Taking the Long View on Wellness

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Scientia

TAKING THE LONG VIEW ON WELLNESS

Nature vs. nurture is one of the oldest debates in biology. Are people's lives determined by their genes, their upbringing, or both? Nearly 30 years ago at the onset of the human genome project, scientists believed that once all human genes were known, all of human health would be explained. To the surprise of many, and the vindication of some, this has not been the case. Nurture plays a significant role in shaping the people we become.
Dr Jeffry Simpson and his research team at the University of Minnesota are trying to understand how our earliest experiences shape our lives into adulthood.

One of the greatest revelations of the past decade has been that genetics don't explain as much about human health and behaviour as many scientists once believed they would. A person's genome certainly lays the foundation for their unique traits, but perhaps unsurprisingly, the environment they grow up in still matters. How does early childhood shape our health and wellbeing as adults? Can we predict what a young child's health will be like in adulthood? What can parents do to offset a difficult childhood environment? Dr Simpson's research team is answering these questions.

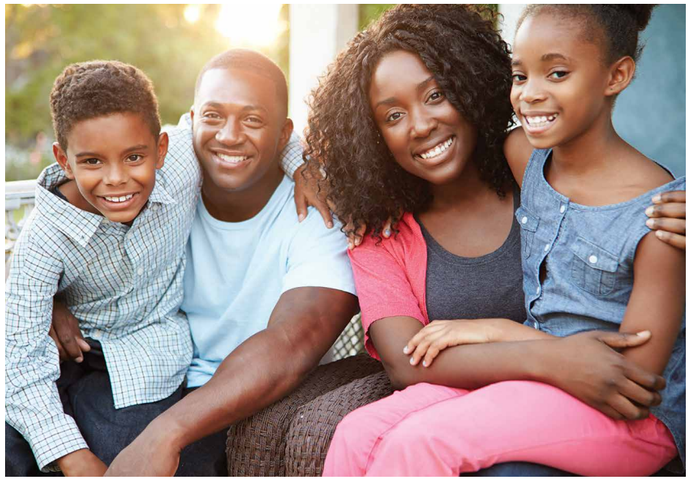
A Lifelong Approach

'I've always been interested in social development and how it shapes what people are like in adulthood,' Dr Simpson says of his work. Many scientists have wondered how childhood shapes our adult lives, but this process is exceedingly difficult to study in humans. It takes decades for a young child to develop into an adult, during which time the researchers themselves are also aging. Children enrolled in a study before they could talk may not be interested in continuing as adults, and maintaining a group of participants over such a long timeframe is difficult. Many researchers lose participants, lose funding, or lose resolve before enough data can be collected to create a meaningful picture of the effects of early life on adult health.

Dr Simpson's pursuit of this phenomenon has been different. His research team's commitment to pursuing these questions has permitted them to follow the same participant group of approximately 170 people for over 35 years now, and the dedication has paid off. The data from this group – researchers involved in the Minnesota Longitudinal Study of Risk and

Adaptation – is one of the most unique datasets in developmental psychology, as very few scientists have longitudinal data spanning the full lifetime of this many individuals. Dr Simpson and his research team are using this special dataset to observe and test hypotheses about how early life experiences shape adult health. They are beginning to be able to predict

'A growing body of research suggests that what happens to a person early in life may be systematically associated with the quality of his or her health years later. Very few studies, however, have followed people longitudinally across their lives. Our research team is doing so.'



which children will be at the highest risk for both psychological and physical ailments as adults and are illuminating the factors that may help to protect children who were raised in stressful environments.

Why study early childhood? As Dr Simpson explains, 'Early in development, our bodies and minds are developing and may be especially sensitive to early environmental events and experiences. This process is called biological programming… If individuals grow up in environments containing high levels of stress, a lot of interpersonal conflict, and fewer resources, the body and the mind must become "prepared" to deal with these environments as best they can.' Put simply, early childhood prepares the brain and the body for obstacles that will likely be faced later in life. Children growing up in difficult environments are subconsciously being 'trained' to deal with difficult environments as adults, which can take a toll on mental and physical health. Later dysfunctional behaviour and thought patterns can also generate distress, which may further elevate stress hormones known to be detrimental to the body and immune system.

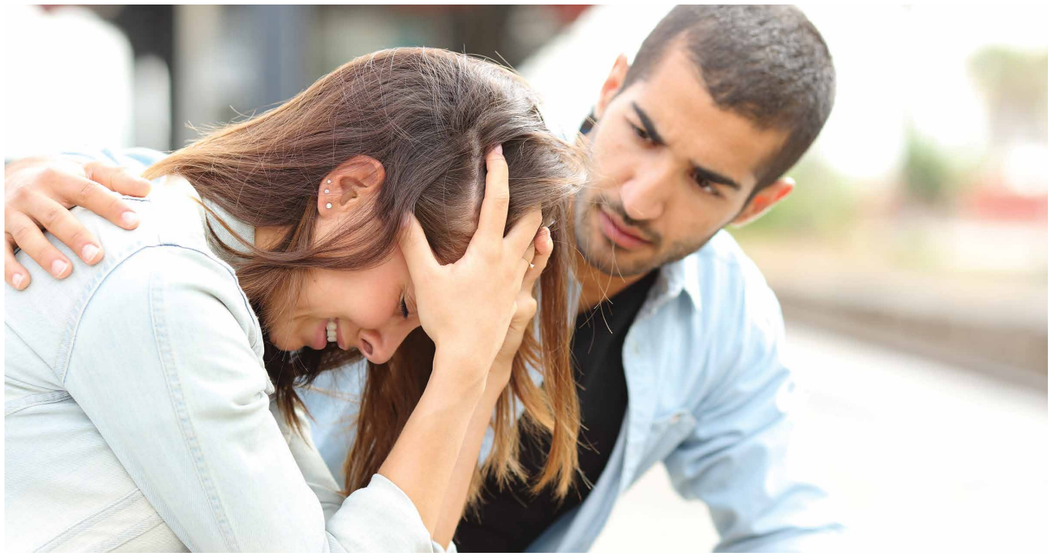
Early Relationships Matter

Parents are the centre of a young child's world and a child's relationship with his or her parents can be one of the earliest predictors of adult health. Attachment theory is one of the hallmark approaches to human development. Infants who are securely attached to their parents view their parents as a safe, trustworthy, and responsive base from which to confidently explore the world, knowing that they can return to the safety of mom or dad if they get scared. Conversely, infants with insecure attachments view their parents as unreliable, inconsistent, or poor sources of care, and may either anxiously cling to them, desperately demanding attention, or avoid them, apprehensively attempting to rough it on their own. Many psychologists have tied these early attachment patterns to similar patterns in adult relationships, but Dr Simpson and his colleagues were one of the first groups to demonstrate that infant attachment also predicts adult health outcomes. They observed attachment patterns in 163 infants, and predicted that those with insecure attachments to their parents early in life would be less healthy as adults. When they revisited these individuals in their early 30s, they found that, even when factors such as gender and socioeconomic status were controlled for, adults who had been insecurely attached as infants had significantly more health problems, particularly inflammation-related illnesses.

So are parents to completely blame? Not entirely. Dr Simpson and his colleagues predicted that some of the health problems associated with early childhood relationships may be related to overactive stress responses in adults who experienced poor maternal bonds as young children. In particular, they wanted to know whether a child's early relationship with his or her mother was linked to how she or he handled stress in adult romantic relationships. To find out, they examined a group of adults whose relationship with their mother had been assessed numerous times in early childhood, through repeated direct observations of mother-child interactions. When these people reached their mid-30s, Dr Simpson's team used an electrodermal activity monitor (a machine that measures physiological indicators of stress in real time) to observe their stress levels during interactions with their adult romantic partners. A clear pattern emerged: individuals whose mothers had been less sensitive and responsive to them as children showed more elevated stress responses during conversations with their partner involving conflict than individuals whose mothers had been more sensitive and responsive. These results held even when factors like relationship quality, gender, and socioeconomic status were accounted for. Less attentive mothers were linked with higher levels of adult stress during relationship conflicts 30 years later.

Unstable Environments & Windows of Influence

One of the patterns also emerging in these data was the influence of unpredictability and lack of consistency early in life. Children are most likely to develop insecure attachment patterns when parental behaviour is inconsistent. Mothers and fathers who are less sensitive to their children's needs are more likely to provide unpredictable responses. Dr Simpson and his team thus hypothesised that this element of environmental unpredictability may also play an important role in the development of negative health outcomes years later.



To study this, they looked at data from 220 individuals who had been studied from birth. Early life unpredictability, characterised by frequent moves, frequent changes in adults sharing the household, frequent parental job changes, along with overall harshness of the environment were measured when children were between ages of 0 to 16. They found that unpredictability between ages 0 and 5 was the strongest predictor of substance abuse by age 16 and criminal behaviour at age 23. Harshness also led to greater substance use at age 16, and the combination of unpredictability and harshness led to adults being most likely to engage in risky or criminal behaviour. Although these individuals also experienced unstable environments from ages 6 to 16, the impact was not as strong as during the earlier years.

Obviously, childhood stress matters for adult health, but it appears to matter more at an earlier age. Dr Simpson and his team wanted to know more about these windows of influence and were also curious about silver linings. His lab had demonstrated that poor parenting could worsen adult health, but could good parenting be protective in highly stressful and unstable environments? To answer these questions, his team examined 163 individuals on whom there was lifelong data. Participants and/or their parents had been interviewed at 16 different time-points throughout life to assess the overall level of stress in their environment. These measurements were then grouped into early childhood, middle childhood, adolescence, young adulthood, and current stress levels. Maternal sensitivity early in life had also been measured, as in the previous study. Participants' health was evaluated at age 32. An interesting pattern emerged. Viewed individually, stress levels early in life, in adolescence, and in adulthood predicted poorer adult health outcomes. Stress levels in middle childhood and young adulthood were not associated with adult health, nor was general cumulative stress. However, when stress occurred during both early life and adolescence, the worst adult health was observed. These findings indicate that both early childhood and adolescence might be 'sensitive windows' during development in regards to stress and health function.

Fortunately, a silver lining shone through: children living in stressful situations who also had sensitive mothers seemed to be insulated from the effects of stress. Attentive, stable parenting made up for stressful environments at all ages. These findings indicate that stress during periods of major developmental changes, especially early childhood and adolescence, may be the most damaging in terms of predicting adult health outcomes. However, reliable, sensitive parenting in childhood may be a protective factor, even if the overall environment is stressful. Parents can do damage, but they can also provide a safe haven during tough times.

Getting Specific

Dr Simpson's research team is not finished with this long-term study. At this point, many of the participants are in their early 40s and continuing to provide fascinating data. Recently, Dr Simpson received funding from the National Institute on Aging to delve even deeper into the physiology of this unique group of lifelong participants. This has allowed his laboratory to collect more detailed health measures, which has permitted them to examine markers of each participant's health and stress levels, such as levels of inflammation in their blood and their stress hormones. Dr Simpson and his team are combining this data, with the comprehensive information already collected from each individual's early life, in the hope of more clearly identifying windows of stress vulnerability, the specific health problems associated with different kinds and timing of early life stress, and understanding how variations in stress levels at specific life stages interact to create unique adult health profiles. 'Our long-range goal is to determine what kinds of early-life experiences uniquely predict certain kinds of health outcomes,' Dr Simpson summarises.

Scientists are just beginning to uncover relations between early life experiences and adult health outcomes. Research like Dr Simpson's is shaping child care practices and interventions that can have lifelong effects and someday may help us develop treatments to reverse the damaging effects of stressful and unstable childhood environments. As we better understand the interactions between our biology and the environment, it is becoming clear that both nature and nurture have lasting impacts on human health. By appreciating both aspects of our development, researchers will propel medicine forward and improve the quality of life worldwide.

Meet the researcher

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Dr Jeffry A. Simpson graduated Summa Cum Laude with an AB in Political Science and Psychology from the University of Illinois at Urbana-Champaign in 1981. He went on to receive a PhD in Psychology from the University of Minnesota, Twin Cities in 1986. After continuing on to a professorship at Texas A&M University following graduation, he eventually returned to the University of Minnesota, where he currently runs his laboratory and is the Director of Minnesota's Interpersonal Relationships Research Doctoral Minor program. Dr Simpson's research focuses on how early life experiences shape adult health and behaviour across the lifespan. His association with the Minnesota Longitudinal Study of Risk and Adaptation has allowed him and his research team to provide unique insights into the mystery of how our childhood shapes the people we grow up to be.

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