Chaos and Instability from Birth to Age Three

Stacey N. Doan and Gary W. Evans

Summary

Many children, especially those from lower-income families, face considerable instability early in their lives. This may include changes in family structure, irregular family routines, frequent moves, fluctuating daycare arrangements, and noisy, crowded, or generally chaotic environments. Moreover, instability and chaos affect young children's development both directly and, via their parents' and other caregivers' exposure to it, indirectly.

Unstable, chaotic environments make it more difficult for children to acquire self-regulatory skills, including self-control and planning, that help them manage their emotions and behaviors, write Stacey Doan and Gary Evans. And when caregivers themselves confront unpredictable events and unreliable circumstances that strain their own adaptive capacities, their ability to provide sensitive, nurturing care may be compromised.

In this article, Doan and Evans show us how social and physical chaos can influence early child development. They focus not only on micro-level factors in families and their immediate surroundings, but also on macro-level processes such as public policy. For example, social safety net programs that are designed to help families from disadvantaged backgrounds can sometimes inadvertently increase the instability and chaos in children's lives. The authors suggest how such programs could be redesigned to decrease rather than exacerbate instability. They also review promising interventions such as parenting programs that may help to reduce instability in children's home lives.

www.futureofchildren.org

Stacey N. Doan is an associate professor of psychology and director of the Berger Institute at Claremont McKenna College, and an adjunct associate professor of population health sciences at City of Hope National Medical Center. Gary W. Evans is the Elizabeth Lee Vincent Professor of design and environmental analysis and of human development at Cornell University's College of Human Ecology.

In characterizing environmental impacts on children's development, researchers distinguish between harshness and predictability.[1] *Harshness* refers to insufficient resources or threat, whereas *predictability* and *instability* refer to variation and consistency in experiences. Many researchers have focused on harshness in children's environments, but fewer have examined instability and unpredictability. Unpredictability operates at many levels of development, from everyday interactions with a primary caregiver to labor market instability that directly affects parents and communities. Moreover, in addition to its direct effects, instability can indirectly influence children's outcomes by compromising caregivers' ability to provide sensitive, nurturing care. To understand the role of unpredictability, researchers examine various types of social instability, including changes in marital status, residential changes, and the predictability and consistency of caregiving. They also look at chaotic environments characterized by noise, crowding, disorganization, and instability.[2] In this article, we detail how unpredictability at different levels affects children's development. The examples we've chosen aren't exhaustive, but they do illustrate the varied ways in which unpredictability shapes children's lives. (We don't include income instability, despite its great importance, because Christopher Wimer and Sharon Wolf cover that topic elsewhere in this issue.)

Theoretical Background

Chaos and instability influence early child development, both directly and indirectly. Being able to accurately predict the environment is fundamental to comprehending cause and consequence, and to developing self-efficacy or mastery—the belief that you can shape your surroundings to meet your needs. An environment that's consistent and predictable is needed to acquire self-regulatory skills, including self-control and planning, that help you manage your emotions and behaviors. Developmentally effective exchanges of energy between children and their surroundings require progressively more complex, reciprocal interactions. Routines and structure are a fundamental platform for circadian rhythm and adequate sleep.

Indirectly, when caregivers must themselves confront unreliable events and circumstances that strain their own adaptive capacities, their ability to sustain responsive and nurturing care of children is challenged. By definition, chaos and instability make it hard to depend on the resources required for personal equanimity and daily functioning. For children from birth to three, parenting behaviors and parent predictability may be some of the most crucial factors for healthy development.

Parenting Behaviors

Primary caregivers exert an inordinate amount of influence on children from birth to age three. Unpredictability in parenting behaviors can be described at the level of basic social interactions. Infants expect their mothers' responses to be predictable and sensitive to their own behavior. When maternal behavior is erratic or unpredictable, children tend to suffer. In one study, researchers examined the extent to which parental behavior is regular, systematic, and organized in moment-to-moment interactions. Unpredictable maternal behaviors when children were one year old was associated with worse cognitive

outcomes.[3] The study with humans was correlational rather than experimental, but when the authors conducted an analogous experiment with rats, they found impaired memory performance among rats that were exposed to higher levels of unpredictable maternal behavior (manipulated by limiting bedding and nesting material).

Predictability of maternal behavior also influences mother-child relationships. The quality of the relationship between infant and primary caregiver is often characterized in terms of attachment styles, with children who are securely attached having the best outcomes.[4] Unpredictable maternal behavior appears to disrupt the development of this bond.[5] Because attachment style develops in early childhood and is crucial to a wide range of outcomes—including physical health, social functioning, and coping mechanisms—this disruption is particularly problematic.[6]

Parents' predictability also affects children's behavior. For example, one experiment found that toddlers whose mothers disciplined them inconsistently—by both reprimanding them and providing positive attention for the same behavior—were most likely to misbehave and have higher levels of negative affect.[7] In another experimental study, schoolchildren hit one another less often when this behavior was met with consistent disapproval.[8] These experiments suggest that when parental discipline is inconsistent or variable, children are more likely to act out.

Finally, when parents' interactions in semi-structured play with their two-year-olds were more coordinated—for example, using familiar play routines such as taking turns or relying on familiar scripts such as reading at bedtime—children had better language skills both at the time and a year later, at 36 months.[9] This result was independent of the amount of mothers' speech or their sensitivity. It's likely that when children know what to expect, they can focus better and direct their attention to new information. Consistent routines and rituals lead to familiarity, which in turn leads to better learning outcomes in children.

Another way to think about parent predictability is whether children can expect adults to be reliable. In one experiment, researchers manipulated the reliability of the social context before engaging three-year-olds in the classic delayed gratification marshmallow task.[10] The children were given an art project for which they could either use materials that were merely adequate or wait a short time while the experimenter retrieved nicer materials. Half the children randomly then received the better option, and half were told that the experimenter had made a mistake and the other art supplies weren't available. The children were then instructed to go ahead and work on the art project. Subsequently, the children whose experimenter had been reliable waited four times longer when given the marshmallow task than did those who had the unreliable experimenter.

In addition to variability in behavior, variability in caregivers' mood influences early development. One study examined the link between predictability of mothers' mood during the prenatal period and its associations with children's negative affectivity over time. Higher entropy with regard to prenatal maternal mood was associated with a higher level of child negative affectivity at one, two, and seven years of age. These effects remained after controlling for pre- and postnatal mood levels, socioeconomic status, gestational age

at birth, and cohabitation with the child's father.[11]

Family Routines

Regular routines (such as consistent meal- and bedtimes) lead to positive developmental outcomes. But most research on this subject has been conducted with older children and, to the best of our knowledge, there are no experimental studies.[12] Family routines are thought to benefit children by providing organization and predictability and by reducing chaos. Regular routines and schedules likely help organize infants' daily biological rhythms, which in turn lay the foundation for higher-level learning.

Having basic physiological needs met is fundamental to children's development, and sleep is especially important both for physical health and growth and for psychological wellbeing.[13] For example, among 12-month-old boys, regular naptimes were positively correlated to mastery-oriented behaviors during a standard toy task.[14] Family routines appear to be crucial for children's sleep. Research suggests that such routines are inversely linked to nighttime wakening among two- to 13-month-old infants.[15] Adherence to bedtime routines has also been associated with more nighttime sleep at 36 and 42 months; the effect was particularly strong when parents' discipline practices were consistent during the day.[16]

Moreover, a lack of sleep routines at age three is associated with greater body fat both at the time and eight years later.[17] On the other hand, a lack of mealtime routines, namely distraction (noise, people coming to and leaving the table, or the presence of toys or books), can alter parents' healthy dietary practices. Such practices may include serving healthy foods at the dinner table as well as maternal feeding responsiveness during meals (for example, encouraging children to eat healthy food).[18] Taken together, then, the research suggests that family routines are important for behavioral development and physical health, perhaps because they add stability to children's lives.

Changes in Family Structure

The structure of American families has changed in the past few decades, with divorce and cohabitation becoming more common.[19] Though most children still live with two biological parents at any given time, more than half will experience an alternative family structure by the time they're 18 years old.[20] In general, research suggests that major transitional events like divorce play a pivotal, causal role in children's behavior, particularly regarding such outcomes as high school graduation, social-emotional adjustment, and mental health as adults.[21]

Though most children still live with two biological parents at any given time, more than half will experience an alternative family structure by the time they're 18 years old.

The nature, frequency, and timing of changes in family structure all interact to impact children's development more than the actual family structure itself. When biological fathers leave the family, they most commonly do so when a child is in the first

year of life; when they join the family, they typically do so in the child's first three years.[22] Exits and entrances of nonbiological fathers are associated with increases in antisocial behavior among children, while entrances of biological fathers reduce antisocial behavior among boys. And national birth cohort data suggest that when nine- to 24-month-olds in single-parent households gain either grandparents or a biological parent in the household, their cognitive abilities improve over time.[23] These findings suggest that the type of transition matters more than the transition itself.

In addition to the type of changes, timing matters. One study examined children who experienced instability at different points in their lives: between birth and the end of kindergarten (early childhood only), between first grade and the end of fourth grade (middle childhood only), and in both early and middle childhood. The study compared these children with others who experienced no instability (serving as the reference group).[24] Family instability in early childhood consistently predicted adverse outcomes, including greater loneliness, lower social competence, less popularity with peers, and more acting out. In contrast, family instability during middle childhood, or instability that occurred during both early and middle childhood, had little effect.

A study that examined cumulative family transitions during three development stages—early childhood, middle childhood, and early adolescence—found that instability in early childhood and in adolescence was associated with adolescent marijuana use.[25] Children who experienced parental relationship instability before age five were more likely at 16 years of age to report having had sexual partnerships or an episode of major depression during adolescence.[26] Other researchers used national data to examine family structural changes at ages zero to three years, four to six, six to eight, and nine to 12. They found that family structure changes in the first three years of life were more consistently related to children's behavior problems than were changes that occurred later.[27]

In sum, though some evidence suggests that instability in family structure can have negative outcomes for young children, the findings depend on a complex variety of factors, including the type of change and the timing. It's likely that the effects of these changes depend on the extent to which they compromise or promote the primary caregiver's ability to provide quality care for the child.

Changes in family structure can also lead to a host of other alterations in children's lives, including but not limited to residential instability.

Residential Instability

While moving isn't uncommon among US families, frequent changes in residence create instability that's associated with detrimental outcomes in children.[28] Residential instability can lead to other sources of instability, including changes in caregivers, schools, and neighborhoods, thus increasing the overall chaotic nature of children's primary environments. Like many risk factors, higher rates of mobility are more likely to affect families from disadvantaged backgrounds, due to forced displacement.[29] The effects of residential moves on children's development stem from a range of factors, including disrupted routines, loss of social support networks, disrupted school experiences, and increased

parenting stress accompanied by diminished parenting quality.[30]

There's little research on how residential instability affects children in their earliest years, but the data we do have suggest negative effects. Moving during the first trimester of pregnancy appears to be a risk factor for adverse birth outcomes, including low birth weight, preterm birth, and being small for gestational age.[31] Children who experience more than three moves before age four tend to have a higher body mass index (BMI), an indicator of body fat, than do children who experience no moves, even after controlling for a variety of potential confounding factors such as mothers' education, family income, parity, and mother's BMI before pregnancy.[32] The effects of residential mobility are likely moderated by individual personality characteristics: the effects are worse for children with high levels of emotionality, and for girls.[33] Family-level variables such as social support can also play a moderating role.[34]

Daycare Instability

Data suggest that 61 percent of US children under five are placed in some type of out-of-home childcare arrangement; nearly a quarter of preschoolers are cared for in organized facilities.[35] It's particularly relevant here that 39 percent of children under five, or over six million, experience irregular childcare arrangements (see the article in this issue by Ajay Chaudry and Heather Sandstrom).

In general, erratic childcare arrangements harm children's social-emotional development. Variability in childcare is linked to less-secure attachment behaviors with the mother, while staying with the same childcare provider is positively associated with attachment security to the caregiver.[36] Instability in childcare arrangements is also associated with greater problematic behavior at age four and in first grade, and negatively associated with social adjustment in prekindergarten.[37] Independently of a host of statistical controls, the number of different daycare arrangements beginning at four months predicts noncompliant behaviors at 24 months (though not at 36 months).[38] In a national sample of Canadian infants and toddlers (aged three and under) cared for outside the home, those with one or more changes in daycare in the previous year were 33 percent more likely to be categorized as having a difficult temperament. However, motoric and social developmental risks were unrelated to daycare changes.[39] In another sample, the number of childcare settings experienced by children between eight and 36 months was negatively associated with social adjustment in prekindergarten.[40] Multiple childcare arrangements in the first year of life predicted acting out in third and fourth grade and peer nominations for aggressive behaviors.[41] Though these studies weren't experimental, each was able to control for a range of factors that can influence the results, such as socioeconomic status.

Quasi-experimental studies, which compare groups of children, support the observational findings. Daycare stability between two and a half and four years of age was positively related to school readiness among low-income children, independently of a host of statistical controls.[42] In one study, researchers observed distress and problem behaviors for three to four weeks before and after infants were moved from one daycare center classroom to a new one with a new caregiver.[43] The transition increased such behaviors, unrelated to other factors such as

pre-move outcomes, socioeconomic status, or gender. Another study, using a national data set, found that changes in the number of concurrent, nonparental caregivers predicted both increased problem behaviors and fewer prosocial actions.[44] In a different form of daycare instability, fluctuations in the peer groups and childcare providers of six- to 30-month-olds were associated with teacher ratings of stress and apprehension, though this relation had dissipated 18 months later.[45]

As Chaudry and Sandstrom note elsewhere in this issue, multiple childcare arrangements are common, particularly among disadvantaged families, and many childcare providers themselves are working poor who are experiencing great financial pressure. Daycare providers' capacity to give children optimal care is often compromised by stress and anxiety related to their own financial instability.

Noise, Crowding, and Chaos

In addition to instability in social contexts, unpredictable environmental factors such as noise, crowding, and chaos are also associated with adverse child development.

Sleep disturbance from chronic noise exposure is well documented, with both behavioral and psychophysiological effects.

Noise

Background noise is everywhere, and noise—defined as unwanted or unattended sound, often at loud volumes—is common in young children's environments.[46] Noise can have many effects, such as impairing learning and perception as well as health.[47] Both cross-sectional and longitudinal data indicate that noise exposure can have negative consequences for children's cognitive development as early as six months through 42 months of age; some evidence suggests that the correlation is stronger in boys and in infants and toddlers with difficult temperaments.[48] In a study of children with a mean age of 28.2 months attending home daycare settings, noise levels were negatively associated with wellbeing—as assessed by experimenter ratings of children's flexibility, confidence, vitality, and pleasure—independent of setting quality, teacher competence, or multiple sociodemographic factors.[49] In a second study, this one of children in center daycare with a mean age of 34.5 months, using similar statistical controls, noise was again significantly related to ratings of wellbeing.[50]

Sleep disturbance from chronic noise exposure is well documented, with both behavioral and psychophysiological effects.[51] Community noise effects on sleep resemble those produced in laboratory studies. In a series of studies in Japan, researchers found that the majority of babies living in an area where noise levels were above a certain threshold had abnormal brain activity, suggesting disturbed sleep.[52] Similarly, in most epidemiological studies, low birth weight is associated with mothers' exposure to occupational and environmental noise, though the quality of research is poor.[53] Experimental work with animals, however, finds adverse noise impacts on birth outcomes along with evidence of stress-related neuroendocrine disruptions caused by noise exposure.[54]

One experimental study examined the role of noise when children from 12 to 36 months old played with toys. Each child was observed with the toys for 30 minutes with a television on (at typical listening volume) and off.[55] The investigators found significant television-related reduction in both length of play episodes and focused attention.

Another aspect of noise exposure that's relevant to early child development is how caregivers adapt to noisy environments. Not surprisingly, teachers and parents in noisier settings are more annoyed, more irritated, and less patient; they report higher levels of fatigue, and teachers report less job satisfaction.[56] Two studies found that parents in noisier home environments were less responsive to one-year-olds; in a different sample of one-year-olds, boys (but not girls) exposed to noise showed less mastery-oriented behavior in a standard play protocol.[57] In an experiment where background noise was manipulated by having a television on or off, parents interacted less with their children (both verbally and nonverbally) and were less responsive to them when the television was on.[58]

Given that language acquisition depends on speech perception, young children who spend a lot of time in noisy settings may be at risk for deficits in reading skills. In comparing two cohorts of children in a daycare center (median age 55 months) before and after extensive sound attenuation in the facility, researchers found that in the second year, after the sound attenuation work, children scored higher on phoneme recognition, an underlying cognitive skill for reading acquisition, and on teacher-rated language skills.[59] Similar improvements in reading acquisition have been documented in primary school children on the noisy side of a school adjacent to a train track following extensive sound attenuation; reading scores remained the same for pupils on the quiet side of the building.[60] And in an experiment, novel word learning among 22- to 30-month-olds was impeded by exposure to background noise, although older toddlers (32 to 36 months) were relatively unaffected.[61]

Crowding

Crowding, typically measured by the number of people per room, can occur either in the home or in school. The evidence suggests that crowding has both direct and indirect effects, and is negatively associated with a range of social and cognitive factors. Like noise, crowding can diminish a parent's ability to provide sensitive care. It's essentially another source of stress, shown to lead to higher levels of the stress hormone cortisol. In one study, more-crowded daycare centers, less space per child, and an unexpectedly large number of caregivers were all associated with greater increases in cortisol among 18- to 40-month-olds.[62] Like any source of stress, crowding can harm social functioning as well as cognitive development.

Crowding influences the social interactions of children and parents alike. Children in crowded nursery schools and those living in more-crowded homes exhibit more social withdrawal at school and are less likely to have formed a playmate bond there.[63] Both in laboratory studies and in manipulations of density in nursery schools, researchers found more social withdrawal in preschoolers who experienced crowding.[64] Among parents of toddlers, responsiveness is diminished in homes that are more crowded.[65] In turn, less-responsive parenting in crowded homes leads to less parent language diversity.[66] In two

large samples of three-year-olds in the United States and the United Kingdom, residential crowding was associated with less maternal responsiveness, which diminished children's basic cognitive skills.[67] Both of these field studies incorporated extensive statistical controls. These observational findings have been replicated in several laboratory studies and quasi-experimental field studies with older children.[68]

In addition to social withdrawal and poor-quality interactions, crowding also seems to increase disruptive behaviors. In a quasi-experimental analysis of a national sample of children from three to 12 years old, increases in residential density were related to increases in acting out and other conduct problems.[69] In a cross-sectional analysis of a different sample (three to 17 years) old with greater variability in residential density, the behavioral problems and overall health effects were replicated.[70] Both analyses included extensive controls for sociodemographic factors. However, another study found that home and daycare crowding in and of itself didn't lead to behavior problems; the researchers saw higher levels of behavioral problems only when crowding was evident at both home and daycare.[71]

Several observational studies reveal negative correlations between residential crowding during infancy and cognitive development.[72] A small number of studies with older children also reveal cognitive deficits caused by crowding. For instance, a time series study that experimentally altered room size among kindergarten children revealed that on-task behavior occurred for 88 percent of the time under low density periods and for 60 percent of the time under high density periods, in the same classrooms with the same students and teachers.[73]

Research also suggests that crowding is associated with aggression, but findings are mixed. Unexpectedly, in one study boys seemed slightly less aggressive when crowded.[74] But in another they were more aggressive when crowded.[75] Girls didn't display higher levels of aggression as a function of crowding in either study. Crowding is often associated with resources or, in the context of childcare, play and educational materials. Crowding seems to be associated with the greatest aggression when density levels are very high and when children have less access to play and educational materials.[76]

Chaos and Instability

As an aspect of the environment, chaos captures many factors—not just noise and density, but also cleanliness, clutter, and instability. Children's development of competency depends, in part, on having their basic physiological needs met (for example, sleep) and on having a predictable, reliable environment that fosters their understanding of the contingency between their own actions and environmental responses. Both of these are undoubtedly harder to come by in chaotic social and physical contexts. Indeed, for preschool children chaos can interfere with sleep, which in turn predicts outcomes such as helplessness.[77] Evidence also suggests that chaos affects the stress response system: among Head Start children, elevations in chaos from the beginning of the school year to the end have been found to be associated with higher levels of cortisol.[78] Long-term exposure to chaos is likely a source of chronic stress that disrupts the development of basic self-control in children.

Though we lack experimental studies with infants, several studies that followed children over time provide evidence of a detrimental relation between chaos and children's development. One study of a predominantly low-income sample measured chaos as a composite of residential density, noise exposure, cleanliness and clutter, and the household's level of preparation for the research team's home visit, recorded when children were two, six, 15, 24, and 36 months old.[79] This index negatively predicted language acquisition at age 36 months and at five years, after controlling for a large number of other factors. Other studies have found that household chaos in the first years of life leads to lower behavioral control in children measured at three to five years of age.[80] A dose-response relationship is apparent: one destabilizing event has no effect, but high levels of instability are associated with health problems and depression in caregivers and with attention/impulsivity problems in children.[81] These findings dovetail with the research showing that regular routines are beneficial for children.

Instability is another composite index that typically includes changes in family composition, residential location, childcare arrangements, and parents' work schedules. The cumulative effect of these changes is likely more detrimental than any single factor alone. Increased instability is negatively associated with a wide range of indicators, including academic, emotional, and behavioral functioning, and the impact is greater among children from more disadvantaged backgrounds.[82] Conversely, children who experienced decreased instability over a two-year period showed improvements in behavior.[83] Moreover, greater instability during childhood appears to influence interpersonal functioning during adolescence and adulthood.[84]

Policies and Interventions

Upstream policies and programs can play a pivotal role in the degree of chaos and instability in young children's lives. Unfortunately, interventions that specifically target predictability are rare—most programs are designed to promote healthy family functioning, or to improve living conditions for children broadly. Furthermore, the design and implementation of policies and programs may themselves influence the degree of chaos and instability in families' lives. Social safety net programs that are designed to help families from disadvantaged backgrounds generally focus on providing resources, but they rarely if ever consider how the programs' stipulations can inadvertently increase instability and chaos in children's lives. For example, to receive government benefits, families typically must be certified and recertified, with eligibility often tied to employment. These factors, along with administrative burdens, can lead to churn, resulting in unstable processes of enrolling and disenrolling, and unpredictable gaps in services. Administrative roadblocks to meeting and maintaining eligibility can shorten the length of time that families receive benefits, increase unpredictability, and heighten financial pressure. As another illustration, 58 percent of American women experience a change in health insurance coverage during their pregnancy, and 36 percent must contend with a change in coverage within six months after their child is born.[85] Moreover, as Christopher Wimer and Sharon Wolf document elsewhere in this issue, poverty is often accompanied by income instability, which has multiple adverse effects on young children. In table 1,

Table 1. How Programs and Policies Contribute to Family Instability

Programs/Policies	Contributions to Instability
Health insurance	Health insurance in the United States is often tied to a job, and it may be gained or lost for a variety of reasons, including employment, eligibility, or financial status. Insurance for prenatal and pediatric care is often sporadic; people enroll and disenroll as a result of fluctuating eligibility, as well as for procedural reasons common among disadvantaged families. Insurance instability reduces the use of preventative care for children as well as continuity of care.
Residential assistance	Programs such as Section 8 focus on providing housing for families via rental vouchers that families can use in any neighborhood. But if landlords can't be compelled to accept Section 8, finding stable housing with willing landlords can be a challenge and can lead to more moves.
Nutrition assistance	Nutrition assistance programs provide supplementary income to meet a family's food needs. The Supplemental Nutrition Assistant Program (SNAP), the largest program in the United States, serves about 45 million Americans. Unfortunately, it's often insufficient; families often run out of SNAP before receiving their next benefit. Moreover, preference for immediate usage can lead to elevated food insecurity at the end of the month, affecting children's development.
Work scheduling	Erratic work schedules affect about 10 percent of the workforce, mostly low-income families. Schedules that change with little notice can undermine economic security, upset family routines, wreak havoc on daycare provision, and generally make it hard to plan and schedule activities.

Source: Sean M. Orzol, Lauren Hula, and Mary Harrington, "Program Churning and Transfers between Medicaid and CHIP," *Academic Pediatrics* 15 (2015): S56–63, https://doi.org/10.1016/j.acap.2015.02.006; Thomas Buchmueller, Sean M. Orzol, and Lara Shore-Sheppard, "Stability of Children's Insurance Coverage and Implications for Access to Care: Evidence from the Survey of Income and Program Participation," *International Journal of Health Care Finance and Economics* 14 (2014): 109–26, https://doi.org/10.1007/s10754-014-9141-1; Ruth A. Lindberg et al., "Housing Interventions at the Neighborhood Level and Health: A Review of the Evidence," *Journal of Public Health Management and Practice* 16 (2010): S44–52, https://doi.org/10.1097/PHH.0b013e3181dfbb72; Susan M. Levin, Neal D. Barnard, and Rose E. Saltalamacchia, "A Proposal for Improvements in the Supplemental Nutrition Assistance Program," *American Journal of Preventive Medicine* 52 (2017): S186–92, https://doi.org/10.1016/j.amepre.2016.07.016; Chad Cotti, John Gordanier, and Orgul Ozturk, "When Does It Count? The Timing of Food Stamp Receipt and Educational Performance," *Economics of Education Review* 66 (2018): 40–50, https://doi.org/10.1016/j.econedurev.2018.06.007; Lonnie Golden, "Irregular Work Scheduling and Its Consequences," briefing paper, Economic Policy Institute, Washington, DC, April 9, 2015, https://www.epi.org/publication/irregular-work-scheduling-and-its-consequences/.

we provide examples of policies and programs that may inadvertently affect family stability.

Yet policies and interventions can improve families' stability if they're redesigned to consider predictability and stability more explicitly. For example, parenting-based interventions aim—through training, support, and education—to enhance or change parent behaviors through video or live modeling of skills, practicing such skills, and feedback.[86] Meta-analyses, where researchers combine results from a host of different studies, suggest that parenting-based interventions are generally effective at improving both parenting behaviors and children's outcomes, including social-emotional development and attachment.[87] While parenting programs don't specifically address unpredictability, a core component of most of them is to foster warmth and contingent responses to children's signals (which is closely related to predictability). A good example is Playing and Learning Strategies (PALS), an infant intervention program that focuses on

improving mothers' ability to be warm and supportive, to limit negative affect, and (of particular relevance here) to respond to children contingently.[88] In a randomized controlled trial, the PALS intervention improved mothers' responsiveness compared to that of a control group; in turn, this improved responsiveness predicted greater growth in infants' emotional and cognitive competency.

In one intervention specific to family routines, parents of Early Head Start (EHS) children were randomly selected to receive information and support to encourage regular bedtimes; a control group of EHS families didn't receive this information. The intervention increased routine bedtimes among two-year-olds by about 10 percent, though it wasn't successful for three-year-olds.[89] A similar experimental intervention reduced the frequency and duration of nighttime awakening among infants and toddlers and, not surprisingly, elevated mothers' mood.[90]

Several programs that focused on cultivating healthy marriages have demonstrated positive outcomes that may affect family stability. Bringing Baby Home, a psycho-educational program for couples transitioning to parenthood, aims to strengthen coping skills to prepare for the stress of a new baby. It offers support groups, education on marital satisfaction, and training for parent-child interactions, and it focuses on keeping fathers involved. Programs like this are particularly important because the transition to parenthood is a period of substantial stress associated with deterioration in relationships.[91] Randomized evaluations of Bringing Baby Home have found that compared to parents in a control group, both husbands and wives report higher rates of marital satisfaction and lower levels of depression and hostile affect.[92] Similarly, the Becoming a Family Project intervention study found that men who participated in a couples group reported more psychological involvement than men who didn't. Moreover, in contrast to the drop in marital satisfaction typically seen after a child is born, marital satisfaction levels remained stable. Perhaps most important, by the time the children reached 18 months of age, 12.5 percent of control group couples had separated or divorced, while all couples in the intervention group remained intact.[93] Overall, 72 couples participated, with 24 in the intervention group and the others serving as controls.

Despite higher rates of family instability among low-income families, few couple and relationship education programs have been designed to serve these groups. But several studies show that these interventions can improve marital satisfaction and foster relationship skills that may mitigate risk for divorce or separation. Data from the Supporting Healthy Marriage Project—a randomized, controlled trial of relationship education of 1,034 low-income couples—found that the intervention was associated with higher levels of relationship satisfaction and improved communication 30 months after the intervention ended.[94] However, the effects were generally small. Interestingly, Hispanic couples (the largest ethnic minority group in the sample) had larger and more consistent positive impacts than did non-Hispanic couples.[95]

Environmental design can also foster more predictability and routine in children's lives. Above we noted examples where

noise attenuation caused improvements in early reading skills. In the same way, architectural configuration of residential layouts can mitigate some of the negative impacts of crowding on psychological health caused by social withdrawal.[96]

Conclusions

The evidence generally suggests that young children have more adjustment problems when they face unpredictable and unstable environments. At the same time, however, we must take into account the specific characteristics of the particular environmental instability or unpredictability, along with children's characteristics and family resources. It's also important to emphasize that the bulk of the evidence is correlational, although the quasi-experimental or experimental evidence that's available converges well with the observational results.

We've described specific dimensions of the social and physical environment and examined how the temporal predictability of these factors is associated with child outcomes. We've also delineated different types of instability in order to describe their nature and potential impacts more clearly. Still, these various sources of instability tend to cluster together. For example, family structural instability often accompanies higher levels of residential mobility, and instability in parents' work schedules undoubtedly creates challenges for childcare arrangements.[97] Instability also clusters with other factors: for example, families who often move are also more likely to be moving from one disadvantaged neighborhood to another. Moreover, environmental instability interacts with other early developmental risk factors, accentuating their harmful impacts. For instance, high residential density amplifies the negative consequences of prematurity and low birth weight on both social-emotional and cognitive development among three-year-olds.[98]

The types of chaos and instability as well as their effects are likely impacted by children's age. Unpredictability and instability in primary caregivers are most detrimental for infants and toddlers, who rely heavily on those caregivers for all their needs. On the other hand, primary caregivers who continue to provide sensitive and nurturing care can likely buffer the effects of other forms of instability, such as moving. Thus caregivers' responses to chaos and unpredictability may be a critical pathway for adverse impacts on children aged three and under. It's worth mentioning that a decades-long research program on chaotic environments among rodents and primates reveals adverse impacts on maternal behaviors among both types of animal—impacts that in turn influence their offspring's behavior and stress biomarkers.[99] Residential instability is linked to school instability and diminished peer relationships, which may affect school-aged children and young adolescents more than infants and toddlers. We need more research, however, to better understand how developmental periods interact with chaos and instability to influence children's development.

Finally, instability isn't necessarily bad. Divorce from an abusive spouse, for example, is better for children in the long run. Children in families that move to better neighborhoods early in their childhood are likely to have better outcomes. And some degree of adversity is

necessary to learn how to manage emotions and behaviors. But when the challenges are highly variable, children's ability to acquire self-regulatory skills is likely compromised. Thus understanding the nature of change—voluntary or involuntary, planned or unplanned—will be important for future research. The current evidence suggests that instability, chaos, and unpredictable circumstances are stressful for parents and children early in life and produce a wide range of negative outcomes. Moreover, disadvantaged families who are also exposed to many other risks are precisely the families most likely to lack stable, predictable, and well-structured environmental conditions.[100] Policies and interventions that aim to help at-risk families need to account for the ways that chaos and instability influence early child development.

Endnotes

1. Bruce J. Ellis et al., "Fundamental Dimensions of Environmental Risk: The Impact of Harsh versus Unpredictable Environments on the Evolution and Development of Life History Strategies," *Human Nature* 20 (2009): 204–68, https://doi.org/10.1007/s12110-009-9063-7; Sheldon Cohen et al., *Behavior, Health and Environmental Stress* (New York: Plenum Press, 1986).

2. Emma K. Adam, "Beyond Quality: Parental and Residential Stability and Children's Adjustment," *Current Directions in Psychological Science* 13 (2004): 210–13, https://doi.org/10.1111/j.0963-7214.2004.00310.x; Gary W. Evans and Theodore D. Wachs, eds., *Chaos and Its Influence on Children's Development: An Ecological Perspective* (Washington, DC: American Psychological Association, 2010), https://doi.org/10.1037/12057-000.

3. Elysia Poggi Davis et al., "Exposure to Unpredictable Maternal Sensory Signals Influences Cognitive Development across Species," *Proceedings of the National Academy of Sciences* 114 (2017): 10390–5, https://doi.org/10.1073/pnas.1703444114.

4. Kenneth N. Levy et al., "Attachment Style," *Journal of Clinical Psychology* 67 (2011): 193–203, https://doi.org/10.1002/jclp.20756.

5. Beatrice Beebe et al., "The Origins of 12-Month Attachment: A Microanalysis of 4-Month Mother–Infant Interaction," *Attachment & Human Development* 12 (2010): 3–141, https://doi.org/10.1080/14616730903338985.

6. Judith A. Feeney, "Implications of Attachment Style for Patterns of Health and Illness," *Child: Care, Health and Development* 26 (2000): 277–88, https://doi.org/10.1046/j.1365-2214.2000.00146.x; Linda J. Luecken, "Childhood Attachment and Loss Experiences Affect Adult Cardiovascular and Cortisol Function," *Psychosomatic Medicine* 60 (1998): 765–72, https://doi.org/10.1097/00006842-199811000-00021; Gunilla Bohlin, Berit Hagekull, and Ann-Margret Rydell, "Attachment and Social Functioning: A Longitudinal Study from Infancy to Middle Childhood," *Social Development* 9 (2000): 24–39, https://doi.org/10.1111/1467-9507.00109.

7. Maureen M. Acker and Susan G. O'Leary, "Inconsistency of Mothers' Feedback and Toddlers' Misbehavior and Negative Affect," *Journal of Abnormal Child Psychology* 24 (1996): 703–14, https://doi.org/10.1007/BF01664735.

8. Douglas B. Sawin and Ross D. Parke, "Inconsistent Discipline of Aggression in Young Boys," *Journal of Experimental Child Psychology* 28 (1979): 525–38, https://doi.org/10.1016/0022-0965(79)90079-1.

9. Kathy Hirsh-Pasek et al., "The Contribution of Early Communication Quality to Low-Income Children's Language Success," *Psychological Science* 26 (July 2015): 1071–83, https://doi.org/10.1177/0956797615581493.

10. Celeste Kidd, Holly Palmeri, and Richard N. Aslin, "Rational Snacking: Young Children's Decision-Making on the Marshmallow Task Is Moderated by Beliefs about Environmental Reliability," *Cognition* 126 (2013): 109–14, https://doi.org/10.1016/j.cognition.2012.08.004.

11. Laura M. Glynn and Tallie Z. Baram, "The Influence of Unpredictable, Fragmented Parental Signals on the Developing Brain," *Frontiers in Neuroendocrinology* 53 (2019): article 100736, https://doi.org/10.1016/j.yfrne.2019.01.002.

12. Barbara H. Fiese, *Family Routines and Rituals* (New Haven, CT: Yale University Press, 2006).

13. Liat Tikotzky et al., "Sleep and Physical Growth in Infants during the First 6 Months," *Journal of Sleep Research* 19 (2010): 103–10, https://doi.org/10.1111/j.1365-2869.2009.00772.x; Nancy A. Hamilton et al., "Sleep and Psychological Well-Being," *Social Indicators Research* 82 (2007): 147–63, https://doi.org/10.1007/s11205-006-9030-1.

14. Theodore D. Wachs, "Specificity of Environmental Action as Manifest in Environmental Correlates of Infant's Mastery Motivation," *Developmental Psychology* 23 (1987): 782–90, https://doi.org/10.1037/0012-1649.23.6.782.

15. Lewis W. Sprunger, W. Thomas Boyce, and John A. Gaines, "Family-Infant Congruence: Routines and Rhythmicity in Family Adaptations to a Young Infant," *Child Development* 56 (1985): 564–72, https://doi.org/10.2307/1129746.

16. Angela D. Staples, John E. Bates, and Isaac T. Petersen, "Bedtime Routines in Early Childhood: Prevalence, Consistency, and Associations with Nighttime Sleep," *Monographs of the Society for Research in Child Development* 80, no. 1 (2015): 141–59, https://doi.org/10.1111/mono.12149.

17. Katherine E. Speirs, Janet M. Liechty, and Chi-Fang Wu, "Sleep, but Not Other Daily Routines, Mediates the Association between Maternal Employment and BMI for Preschool Children," *Sleep Medicine* 15 (2014): 1590–93, https://doi.org/10.1016/j.sleep.2014.08.006; Sarah E. Anderson et al., "Self-Regulation and Household Routines at Age Three and Obesity at Age Eleven: Longitudinal Analysis of the UK Millennium Cohort Study," *International Journal of Obesity* 41 (2017): 1459–66, https://doi.org/10.1038/ijo.2017.94.

18. Eileen FitzPatrick, Lynn S. Edmunds, and Barbara A. Dennison, "Positive Effects of Family Dinner Are Undone by Television Viewing," *Journal of the American Dietetic Association* 107 (2007): 666–71, https://doi.org/10.1016/j.jada.2007.01.014; Jaclyn A. Saltzman et al., "Associations between Father Availability, Mealtime Distractions and Routines, and Maternal Feeding Responsiveness: An Observational Study," *Journal of Family Psychology* 33 (June 2019): 465–75, https://doi.org/10.1037/fam0000519.

19. Lynne M. Casper and Suzanne M. Bianchi, *Continuity & Change in the American Family* (Thousand Oaks, CA: Sage, 2002).

20. Larry Bumpass and Hsien-Hen Lu, "Trends in Cohabitation and Implications for Children's Family Contexts in the United States," *Population Studies* 54 (2000): 29–41, https://doi.org/10.1080/713779060.

21. Sara McLanahan, Laura Tach, and Daniel Schneider, "The Causal Effects of Father Absence," *Annual Review of Sociology* 39 (July 2013): 399–427, https://doi.org/10.1146/annurev-soc-071312-145704.

22. Mitchell et al., "Family Structure Instability, Genetic Sensitivity, and Child Well-Being," *American Journal of Sociology* 120 (2015): 1195–1225, https://doi.org/10.1086/680681.

23. Yongmin Sun and Yuanzhang Li, "Alternative Households, Structural Changes, and Cognitive Development of Infants and Toddlers," *Journal of Family Issues* 35 (2014): 1440–72, https://doi.org/10.1177/0192513X13495399.

24. Shannon E. Cavanagh and Aletha C. Huston, "The Timing of Family Instability and Children's Social Development," *Journal of Marriage and Family* 70 (2008): 1258–70, https://doi.org/10.1111/j.1741-3737.2008.00564.x.

25. Shannon E. Cavanagh, "Family Structure History and Adolescent Adjustment," *Journal of Family Issues* 29 (2008): 944–80, https://doi.org/10.1177/0192513X07311232.

26. Kelly L. Donahue et al., "Early Exposure to Parents' Relationship Instability: Implications for Sexual Behavior and Depression in Adolescence," *Journal of Adolescent Health* 47 (2010): 547–54, https://doi.org/10.1016/j.jadohealth.2010.04.004.

27. Rebecca M. Ryan and Amy Claessens, "Associations between Family Structure Changes and Children's Behavior Problems: The Moderating Effects of Timing and Marital Birth," *Developmental Psychology* 49 (2013): 1219–31, https://doi.org/10.1037/a0029397.

28. Tim Jelleyman and Nicholas Spencer, "Residential Mobility in Childhood and Health Outcomes: A Systematic Review," *Journal of Epidemiology & Community Health* 62 (July 2008): 584–92, https://doi.org/10.1136/jech.2007.060103.

29. Matthew Desmond, Carl Gershenson, and Barbara Kiviat, "Forced Relocation and Residential Instability among Urban Renters," *Social Service Review* 89 (2015): 227–62, https://doi.org/10.1086/681091.

30. Adam, "Beyond Quality."

31. Julia C. Bond et al., "Residence Change during the First Trimester of Pregnancy and Adverse Birth Outcomes," *Journal of Epidemiology & Community Health* 73 (2019): 913–19, https://doi.org/10.1136/jech-2018-211937.

32. Tim T. Morris, Kate Northstone, and Laura D. Howe, "Examining the Association between Early Life Social Adversity and BMI Changes in Childhood: A Life Course Trajectory Analysis," *Pediatric Obesity* 11 (2016): 306–12, https://doi.org/10.1111/ijpo.12063.

33. Zolinda Stoneman et al., "Effects of Residential Instability on Head Start Children and Their Relationships with Older Siblings: Influences of Child Emotionality and Conflict between Family Caregivers," *Child Development* 70 (1999): 1246–62, https://doi.org/10.1111/1467-8624.00090; Lynn Magdol, "Is Moving Gendered? The Effects of Residential Mobility on the Psychological Well-Being of Men and Women," *Sex Roles* 47 (2002): 553–60, https://doi.org/10.1023/A:1022025905755.

34. Elizabeth M. Riina, Adam Lippert, and Jeanne Brooks-Gunn, "Residential Instability, Family Support, and Parent-Child Relationships among Ethnically Diverse Urban Families," *Journal of Marriage and Family* 78 (2016): 855–70, https://doi.org/10.1111/jomf.12317.

35. Lynda Laughlin, "Who's Minding the Kids? Child Care Arrangements: Spring 2011," *Household Economic Studies* (US Census Bureau, US Department of Commerce) (2013), https://www.census.gov/prod/2013pubs/p70-135.pdf.

36. Joan Suwalsky et al., "Continuity of Substitute Care in Relation to Infant-Mother Attachment," paper presented at the Annual Meeting of the American Psychological Association, Washington, DC, August 1986; Helen Raikes, "Relationship Duration in Infant Care: Time with a High-Ability Teacher and Infant-Teacher Attachment," *Early Childhood Research Quarterly* 8 (1993): 309–25, https://doi.org/10.1016/S0885-2006(05)80070-5.

37. Carollee Howes and Claire E. Hamilton, "The Changing Experience of Child Care: Changes in Teachers and in Teacher-Child Relationships and Children's Social Competence with Peers," *Early Childhood Research Quarterly* 8 (1993): 15–32, https://doi.org/10.1016/S0885-2006(05)80096-1; Verne R. Bacharach and Alfred A. Baumeister, "Child Care and Severe Externalizing Behavior in Kindergarten Children," *Journal of Applied Developmental Psychology* 23 (2003): 527–37, https://doi.org/10.1016/S0193-3973(02)00140-5; Carollee Howes, "Relations between Early Child Care and Schooling," *Developmental Psychology* 24 (1988): 53–7, https://doi.org/10.1037/0012-1649.24.1.53; Mary E. Bratsch-Hines et al., "Child Care Instability from 6 to 36 Months and the Social Adjustment of Children in Prekindergarten," *Early Childhood Research Quarterly* 30 (2015), https://doi.org/10.1016/j.ecresq.2014.09.002.

38. NICHD Early Child Care Research Network, "Early Child Care and Self-Control, Compliance, and Problem Behavior at Twenty-Four and Thirty-Six Months," *Child Development* 69 (1998): 1145–70, https://doi.org/10.2307/1132367.

39. Dafna E. Kohen, Clyde Hertzman, and Michele Wiens, "Environmental Changes and Children's Competencies," working paper W-98-25E, Human Resources Development Canada, Ottawa, ON, 1998.

40. Bratsch-Hines et al., "Child Care Instability."

41. Lise M. Youngblade, "Peer and Teacher Ratings of Third- and Fourth-Grade Children's Social Behavior as a Function of Early Maternal Employment," J*ournal of Child Psychology and Psychiatry* 44 (2003): 477–88, https://doi.org/10.1111/1469-7610.00138.

42. Susanna Loeb et al., "Child Care in Poor Communities: Early Learning Effects of Type, Quality, and Stability," *Child Development* 75 (2004): 47–65, https://doi.org/10.1111/j.1467-8624.2004.00653.x.

43. Debby Cryer et al., "Effects of Transitions to New Child Care Classes on Infant/Toddler Distress and Behavior," *Early Childhood Research Quarterly* 20 (2005): 37–56, https://doi.org/10.1016/j.ecresq.2005.01.005.

44. Taryn W. Morrissey, "Multiple Child-Care Arrangements and Young Children's Behavioral Outcomes," *Child Development* 80 (2009): 59–76, https://doi.org/10.1111/j.1467-8624.2008.01246.x.

45. J. Clasien De Schipper et al., "The Relation of Flexible Child Care to Quality of Center Day Care and Children's Socio-Emotional Functioning: A Survey and Observational Study," *Infant Behavior and Development* 26 (2003): 300–25, https://doi.org/10.1016/S0163-6383(03)00033-X.

46. Michel Picard, "Characteristics of the Noise, Reverberation Time and Speech-to-Noise Ratio Found in Day-Care Centers," *Canadian Acoustics* 32, no. 3 (2004): 30–1, https://jcaa.caa-aca.ca/index.php/jcaa/article/view/1612.

47. Lucy C. Erickson and Rochelle S. Newman, "Influences of Background Noise on Infants and Children," *Current Directions in Psychological Science* 26 (2017): 451–57, https://doi.org/10.1177/0963721417709087.

48. Theodore D. Wachs, Ina C. Uzgiris, and J. McVicker Hunt, "Cognitive Development in Infants of Different Age Levels and from Different Environmental Backgrounds: An Explanatory Investigation," *Merrill-Palmer Quarterly of Behavior and Development* 17 (1971): 283–317, https://www.jstor.org/stable/23084532.

49. Mariëlle Linting et al., "Threshold for Noise in Daycare: Noise Level and Noise Variability Are Associated with Child Wellbeing in Home-Based Childcare," *Early Childhood Research Quarterly* 28 (2013): 960–71, https://doi.org/10.1016/j.ecresq.2013.03.005.

50. Claudia D. Werner et al., "Noise in Center-Based Child Care: Associations with Quality of Care and Child Emotional Wellbeing," *Journal of Environmental Psychology* 42 (2015): 190–201, https://doi.org/10.1016/j.jenvp.2015.05.003.

51. Mia Zaharna and Christian Guilleminault, "Sleep, Noise and Health: Review," *Noise and Health* 12 (2010): 64–9, https://doi.org/10.4103/1463-1741.63205.

52. Yoshinori Ando and Hiroaki Hattori, "Effects of Noise on Sleep of Babies," *Journal of the Acoustical Society of America* 62 (1977): 199–204, https://doi.org/10.1121/1.381482.

53. Gordana Ristovska, Helga Elvira Laszlo, and Anna L. Hansell, "Reproductive Outcomes Associated with Noise Exposure—A Systematic Review of the Literature," *International Journal of Environmental Research and Public Health* 11 (2014): 7931–52, https://doi.org/10.3390/ijerph110807931; Mark J. Nieuwenhuijsen, Gordana Ristovska, and Payam Dadvand, "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Adverse Birth Outcomes," *International Journal of Environmental Research and Public Health* 14 (2017): 1252, https://doi.org/10.3390/ijerph14101252.

54. Ristovska, Laszlo, and Hansell, "Reproductive Outcomes."

55. Marie Evans Schmidt et al., "The Effects of Background Television on the Toy Play Behavior of Very Young Children," *Child Development* 79 (2008): 1137–51, https://doi.org/10.1111/j.1467-8624.2008.01180.x.

56. Gary W. Evans and Staffan Hygge, "Noise and Cognitive Performance in Children and Adults," in *Noise and Its Effects*, ed. Linda M. Luxon and Deepak Prasher (Chichester, UK: Wiley, 2007), 549–66.

57. Theodore D. Wachs and Ozlem Camli, "Do Ecological or Individual Characteristics Mediate the Influence of the Physical Environment upon Maternal Behavior," *Journal of Environmental Psychology* 11 (1991): 249–64, https://doi.org/10.1016/S0272-4944(05)80186-0; Feyza Corapci and Theodore D. Wachs, "Does Parental Mood or Efficacy Mediate the Influence of Environmental Chaos upon Parenting

Behavior?," *Merrill-Palmer Quarterly* 48 (2002): 182–201, https://doi.org/10.1353/mpq.2002.0006; Wachs, "Specificity of Environmental Action."

58. Heather L. Kirkorian et al., "The Impact of Background Television on Parent-Child Interaction," *Child Development* 80 (2009): 1350–59, https://doi.org/10.1111/j.1467-8624.2009.01337.x.

59. Lorraine E. Maxwell and Gary W. Evans, "The Effects of Noise on Pre-School Children's Pre-Reading Skills," *Journal of Environmental Psychology* 20 (2000): 91–7, https://doi.org/10.1006/jevp.1999.0144.

60. Arline L. Bronzaft, "The Effect of a Noise Abatement Program on Reading Ability," *Journal of Environmental Psychology* 1 (1981): 215–22, https://doi.org/10.1016/S0272-4944(81)80040-0.

61. Brianna T. M. McMillan and Jenny R. Saffran, "Learning in Complex Environments: The Effects of Background Speech on Early Word Learning," *Child Development* 87 (2016): 1841–55, https://doi.org/10.1111/cdev.12559; Justine Dombroski and Rochelle S. Newman, "Toddlers' Ability to Map the Meaning of New Words in Multi-Talker Environments," *Journal of the Acoustical Society of America* 136 (2014): 2807–15, https://doi.org/10.1121/1.4898051.

62. Alain Legendre, "Environmental Features Influencing Toddlers' Bioemotional Reactions in Day Care Centers," *Environment and Behavior* 35 (2003): 523–49, https://doi.org/10.1177/0013916503035004005.

63. Christine Liddell and Pieter Kruger, "Activity and Social Behavior in a Crowded South African Township Nursery: A Follow-Up Study on the Effects of Crowding at Home," *Merrill-Palmer Quarterly* 35 (1989): 209–26, https://www.jstor.org/stable/23086365.

64. Chalsa M. Loo, "The Effects of Spatial Density on the Social Behavior of Children," *Journal of Applied Social Psychology* 2 (1972): 372–81, https://doi.org/10.1111/j.1559-1816.1972.tb01288.x; Corinne Hutt and M. Jane Vaizey, "Differential Effects of Group Density on Social Behaviour," *Nature* 209 (1966): 1371–2, https://doi.org/10.1038/2091371a0; J. Wesley Burgess and W. Kyle Fordyce, "Effects of Preschool Environments on Nonverbal Social Behavior: Toddlers' Interpersonal Distances to Teachers and Classmates Change with Environmental Density, Classroom Design, and Parent-Child Interactions," *Journal of Child Psychology and Psychiatry* 30 (March 1989): 261–76, https://doi.org/10.1111/j.1469-7610.1989.tb00239.x; Penny L. Mcgrew, "Social and Spatial Density Effects on Spacing Behaviour in Preschool Children," *Journal of Child Psychology and Psychiatry* 11 (1970): 197–205, https://doi.org/10.1111/j.1469-7610.1970.tb01026.x; Wolfgang F. E. Preiser, "Work in Progress: Behavior of Nursery School Children under Different Spatial Densities," *Man-Environment Systems* 2 (1972): 247–50.

65. Robert H. Bradley and Bettye M. Caldwell, "The HOME Inventory and Family Demographics," *Developmental Psychology* 20 (1984): 315–20, https://doi.org/10.1037/0012-1649.20.2.315; Corapci and Wachs, "Parental Mood or Efficacy"; Theodore D. Wachs, "The Nature of the Physical Microenvironment: An Expanded Classification System," *Merrill-Palmer Quarterly* 35 (1989): 399–419, https://www.jstor.org/stable/23086393; Wachs and Camli, "Ecological or Individual Characteristics."

66. Gary W. Evans, Lorraine E. Maxwell, and Betty Hart, "Parental Language and Verbal Responsiveness to Children in Crowded Homes," *Developmental Psychology* 35 (1999): 1020–23, https://doi.org/10.1037/0012-1649.35.4.1020.

67. Gary W. Evans, John Eckenrode, and Lyscha A. Marcynyszyn, "Chaos and the Macrosetting: The Role of Poverty and Socioeconomic Status," in *Chaos and Its Influence on Children's Development: An Ecological Perspective.*, ed. Gary W. Evans and Theodore D. Wachs (Washington, DC: American Psychological Association, 2010), 225–38, https://doi.org/10.1037/12057-014.

68. Gary W. Evans, "Child Development and the Physical Environment," *Annual Review of Psychology* 57 (2006): 423–51, https://doi.org/10.1146/annurev.psych.57.102904.190057.

69. Claudia D. Solari and Robert D. Mare, "Housing Crowding Effects on Children's Wellbeing," *Social Science Research* 41 (2012): 464–76, https://doi.org/10.1016/j.ssresearch.2011.09.012.

70. Ibid.

71. Lorraine E. Maxwell, "Multiple Effects of Home and Day Care Crowding," *Environment and Behavior* 28 (1996): 494–511, https://doi.org/10.1177/0013916596284004.

72. Evans, Eckenrode, and Marcynyszyn, "Chaos and the Macrosetting."

73. Patricia J. Krantz and Todd R. Risley, "The Organization of Group Care Environments: Behavioral Ecology in the Classroom," paper presented at the annual meeting of the American Psychological Association, Honolulu, HI, 1972.

74. Loo, "Effects of Spatial Density."

75. Loo and Judi Smetana, "The Effects of Crowding on the Behavior and Perception of 10-Year-Old Boys," *Environmental Psychology and Nonverbal Behavior* 2 (1978): 226–49, https://doi.org/10.1007/BF01173771.

76. Rohe and Arthur H. Patterson, "The Effects of Varied Levels of Resources and Density on Behavior in a Day Care Center," in *Man-Environment Interactions: The State of the Art in Environmental Design Research—Proceedings of the Fifth Annual Environmental Design Research Association Conference*, ed. D. H. Carson (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1974), 161–71.

77. Eleanor D. Brown and Christine M. Low, "Chaotic Living Conditions and Sleep Problems Associated with Children's Responses to Academic Challenge," *Journal of Family Psychology* 22 (2008): 920–23, https://doi.org/10.1037/a0013652.

78. Eleanor D. Brown et al., "Economic Instability and Household Chaos Relate to Cortisol for Children in Poverty," *Journal of Family Psychology* 33 (2019): 629–39, https://doi.org/10.1037/fam0000545.

79. Lynne Vernon-Feagans et al., "Chaos, Poverty, and Parenting: Predictors of Early Language Development," *Early Childhood Research Quarterly* 27 (2012): 339–51, https://doi.org/10.1016/j.ecresq.2011.11.001.

80. Lynne Vernon-Feagans, Michael Willoughby, and Patricia Garrett-Peters, "Predictors of Behavioral Regulation in Kindergarten: Household Chaos, Parenting, and Early Executive Functions," *Developmental Psychology* 52 (2016): 430–41, https://doi.org/10.1037/dev0000087.

81. Dana Charles McCoy and C. Cybele Raver, "Household Instability and Self-Regulation among Poor Children," *Journal of Children and Poverty* 20 (2014): 131–52, https://doi.org/10.1080/10796126.2014.976185.

82. Paula Fomby and Andrew J. Cherlin, "Family Instability and Child Well-Being," *American Sociological Review* 72 (2007): 181–204, https://doi.org/10.1177/000312240707200203; Evans and Wachs, *Chaos and Its Influence.*

83. Brian P. Ackerman, Eleanor Brown, and Carroll E. Izard, "Continuity and Change in Levels of Externalizing Behavior in School Children from Economically Disadvantaged Families," *Child Development* 74 (2003): 694–709, https://doi.org/10.1111/1467-8624.00563.

84. Ohad Szepsenwol, Osnat Zamir, and Jeffry A. Simpson, "The Effect of Early-Life Harshness and Unpredictability on Intimate Partner Violence in Adulthood: A Life History Perspective," *Journal of Social and Personal Relationships* 36 (2019): 1542–56, https://doi.org/10.1177/0265407518806680.

85. Jamie R. Daw et al., "Women in the United States Experience High Rates of Coverage 'Churn' in Months before and after Childbirth," *Health Affairs* 36 (2017): 598–606, https://doi.org/10.1377/hlthaff.2016.1241.

86. Anilena Mejia, Rachel Calam, and Matthew R. Sanders, "A Review of Parenting Programs in Developing Countries: Opportunities and Challenges for Preventing Emotional and Behavioral Difficulties in Children," *Clinical Child and Family Psychology Review* 15 (June 2012): 163–75, https://doi.org/10.1007/s10567-012-0116-9.

87. Jennifer Wyatt Kaminski et al., "A Meta-Analytic Review of Components Associated with Parent Training Program Effectiveness," *Journal of Abnormal Child Psychology* 36 (2008): 567–89, https://doi.org/10.1007/s10802-007-9201-9.

88. Susan H. Landry, Karen E. Smith, and Paul R. Swank, "Responsive Parenting: Establishing Early Foundations for Social, Communication, and Independent Problem-Solving Skills," *Developmental Psychology* 42 (2006): 627–42, https://doi.org/10.1037/0012-1649.42.4.627.

89. Cheri Vogel et al., "Impacts of Early Head Start Participation on Child and Parent Outcomes at Ages 2, 3, and 5," *Monographs of the Society for Research in Child Development* 78, no. 1 (2013): 36–63, https://doi.org/10.1111/j.1540-5834.2012.00702.x.

90. Jodi A. Mindell et al., "A Nightly Bedtime Routine: Impact on Sleep in Young Children and Maternal Mood," *Sleep* 32 (2009): 599–606, https://doi.org/10.1093/sleep/32.5.599.

91. Carolyn Pape Cowan and Philip A. Cowan, "Interventions to Ease the Transition to Parenthood: Why They Are Needed and What They Can Do," *Family Relations* 44 (1995): 412–23, https://doi.org/10.2307/584997; Brian D. Doss et al., "The Effect of the Transition to Parenthood on Relationship Quality: An 8-Year Prospective Study," *Journal of Personality and Social Psychology* 96 (2009): 601–19, https://doi.org/10.1037/a0013969.

92. M. Robin Dion, "Healthy Marriage Programs: Learning What Works," *Future of Children* 15, no. 2 (2005): 139–56, https://www.jstor.org/stable/3556567.

93. Cowan and Cowan, "Interventions to Ease the Transition."

94. Hannah C. Williamson et al., "Effects of Relationship Education on Couple Communication and Satisfaction: A Randomized Controlled Trial with Low-Income Couples," *Journal of Consulting and Clinical Psychology* 84 (2016): 156–66, https://doi.org/10.1037/ccp0000056.

95. JoAnn Hsueh et al., *The Supporting Healthy Marriage Evaluation: Early Impacts on Low-Income Families* (Washington, DC: Administration for Children and Families, Office of Planning, Research, and Evaluation, 2012).

96. Gary W. Evans, Stephen J. Lepore, and Alex Schroeder, "The Role of Interior Design Elements in Human Responses to Crowding," *Journal of Personality and Social Psychology* 70 (1996): 41–46, https://doi.org/10.1037/0022-3514.70.1.41.

97. Dani Carrillo et al., "Instability of Work and Care: How Work Schedules Shape Child-Care Arrangements for Parents Working in the Service Sector," *Social Service Review* 91 (2017): 422–55, https://doi.org/10.1086/693750.

98. Robert H. Bradley et al., "Early Indications of Resilience and Their Relation to Experiences in the Home Environments of Low Birthweight, Premature Children Living in Poverty," *Child Development* 65 (1994): 346–60, https://doi.org/10.2307/1131388.

99. Jeremy D. Coplan et al., "Maternal Hypothalamic-Pituitary-Adrenal Axis Response to Foraging Uncertainty: A Model of Individual vs. Social Allostasis and the 'Superorganism Hypothesis,'" *PLoS ONE* 12 (2017): e0184340, https://doi.org/10.1371/journal.pone.0184340.

100. Gary W. Evans, "The Environment of Childhood Poverty," *American Psychologist* 59 (2004): 77–92, https://doi.org/10.1037/0003-066X.59.2.77.