

## O. Ivar Lovaas: Pioneer of Applied Behavior Analysis and Intervention for Children with Autism

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**Abstract** O. Ivar Lovaas (1927–2010) devoted nearly half a century to ground-breaking research and practice aimed at improving the lives of children with autism and their families. In the 1960s, he pioneered applied behavior analytic (ABA) interventions to decrease severe challenging behaviors and establish communicative language. Later, he sought to improve outcomes by emphasizing early intervention for preschoolers with autism, provided in family homes with active parental participation. His studies indicated that many children who received early intensive ABA made dramatic gains in development. Lovaas also disseminated ABA widely through intervention manuals, educational films, and public speaking. Moreover, as an enthusiastic teacher and devoted mentor, he inspired many students and colleagues to enter the field of ABA and autism intervention.

**Keywords** Autism · Applied behavior analysis · Early intervention · Behavior modification · Lovaas

Many people regard the name *O. Ivar Lovaas* as synonymous with applied behavior analysis (ABA) and ABA as an intervention specifically for children with autism. Lovaas tried to dispel this one-dimensional view whenever he could by crediting his own accomplishments to mentors

such as Don Baer and by extolling ABA interventions for individuals with many different needs, not just those with autism. Nevertheless, his extraordinary achievements in helping children with autism, ground-breaking clinical practices, commitment to testing the efficacy of these practices, knack for popularizing his work, and charismatic personality ensured his prominence (Figs. 1, 2).

Lovaas was born in Norway in 1927, immigrated to the U.S. in 1950 and received his Ph.D. in psychology from the University of Washington in 1958. He stayed on as an acting assistant professor for 3 years, teaching and conducting research at the Child Development Institute. In 1961, he accepted a position as an assistant professor in the UCLA Psychology Department, where he spent the remainder of his career. Lovaas died at the age of 83 on August 2, 2010.

Lovaas did not develop an interest in children with autism until he was in his thirties, soon after he arrived at UCLA. However, from that time until near his death, he devoted almost a half century to improving the lives of these children. Lovaas' interest in children with autism came about accidentally. His initial research at the University of Washington had been on how a person's language may influence other behavior, a process later described as instructional control or rule-governed behavior. At UCLA, Lovaas sought to extend this research by studying how to teach language to children who had communication delays and testing the effects of improved language on other behavior such as social interaction. Searching for children with communication delays, he visited a clinic for children with autism, where he became convinced that he had found the ideal group for his work.

During the next year, Lovaas was referred only one client, Beth. To fill his laboratory space, he and his students devoted 6 h per day, 5 days a week, to Beth. Indeed,

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**Fig. 1** Ole Ivar Lovaas (1927–2010)

Lovaas admitted that, during this period, he spent more time with Beth than he did with his own children. However, the situation turned out to be pivotal for his research because the close work with Beth allowed him to develop a system to score multiple behaviors simultaneously and in real time, and use single-subject experimental designs to start developing interventions.

Beginning in 1965, based on this early work, Lovaas published a remarkable series of articles that transformed ABA and services for autism. The initial two articles presented his system for coding behaviors during direct observations and a pioneering investigation of antecedents and consequences that maintained a problem behavior, a forerunner of what is now called experimental functional analysis. Lovaas and his colleagues soon built on the methodological foundation from these studies, as they reported the first demonstration of an effective way to teach nonverbal children to speak, a study on establishing social (secondary) reinforcers, a procedure for teaching children to imitate, and several studies on interventions to reduce life-threatening self-injury and aggression.

Although Lovaas always emphasized positive reinforcement above all, he resorted on rare occasions to contingent aversives. The aversives included low doses of electric shock for life-threatening self-injury or aggression displayed by institutionalized children with autism in the 1960s and slaps on the thigh for less urgent but still devastating problem behaviors displayed by children with autism in their homes in the 1970s and 1980s. The rapid reduction of even the most horrifying behavior—children’s punching themselves hard in the face thousands of times every hour, chewing off their fingertips, smashing their heads against the sharpest object available, or poking their eyes—helped prove that children with autism were sensitive to consequences, contrary to the conventional wisdom in the 1960s. Moreover, the identification of a quick and



**Fig. 2** Fieldwork in Behavior Modification class, UCLA, c1992. Lovaas in *back row, far left*

effective intervention was crucial in showing that children with autism did not need to be confined to a hospital but could live in their communities. Yet the question was always whether the ends justified the means and whether Lovaas was brave or reckless for administering aversives. By the late 1980s, Lovaas felt the issue had become moot because non-aversive interventions had become so sophisticated and successful that aversives were no longer necessary, at least for the young children in his clinic. Accordingly, he stopped using them at that time. However, his espousal of aversives over a period of many years remains a controversial part of his legacy.

In 1973, Lovaas and his colleagues published one of the first long-term follow-ups of ABA intervention. Lovaas was heartbroken when he saw that most of the children with autism had reverted to their pre-intervention levels of functioning, losing their gains in language, social interaction, and play when they went back to the hospital settings where they and most other children with autism lived at the time. Along with his colleagues, he proposed several ways to improve outcomes such as starting intervention during the children's preschool years instead of later in childhood or adolescence, involving parents in the intervention, and implementing the intervention in the family home rather than an institutional setting. However, even in the *Journal of Applied Behavior Analysis*, where the follow-up study appeared, reviewers doubted that there was much empirical basis for Lovaas and colleagues' proposals for increasing the effectiveness of ABA. After much back and forth between Lovaas and the editors, the study was eventually published with a postscript in which the reviewers acknowledged the great importance of the study but also pointed out its limitations as a source of evidence for refining ABA interventions.

By the time the 1973 study appeared, Lovaas had already stopped working in hospitals and started his home-based early intervention clinic, the UCLA Young Autism Project. Meanwhile, he continued to report ground-breaking findings. Notably, in 1971, along with Bob Koegel and Laura Schreibman, he showed that many children with autism have a learning style that can hinder them from learning important skills and generalizing these skills outside the intervention setting. Lovaas and colleagues called this style stimulus overselectivity, which is demonstrated when participants respond to only one detail of a multifaceted stimulus, such as when attending to a person's shoes only when learning the differences between boy and a girl. They published several additional studies on this topic during the 1970s, as well as a study on the nature and significance of echolalia.

In 1987, Lovaas published the study for which he is now best known: the report entitled "Behavioral Treatment and Normal Educational and Intellectual Functioning in Young

Autistic Children," which appeared in the *Journal of Consulting and Clinical Psychology*. This report indicated that children with autism who received early intensive ABA achieved vastly better outcomes than similar children who received little or no ABA. Provocatively, Lovaas described 9 of the 19 intensively treated children as "normal-functioning" and possibly even recovered. In so doing, he challenged the prevailing belief that, although children with autism might be able to learn isolated skills, they would always be delayed and socially isolated. The study sparked passionate debate. While some hailed it as a breakthrough, others vigorously criticized the methodology and argued that it was an exaggeration to describe the children with the most favorable outcomes as "normal functioning."

In the 1990s, Lovaas built on the 1987 study by co-authoring a long-term follow-up of children in the 1987 study, as well as several replication studies. He also obtained two federal grants to support replications by other investigators. He continued to publish important work until he was in his late seventies, notably a long-awaited revision of his intervention manual. His efforts helped gain widespread acceptance for early intensive ABA, despite ongoing debate over the quality of research on this intervention and the magnitude of its effects.

Over his long career, many aspects of Lovaas's research had clear precedents in the ABA literature. His perseverance in searching for effective interventions was inspired by B. F. Skinner. Lovaas' system for coding direct observations owed much to Don Baer, Sid Bijou, and others at the University of Washington. His analyses of antecedents and consequences were strongly influenced by investigators such as Ted Ayllon and Israel Goldiamond. His use of discrete trial training, which is a highly structured teaching format for one-on-one teaching, was borrowed from Todd Risley, who, along with Mont Wolf and Hayden Mees, reported the initial study on ABA for children with autism in 1964. Lovaas's inclusion of parents as active participants in the intervention dovetailed with what others began to do in the late 1960s and early 1970s. However, Lovaas was the first to put these separate activities together to form a comprehensive treatment approach and empirically evaluate this approach.

In addition to synthesizing existing ABA principles and research, Lovaas introduced many innovations. From the early 1960s onward, he sought to provide 30–40 h per week of individual teaching to children with autism—far more than was customary. In so doing, he drew upon isolated case reports from 19th century special educators, especially Jean Marc Gaspard Itard, who worked virtually all day for many months with Victor, the so-called "Wild Boy of Aveyron." Still, Lovaas may have been the first to adopt this practice as a standard policy. Critics worried that

so many hours of intervention would overburden children and families, especially when Lovaas applied it to preschool children in the UCLA Young Autism Project. They also questioned the extent to which available data justified recommending 40 h per week, as opposed to some lower amount such as 20–25 h. Despite having little objective evidence to counter these criticisms, Lovaas became more and more insistent over time that, if children with autism are to have the same learning opportunities that are available to typically developing children, who learn all day every day, they must have 40 h.

Another innovation was the recruitment of undergraduate students and sending them to the family home to implement the intervention. This was a bold move, considering the risks of sending students out into communities and relying on them as the primary therapists. However, with appropriate precautions in place, especially provisions for ensuring adequate oversight by project directors, the use of students turned out to be a brilliant solution to the quandary of how to enlist the large numbers of bright, highly motivated people needed to run a 40 h per week program. Variations of this strategy have become commonplace in ABA intervention programs.

Alongside his research and clinical innovations, Lovaas devoted much of his energy to advocacy on behalf of autism and popularization of ABA. In the 1960s, he helped found the parent organization now called the Autism Society of America. He also became a strong proponent of moving children (and adults) with autism from large institutions into small group homes. Together with several of his graduate students, he undertook a large project to support this movement by instructing group home providers to implement ABA interventions. Subsequently, as many children in the Young Autism Project successfully entered general education classes in public schools, he also became a proponent of inclusion in these classes.

Lovaas' popularizations included one of the first films on ABA, produced in 1969 to show interventions for teaching language to children with autism. This film, along with a 1988 film on the UCLA Young Autism Project, introduced generations of undergraduates to ABA. Lovaas also published two of the first ABA intervention manuals in 1977 and 1981 (the latter accompanied by videotapes illustrating the intervention approaches), with a revision in 2003. These manuals laid out how and what to teach, thereby making ABA accessible to many families and providers. Always quotable and not shy about extolling the

benefits of ABA, Lovaas was profiled in many media outlets such as *Life*, *Rolling Stone*, the *New York Times*, and the *CBS Evening News*. He also conducted numerous workshops and conferences for parents and providers.

In the UCLA community, Lovaas was a popular instructor who entertained and instructed undergraduates with his loud, tenor voice, strong Nordic accent, mischievous laugh, and rollicking stories about the relevance of ABA to all sorts of activities from dating to milking cows in cold weather to salmon swimming upstream to spawn. His students saw a charismatic, passionate, breath-taking, and gifted man. After taking his introductory classes, many leaped at the opportunity to complete a practicum in the UCLA Young Autism Project. Those who were lucky enough to go on to work more closely with him, including his graduate students, collaborators, and staff, got to know a more complicated person than they might have anticipated from his exuberant public persona. His capacity for praising motivating, and supporting his students was vast, but he could also be immensely critical and harsh. His extreme excitement for a project or idea could suddenly vanish for no obvious reason. Although his often unpredictable moods and change of focus could be disheartening to students and colleagues, they reflected the intensity of his search for clinically important and creative ideas. Following his advice (and sometimes starting over again from scratch) almost always resulted in improved projects and gave collaborators tools they needed to establish themselves as independent investigators or clinicians. Former students such as Bob Koegel, Laura Schreibman, and Ted Carr have become leaders in research on ABA for children with autism. Others such as Jim Varni and Dennis Russo have made major contributions to research on other clinical populations. Still others such as John McEachin, Ron Leaf, Jacquie Wynn, and Doreen Granpeesheh have opened large, thriving practices.

While equating Lovaas with ABA is far too simplistic, he was a larger than life figure who arguably did as much as or more than anyone else to improve the lives of children with autism and their families, who did his utmost to ensure that the ABA interventions developed by him and others receive the attention and respect they deserve, and who brought many students into the field to build on his prodigious contributions.

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