early form of learning. A study by Zmyj, Daum, & Aschersleben shows that one of the thoughtful aspects of imitation develops by 12 months of age.

In the study, 9- and 12-month-olds watched videos of an adult turning on a lamp. This was done in an unusual way -- by the adult touching it with her head. In one video, her hands were free as she turned the lamp on. In a second, she put a blanket over her hands before turning it on. In a third, her hands were securely taped to the table. A control video showed her turning on the lamp by hand.

After the infants saw repetitions of one of the videos, the lamp was placed in front of them, and they were watched to see if they would try to turn it on with their heads.

The 9-month-olds didn’t imitate the head touching after any video. But 75% of the 12-month-olds tried to imitate the head touching of the adult whose hands were free. It’s no surprise that these infants were more likely to try head touching than infants who saw the lamp lit by hand. However, they were also more likely to try head touching than the infants who saw the adult with taped hands.

The authors speculate that by a year, infants may consider it reasonable to use one’s head when one’s hands are unavailable. When they see head touching without an obvious reason, however, they seem to think that it might be worth looking into. Copying the behavior seems to be a way of exploring this.

The 12-month-olds who saw the adult with hands blanketed didn’t show the same response. But in this ambiguous situation, the hands might have been interpreted as either unavailable or available. The authors believe that at this age the constraint needs to be quite obvious.

These findings support the idea that when 1-year-olds imitate others, they are sensitive to why a person performs a novel act. Unlike 9-month-olds, they think about what’s worth imitating. [Zmyj, N., Daum, M. M., & Aschersleben, G. (2009). *Infancy*, 14, 131-141.]

Quick Take

High socioeconomic status (SES) has been linked with superior vocabulary development in children. But videotapes of 14-month-olds and their parents showed a lot more gesturing between parents and infants with high SES than those with low SES. On average, high SES children expressed 24 different meanings in gestures, versus 13 for low SES children. Between 14 and 22 months, the parental gesture rates remained the same, but the infants increased their rates to match their parents. Analyses at age 4-1/2 showed that early parental gesturing may be part of the reason why high SES children have larger vocabularies than low SES children. [Rowe, M. L., & Goldin-Meadow, S. (2009). *Science*, 323, 951-953.]

What's Mine is Yours

Children first begin to show empathy and offer assistance at about a year of age. But spontaneous sharing is rare at that age. Celia Brownell and her colleagues note that sharing may be difficult because the child often ends up with less. To get around this, they studied no-cost sharing with 28 18- and 25-month-olds.

They placed each child at one end of a table across from an unfamiliar adult. On the table was an apparatus in which food treats (a raisin or cracker) could be placed. Two handles on the child's side of the apparatus could be pulled independently. One delivered a treat to the child; the other delivered one to both parties.

After the children were taught to use the handles, they were given 3 types of test trials. Before some, the adult expressed an interest in the treat saying, "I like [crackers]. I want a [cracker]." But in other trials, she looked at the treat, wore a neutral expression, and did not speak. In control trials, she was not present.

The 25-month-olds were just as likely to pull the sharing handle as the non-sharing handle when the adult was absent or silent. But when she expressed a clear interest in the treat, they were more likely to pull the sharing one. In contrast, the 18-month-olds did not share in any condition.

It seems that tots don't share voluntarily until two, even when it doesn't deprive them of anything. Moreover, the recipient had to make her desire clear. The 2-year-olds were not able to infer what might be an unexpressed desire.

Despite this limitation, there was evidence of developmental progress. The 2-year-olds showed both an appreciation of the adult's desires and the willingness to fulfill them. [Brownell, C. A., Svetlova, M., & Nichols, S. (2009). *Infancy*, 14, 117-130.]

Preschoolers and School-Aged Children

Ask Someone Who Knows

Do preschoolers think adults have all the answers? Not all the time, according to Mieke VanderBorgh and Vikram Jaswal.

They asked 65 3-, 4-, and 5-year-olds whether an adult or a child would know more about various toys (e.g., "Who would know where you play with this toy?") and foods (e.g., "Who would know why this food is good for you?"). For each question, the children chose between stick figures that represented a child and an adult.

Children of all ages thought that the adult could best handle most of the food questions and the child could best handle most of the toy questions. Thus, even the 3-year-olds understood that expertise may vary, depending on the domain.

The children could also consider mitigating evidence. When a toy was described as a favorite of the adult but new to the child, most children directed the question to the adult. And when food was described as a favorite of the child but new to the adult, most children directed the question to the child.

[VanderBorgh, M., & Jaswal, V. K. (2009). *Infant and Child Development*, 18, 61-71.]

Feeling Left Out

When adults feel left out, they often try to become more similar to the group that has excluded them. This seems to be a subconscious attempt to seek acceptance. Harriet Over and Malinda Carpenter wondered whether young children respond to ostracism in this way, too.

To study this, they showed 28 5-year-olds videos of shapes moving on a screen as though they were interacting socially. For example, one video showed three blue pentagons that seemed to be playing together. When a 4th pentagon appeared and tried to join them, they responded by moving away. After several tries, the 4th pentagon moved to the edge of the screen and remained there, as though in defeat. The same shapes were shown in control videos, but no social exclusion was implied.

After the videos were shown, an experimenter demonstrated 8 simple actions using a stick and a box (e.g., rotating the stick, dragging it along the lid of the box). The child was then given the objects and told, "Now you."

The children who saw the ostracism videos imitated more of the experimenter's actions than did the children who saw the control videos. The authors believe that they correctly interpreted the actions in their videos as the 4th pentagon being ostracized by its group. They think that this realization evoked a subconscious wish to be more like the model of their own group (represented by the experimenter). Becoming more like her would presumably lessen the possibility of their own exclusion.

It may also be that seeing the ostracism made them more alert to social information generally, which would help them recall more accurately the actions of the experimenter.

Whatever the case, the authors think that the response of the children is noteworthy because it was not they, themselves, who were being left out. That this sensitivity exists at such an early age would demonstrate the profound human need to belong. [Over, H., & Carpenter, M. (in press). *Developmental Science*.]

Quick Take

If a society emphasizes striving for excellence, are its children more apt to grow up to be economically productive? Support for this idea comes from an analysis of German and math textbooks of two German federal states that differed in economic power. The 2nd- and 9th-grade books used in the state with high economic standing and high student assessments included lots of imagery that stressed competition and praised success. Those used in the state with low economic standing and weak student assessments included much less achievement imagery. [Engeser, S., Rheinberg, F., & Möller, M. (in press). *Journal of Research in Personality*.]

Feeling Moral Disgust

Adults typically respond to the smell of rancid food or the sight of feces by feeling disgust. But the violation of moral codes disgusts us, too. Child abuse, for example, elicits strong feelings of revulsion in most adults. Hanah Chapman and her colleagues wondered whether these two reactions spring from the same base.

To test this, they used electromyographs to record the facial movements of adult participants as they drank noxious liquids; as they looked at photos of substances such as feces; and as they played a money-sharing game in which they were treated unfairly. The same facial movements (raising the upper lip and wrinkling the nose) occurred when the participants felt unfairly treated as when they drank foul-tasting liquids and saw unpleasant photos.

The authors think that the disgust we feel when moral codes are violated may originate with the primitive disgust of odors and tastes. Just as oral disgust guides us to reject hazardous foods, moral disgust may guide us to reject transgressions and transgressors. If so, our moral sense, like our disgust for dangerous substances, may have evolutionary roots.

At what point do children begin to show moral disgust? Judith Danovitch and Paul Bloom tested kindergartners, 2nd-, and 4th-graders to find out. In 2 studies, the children judged whether various behaviors were "disgusting." For all age groups, disgusting physical actions (e.g., putting your hand in

slime) were labeled “disgusting” more often than non-disgusting physical ones (e.g., putting your hand in water).

The children didn’t think that moral transgressions (e.g., stealing from a child) were as repugnant as disgusting physical actions. Still, there was *some* evidence of moral disgust. They found moral transgressions more disgusting than neutral actions such as accidentally breaking a friend’s toy. The children also made distinctions based on the severity of the violation. For example, they thought that stealing from a child was more disgusting than stealing from a supermarket.

Because even the kindergartners judged moral transgressions to be disgusting, the authors suggest that youngsters aren’t just speaking metaphorically when they call such actions “disgusting.” They note, however, that family language is a factor that this research did not address. Frequent use of the term “disgust” to describe moral transgressions may have played a role. [Chapman, H. A., Kim, D. A., Susskind, J. M., & Anderson, A. K. (2009). *Science*, *23*, 1222-1226; Danovitch, J., & Bloom, P. (2009). *Emotion*, *9*, 107-112.]

Grade-School Gambling

Recreational gambling in adolescence can predict high involvement in gambling in adulthood. But what predicts that? Pagani, Derevensky, and Japel think that impulsivity does.

They asked 163 Canadian 6th-graders how often they were involved in gambling-related activities (card-playing, bingo, buying lottery tickets, betting while playing video games of video poker, and betting on sports outcomes). Ratings of the children’s impulsivity (i.e., inattention, distractibility, and hyperactivity) were available from their kindergarten teachers.

The 5-year-olds who were the most impulsive became the 11-year-olds who gambled most often. For every 1-unit increase in kindergarten impulsivity, there was a 25% increase in the rate of gambling. This was true even when parental education, family dysfunction, and parental gambling habits were taken into account. The authors caution that unless children outgrow it, their early impulsivity may put them at risk for excessive gambling in adolescence and adulthood.

Other research has shown a link between impulsivity and gambling with children as young as 10. This study shows that impulsivity may predict gambling behavior long before it begins. (Pagani, L. S., Derevensky, J. L., & Japel, C. (2009). *Archives of Pediatric and Adolescent Medicine*, *163*, 238-243.]

Quick Take

Among 61 Dutch families and their 8- to 9-year-old biological offspring, moms tended to feel closer to children whose personalities matched their own and dads tended to feel closer to children who looked like them. The authors believe that this is rooted in evolution. Investing time and resources in one’s biological children increases the likelihood of genetic endurance. Whereas women can be sure a child is theirs, men cannot; hence their greater reliance on physical similarity to identify likely offspring. [Heijkoop, M., Dubas, J. S., & van Aken, M. A. G. (2009). *European Journal of Developmental Psychology*, *6*, 64-69.]

First Job

We generally think of early jobs as fostering independence and self-esteem. But a study of 5,147 5th-graders drawn from 3 large U.S. cities shows that early jobs may also have a down side. Rajeev Ramchand and his colleagues asked the youths about their jobs, their recent substance use, and their delinquent behaviors. Their parents provided information about ethnicity and family income.

About one in five (25% of boys, 17% of girls) had a job during the previous year. Most worked less than 5 hours a week. Yard work was the most common job (24%) followed by child care (17%). Cleaning and doing chores were also cited frequently.

Youngsters from less affluent families reported fewer jobs than those from more affluent families. Similarly, Hispanic and black youths reported fewer jobs than white or other minority youths. The more limited resources for helping these youngsters find jobs and/or the local opportunities to work may account for these differences.

Truancy and the use of inhalants were unrelated to job status. But holding a job was linked with several other negative behaviors. Compared to non-employed youngsters, youths with paying jobs were

twice as likely to smoke cigarettes, and 3 times as likely to smoke marijuana. They were also more apt to use alcohol, to have been in a fight, and to have attempted to run away from home.

The authors suggest that because working for pay is grouped with substance use and delinquency as “grown-up” behaviors, the latter activities may be especially enticing to some. For youths so inclined, having a paycheck and spending more time away from home make it easier to engage in these behaviors. The authors urge parents and clinicians to pay closer attention to children’s work lives, monitoring what they are doing and how their earnings are spent. [Ramchand, R. et al. (2009). *American Journal of Preventive Medicine*, 36, 297-303.]

Quick Take

Among 4,000 German 4th-graders, 44% of the children reported nightmares but only 29% of their parents were aware of them. The children who had nightmares reported that they often saw themselves as clingy and nervous in new situations whereas their parents didn’t see them that way. In other findings, frequent nightmares were linked to various sleep problems and girls reported more nightmares than boys did. The authors suggest that both child and parent reports be used to study children’s nightmares. [Schredl, M., Fricke-Oerkermann, L., Mitschke, A., Wiater, A., & Lehmkuhl, G. (2009). *European Child & Adolescent Psychiatry*, 18, 20-25.]

Pre-Adolescents and Adolescents

Grandparents Get Involved

As longevity improves, more and more children have living grandparents through the adolescent years. S. Attar-Schwartz and her colleagues wondered how this might relate to teens’ emotional well-being. Of particular interest was whether the relation between grandparent involvement and teen outcomes varies with family structure. Three types of families were compared: single-parent, two biological parents, and stepfamilies.

The researchers asked 1,515 11- to 16-year-olds from families in the U.K. to identify the grandparent to whom they felt the closest. To do this, the teens rated the extent to which a grandparent had cared for them, offered advice for the future, helped them financially, and taken part in their social and school activities.

For all types of families, the more involved the grandparents were, the less likely the teens were to report emotional problems and the more likely they were to be thoughtful, caring, and helpful with others. For teens with single- or step-parents, greater grandparent involvement was also linked with reduced conduct problems and for those with step-parents it was linked with fewer peer problems, as well.

The grandparents were involved to the same extent in all three family types. But the link between grandparent involvement and reduced overall teen problems was stronger for teens from single- and step-parent families than for those with two biological parents. (Note, however, that these were the teens who reported the most problems.)

The authors suggest that grandparents can be surrogates for stressed-out parents who are suddenly single and/or busy adapting to the new family arrangements, increased workloads, or time constraints that are apt to accompany family disruptions. During such times, grandparents may play a valuable role by providing continuity in care-giving. [Attar-Schwartz, S., Tan, J-P., Buchanan, A, Flouri, E., & Griggs, J. (2009). *Journal of Family Psychology*, 23, 67-75.]

Humiliation, Status, and Depression

How well teens respond to humiliation may be influenced by their social status. Researchers led by Cecilia Åslund asked 5,396 Swedish 9th- and 11th- graders how often in the past 3 months they had been ridiculed or insulted. The teens also estimated their parents' income level and social standing and rated their own standing among friends and schoolmates. Depression was assessed with a standardized scale.

Girls were more apt to report humiliating experiences, to rank themselves as having low-family status, and to feel depressed than boys were. But both boys and girls who were frequently humiliated were about 4 times as likely to feel depressed as those with few such experiences were.

Predictably, the teens who saw themselves as “beneath” their peers were at the greatest risk of depression. But adding humiliation to the mix revealed a twist. Frequently humiliated teens of both high- and low-status teens were about 5 times more likely to feel depressed than those of medium-status were.

It's thought that low status may contribute to chronic stress and may even alter neuroendocrine functions, leading to depression and other health problems. So it's not surprising that high humiliation, coupled with low status would be linked to depression.

But why high family status plus high humiliation should be linked with depression is curious. The authors think that students in high-status families may feel extra pressure to achieve. Fear of failing may add to the stresses that predict depression. Teens of medium status are more apt to feel in synch with their peers, which may help bolster their psychological health. [Åslund, C., Leppert, J., Starrin, B., & Nilsson, K. W. (2009). *Archives of Pediatric and Adolescent Medicine*, 163, 55-60.]

Downgrading Female Science Teachers

In kindergarten, girls and boys show equal interest in science. But somewhere in the next few years, they decide that science is really a boy's province. By the time they reach high school, their biases seem to extend to who should teach it.

Geoff Potvin and his colleagues analyzed surveys from 6,994 college students in introductory science courses. In the surveys, the students rated the teachers they had in their most recent high school science course. Their ratings covered factors such as the teacher's knowledge, enthusiasm, fairness, organizational ability, and classroom control. Grades from the students' college and high school science courses were also available.

The female students rated male teachers just as highly as the male students did for biology, chemistry, and physics. However, the female students rated female teachers lower than male teachers for physics and the males students rated them lower for all three courses. These differences remained significant even when teaching styles and teacher characteristics were taken into account.

The authors note that based on student outcomes, the female science teachers seemed to be just as effective as the male science teachers were. Just as many students of female teachers as students of male teachers went on to pursue science in college. Moreover, the students who had female teachers earned just as high grades in their college science course as the students who had male teachers.

These findings reveal a worrisome continuation of the science gender bias, primarily in males but also, to some extent, in females. The authors point out that the low representation of women in physics may be related to this. [Potvin, G., Hazari, Z., Tai, R. H., & Sadler, P. M. (in press). *Science Education*.]

Quick Take

Girls aren't alone in worrying about their body image. A survey of 3890 16-20 year-old Swiss males shows that about 25% enjoyed feeling hungry and/or worried about their weight or appearance. Another 20% reported that they had trouble controlling their eating or had forced vomiting. Compared with healthy boys, these boys were more likely to be in the academic track than in the vocational track. They were more apt to be overweight and depressed; to be frequently teased by peers; to have experienced early puberty and sexual abuse; and to have problems with delinquency, alcohol misuse, and violence. [Dominé, F., Berchtold, A., Akre, C., Michaud, P-A., & Suris, J-C. (2009). *Journal of Adolescent Health*, 44, 111-117.]

Smoking Teens to Blue Adults

We're not alone in feeling depressed. Rats seem to get depressed, too. Like humans, they lose interest in things they used to like and become less able to respond to stress. Sergio Iñiguez and his colleagues report that rats that were exposed to nicotine as adolescents show these symptoms of depression as adults.

They injected adolescent male rats with nicotine or saline over 15 days and tested them for depressive symptoms after 24 hours and when they were adults. A group of adult rats were similarly injected and tested 24 hours later.

Rats that were exposed to nicotine in adulthood did not show depression-like effects. But the rats that received nicotine injections (NI) in adolescence became depressed adults. This could be seen in their lower preference for sugar water over water compared to that of the saline-injected (SI) rats. They also showed a greater vulnerability to stress. Compared to SI rats, they spent more time in the closed-in areas of a stressful maze and indulged in more self-grooming while there.

Normal rats placed in water usually swim about and try to escape before eventually giving up. When put in this situation as adults, the NI rats made fewer swimming strokes and became immobilized more quickly and more profoundly than the SI rats. (Surprisingly, adolescents rats that were injected with nicotine for just one day showed these same changes in adulthood.)

As with humans, the depression-like state could be reversed. It responded to anti-depressant drugs as well as to more nicotine. This is consistent with the human response in which smoking functions as a stress reliever.

The authors believe that teens may be especially vulnerable to nicotine because the neurotransmitter system of the brain is still developing. Most smokers begin smoking during adolescence, a period often fraught with anxiety for teens. These findings suggest that while nicotine may provide temporary relief, it may take a toll in the long run. [Iñiguez, S. D., Warren, B. L., Parise, E. M., Alcantara, L. F., Schuh, B., Maffeo, M. L., Manojlovic, Z., & Bolaños-Guzmán, C. A. (2009). *Neuropsychopharmacology*, 1-16.]

Quick Take

Surveys at a large public university show that student alcohol use is related to college living arrangements. Students in the 4-student suites were more likely to drink alcohol often, to drink it heavily, and to drink it in their rooms than those in the 2-student rooms. In addition, the females on coed floors drank more alcohol and drank it more often than the females on all-female floors. [Cross, J. E., Zimmerman, D., & O'Grady, M. A. (in press). *Environment and Behavior*

About the Editors: Dr. Roder has a Ph.D. in Experimental Psychology from Tufts University. Dr. Sgan has a Ph.D. in Developmental Psychology from Cornell University. Both editors have conducted and published research and have extensive teaching experience. Both have reviewed manuscripts for a major publication in the field. While both editors are interested in the total spectrum of development from infancy to adolescence, Dr. Sgan's focus is primarily social and personality development and Dr. Roder's is perceptual/cognitive development. Both editors claim to have raised two semi-well-adjusted children and between them they claim six perfect grandchildren.

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