Birth trauma linked to adolescent suicide

Recently, a teenage girl was referred to psychologist Lee Salk as a potential suicide attempter. After observing her behavior and studying her family history, Salk, of Cornell University Medical College's psychiatry department in New York City, decided that the girl was trying to assert her independence from a domineering mother and was unlikely to try suicide. One factor that swayed Salk: The girl had undergone no complications at birth.

The case, he says, illustrates the results of a groundbreaking study that Salk, Lewis P. Lipsitt, professor of psychology at Brown University in Providence, R.I., and three others have published in the March 16 LANCET. The researchers report that infants who experience difficult births or whose mothers are ill during pregnancy are at considerably higher risk of suicide in adolescence than are other youngsters.

The findings strikingly and ironically suggest that medical advances that have saved so many infants who would haved died of respiratory failure in the past may also have helped create a group of youngsters who are later unable to cope with the stresses of adolescent life. "It's most interesting," says Salk, "that suicide rates for teenagers and young adults have risen 300 percent in 30 years at the same time infant mortality has fallen."

In their study of the records of 52 adolescents who committed suicide and 104 young people in two control groups matched for age and socioeconomic background, Salk and his colleagues found that 60 percent of the suicide victims had experienced one or more of three major risk factors around the time of birth: respiratory distress at birth for more than one hour—19 percent for suicide victims vs. 4 to 8 percent for controls; lack of prenatal care for the first 20 weeks of pregnancy—31 percent vs. 4 to 12 percent; and chronic disease in the pregnant mother—21 percent vs. 0 to 6 percent.

These are not *direct* causes of suicide, the researchers stress, but they do appear to contribute to later predisposition to suicide. "We have no way of knowing what mechanisms are at work, but we can speculate," Salk says. The lack of prenatal care could suggest an unwanted pregnancy, he says, an attitude that can carry on through life. Both maternal illness and infant respiratory problems could render a child less able—physically and psychologically—to adjust to the family and environmental pressures of adolescence.

Lipsitt, who has previously linked such apparently "minor" birth-related risks to sudden infant death syndrome, says the suicide study results are "another indication that ... children who start off life in jeopardy behave differently ... In turn, people [including their parents] may act differently toward them." This "reciprocating spiral of interaction," he says, can conceivably contribute to later problems, including suicide.

This belief is shared by Alan L. Berman, professor of psychology at American University in Washington, D.C., and president of the Denver-based American Association of Suicidology. "Early trauma may change the relationship between parent and child," said Berman, who had not seen the LANCET study.

The study results hold out promise that some suicides might be preventable by allowing clinicians to spot the early warning signs in a youngster's birth record. At the same time, however, the findings offer another chilling possibility: "We tend — and this is not an ethical judgement—not to favor the weak," Salk says. It might be, he speculates, that there is a "strange" set of "natural checks and balances" at work; children who previously would have died at birth are now being rescued and allowed to live. "Maybe nature," Salk says, "meant it not to be this way."

Lipsitt emphasizes that "it is important to realize that most children at risk do not go on to commit suicide." He adds, however, that "one could say we have gone beyond nature with our technology in saving some infants who would not have been saved. And it behooves us to look at the developmental consequences of that technology." —*J. Greenberg*

Laser cooling: Putting atoms on ice

In experiments reminiscent of "Star Wars" on a microscopic scale, two teams of researchers have for the first time succeeded in using the fine touch of a laser beam to bring a stream of speeding atoms to a halt. They did it by shining precisely tuned laser light into the face of an onrushing beam of free, neutral sodium atoms.

These experiments open the way for trapping neutral atoms within pockets created by electrical or magnetic fields. Stationary or slowly drifting atoms may spend enough time within the traps to allow extremely precise measurements of their spectra — the frequencies at which the atoms absorb or emit light. Normally, any atomic movement tends to broaden, shift or blur these spectral lines. Until now, only ions (atoms with a net electrical charge) could be trapped and would stay put long enough for such exact observations to be made.

"Right now, the technique we have is suitable for providing nearly stopped atoms for loading into magnetic or laser traps," says William D. Phillips of the National Bureau of Standards (NBS) in Gaithersburg, Md. Phillips, Harold Metcalf of the State University of New York at Stony Brook and their colleagues describe their method in the March 11 PHYSICAL REVIEW LETTERS.

In this technique, a laser beam, tuned to one of the resonance frequencies at which sodium atoms absorb light, is fired directly at a narrow beam of sodium atoms that initially have an average speed of about 1,000 meters per second. For each photon absorbed, an atom slows down by a certain amount. It takes about 30,000 photons to bring a given sodium atom to rest.

But, just as the pitch of a train's whistle changes when the oncoming train slows down (the Doppler effect), so too the atomic resonance frequency shifts slightly as atoms slow down. If the shift is too large, the atoms no longer absorb laser light and stop slowing down. To compensate for this effect, the researchers use a magnetic field that gradually varies along the length of a solenoid through which the sodium beam passes. This magnetic field brings an atom's resonance frequency back to a level at which laser light can be absorbed.

"If the magnetic field changes too rapidly, then the atoms can't absorb light fast enough to keep up with the change in the field and they go out of resonance," says Phillips. "We've carefully designed the field gradient so that that doesn't happen. The deceleration of the atoms automatically adjusts itself so that it occurs at exactly the rate necessary to keep up with the change in the magnetic field."

A rival technique, reported in the same journal and developed at the Joint Institute for Laboratory Astrophysics in Boulder, Colo., also uses the idea of laser "cooling"—slowing atoms to speeds that correspond to temperatures well below 1 kelvin (close to absolute zero). However, instead of using a spatially varying magnetic field along the length of a solenoid to compensate for the Doppler effect, this group of reseachers changes the frequency of the laser light. If an atom happens to absorb too many photons, it automatically stops absorbing until the frequency of the laser catches up.

So far, both techniques have been tried only on sodium atoms. "No one would be serious about making a practical frequency standard with sodium atoms," says Phillips. However, "it might be possible to make a lot of very slow cesium atoms and to use them in very much the same way as they're now used in atomic clocks."

John L. Hall and the Boulder group are more expansive. They report, "We expect that the near future will offer some delicious and bizarre advances in the art of manipulating atoms." —*I. Peterson*