

Autism

L I F E

# Autism

- A highly individualized behavior disorder
  - Communicative impairment
  - Social impairment
  - Stereotyped behavior

# Communicative Impairments

- delayed or lack in development of vocal language,
  - *no or few words or gestures,*
- impairment in initiation or maintenance of conversation,
  - *tangential, noncontextual conversation,*
- stereotyped and repetitive language or idiosyncratic language,
  - *repeated phrases, echolalia, or preoccupation with topics,*
- lack of varied, spontaneous, developmentally appropriate play,
  - *impaired dramatic, make-believe, or imitative social play,*

# Social Impairments

- impaired use of multiple nonverbal social behaviors to regulate social interaction,
  - *ineffective eye contact, facial expressions, body postures, and gestures,*
- lack of developmentally appropriate peer relationships,
  - *lack of cooperative play, lack of mutual friendships,*
- lack of spontaneous sharing of enjoyment, interests, or achievements,
  - *does not show objects of interest to others, or seek to involve others in play,*
- lack of social or emotional reciprocity,
  - *lack of mutual conversations or empathy,*

# Stereotyped Responses

- abnormally encompassing preoccupation with interests, *perseverative staring at or play with items, or discussion,*
- inflexible adherence to routines or rituals, tendency to rote vs. generalized learning, *tantrums or self-injures when a routine is not followed precisely,*
- stereotyped, repetitive body movements, *hand-flapping, finger-twisting, complex body movements,*
- persistent preoccupation with parts of objects, *gazing at moving lights, listening to sounds, stimulus overselectivity,*

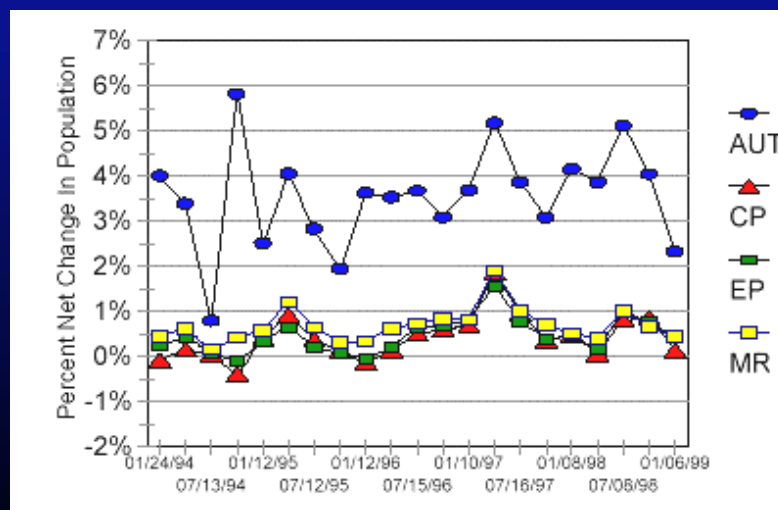
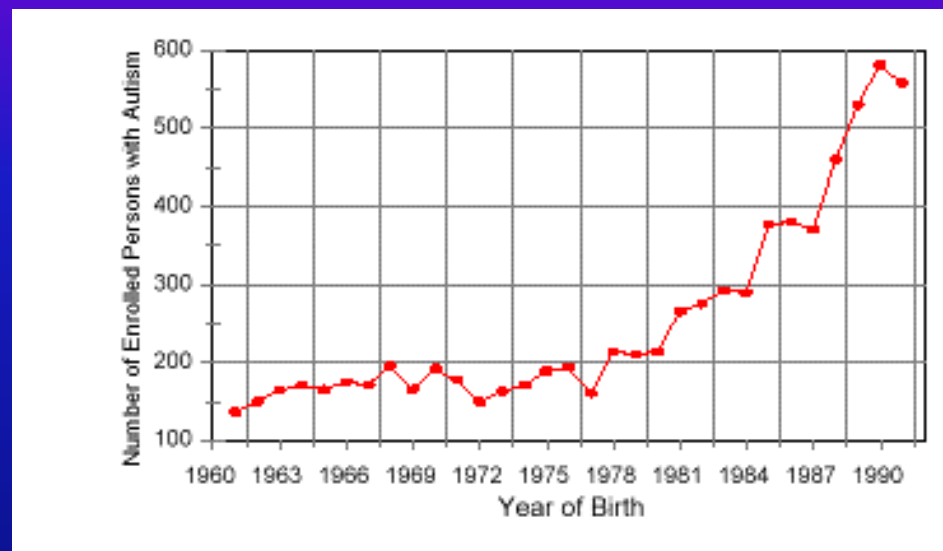
# Etiology of Autism

- The Syndrome of Autism Spectrum Disorder
  - Behavior is over-determined
    - Multiple biological factors
      - Nutrition
      - Physical health
    - Interaction with exacerbating diseases
      - Gastric disorders
    - Interaction of genetic and environmental causes
    - Neurodevelopmental processes
  - Identified genetic types
    - Fragile X
    - Rett
    - Phenylketonuria
    - Williams
    - Landau Kleffner
  - Organized at the level of behavior

# Trends, Prevalence, and Clusters

## Autism

- 100% ↑ Autism over 30 years
- 210% ↑ Autism in California DSS System: 1987-1998
- 400% ↑ Above nation: Prevalence in Brick Township, NJ



# Cellular Events in Neurodevelopment

## Events:

- Division
- Migration
- Differentiation
- Formation of synapses
- Pruning of synapses
- Apoptosis
- Myelination

**Active  
throughout  
childhood &  
adolescence**



Prenatal Period (Months)                      Postnatal Period (Years)  
 0 1 2 3 4 5 6 7 8 9      Birth 1 2 3 4 5 6 7 8 9 10

**Cell Proliferation**



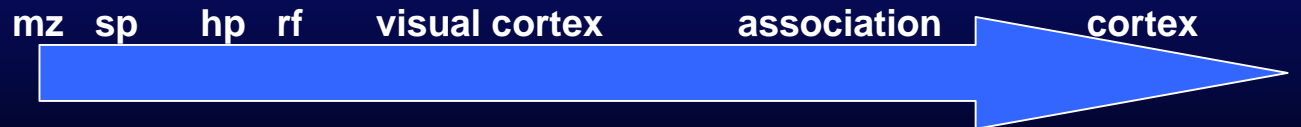
**Migration of Neurons**



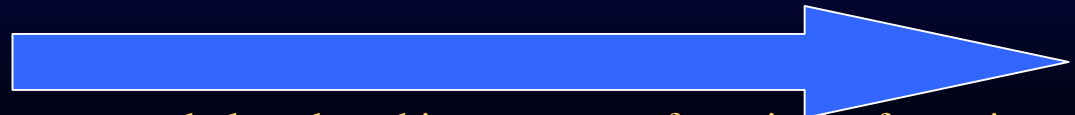
**Subplate Neurons**



**Synapse Formation**



**Myelination**

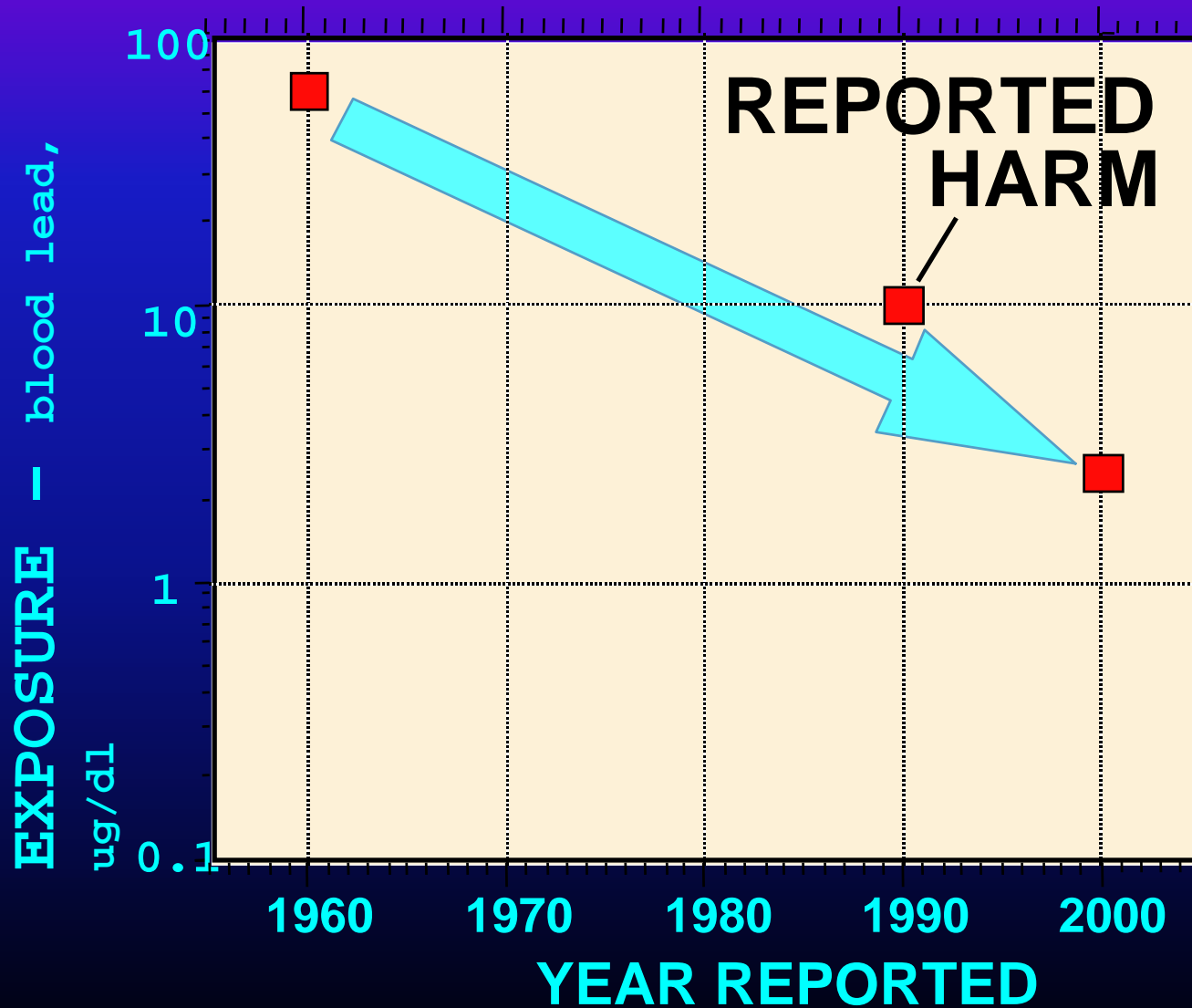


Key: mz – marginal zone; sp – subplate; hp – hippocampus; rf – reticular formation

# Specific processes disrupted by neurodevelopmental toxicants

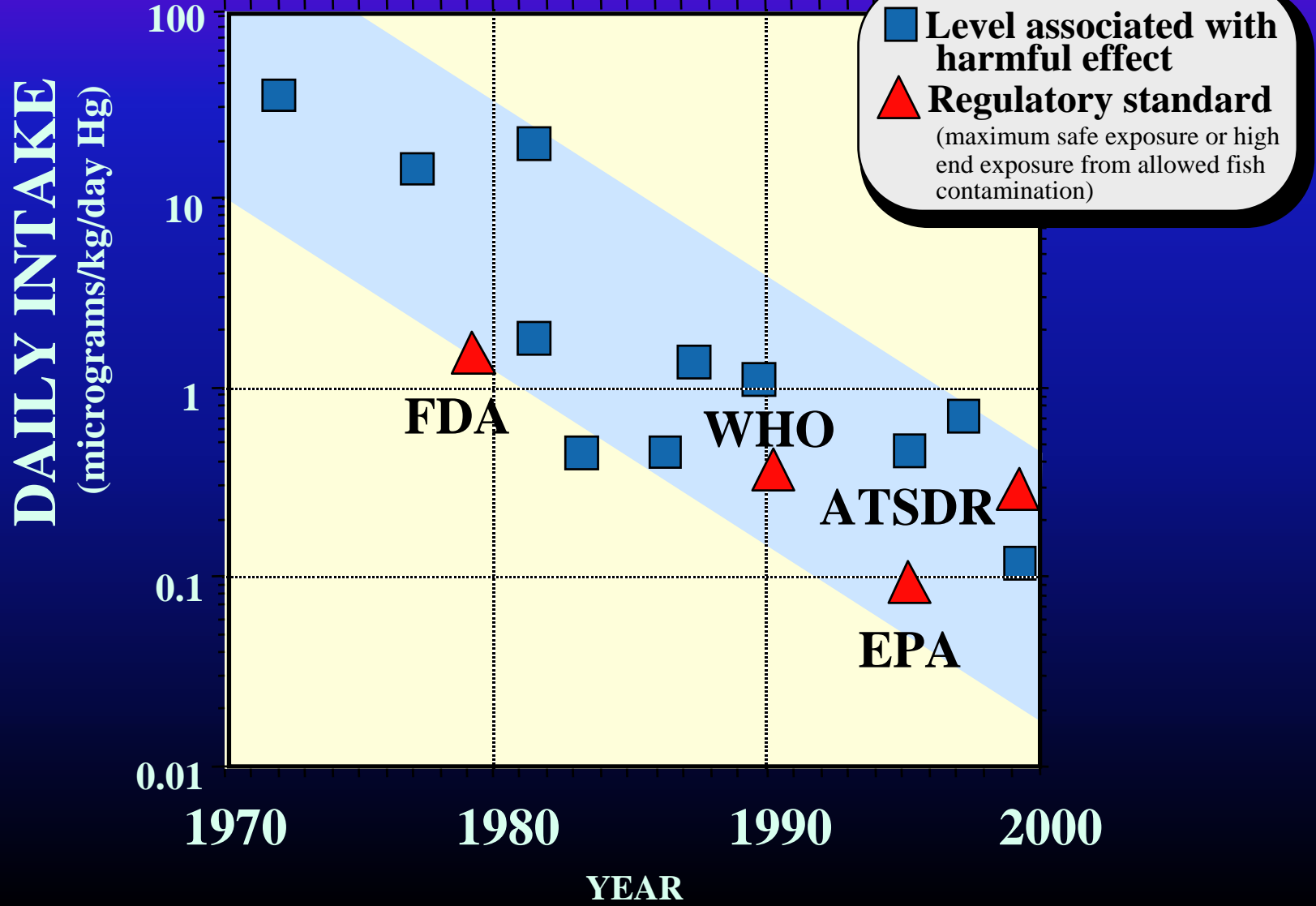
<b>proliferation</b>	radiation, ethanol, mercury, cholinesterase inhibitors
<b>migration</b>	radiation, mercury, ethanol
<b>differentiation</b>	ethanol, nicotine, mercury, lead
<b>synaptogenesis</b>	radiation, ethanol, lead, triethyl tin, parathion, PCBs
<b>gliogenesis &amp; myelinization</b>	dec. thyroid, ethanol, lead
<b>apoptosis</b>	ethanol, lead, mercury
<b>signaling</b>	ethanol, cholinesterase inhibitors, mercury, lead, PCBs

# Lead: Declining Threshold of Harm



# Mercury:

## Declining Threshold of Harm

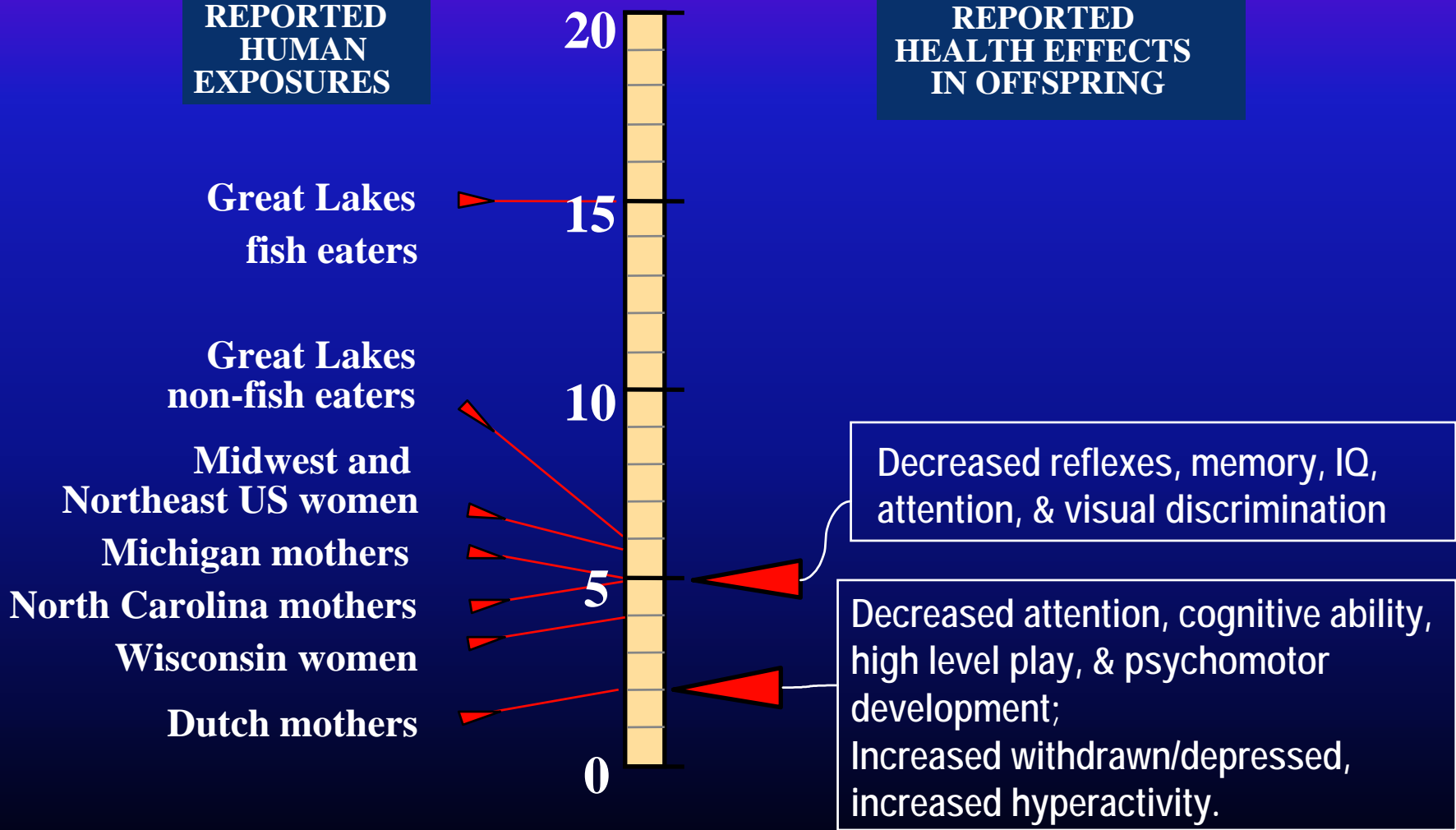


# PCBs: Inadequate Margin of Safety

## PCB BLOOD LEVELS (ppb)

REPORTED HUMAN EXPOSURES

REPORTED HEALTH EFFECTS IN OFFSPRING





# Effective Behavioral Treatment of Autism

# Behavior Therapy for Autism

- The development of a child who will
- empathize and share affection with his family
- independently make and keep mutual friendships
- succeed in school
- interact responsively and dynamically
- be effective in social situations, and
- meet the natural expectations of the environment
- without requiring specialized therapy

# The Development of the Young Child



L I F E

# The Discrete Trial

L I F E

# The Discrete Trial



**Discriminative  
Stimulus ( $S^D$ )**

**Salient  
Natural  
Instruction  
Toy  
Social Behavior  
Group Setting  
Peer Behavior  
Conversation  
Statement  
Question  
Worksheet  
Duration  
Mode**

# The Discrete Trial

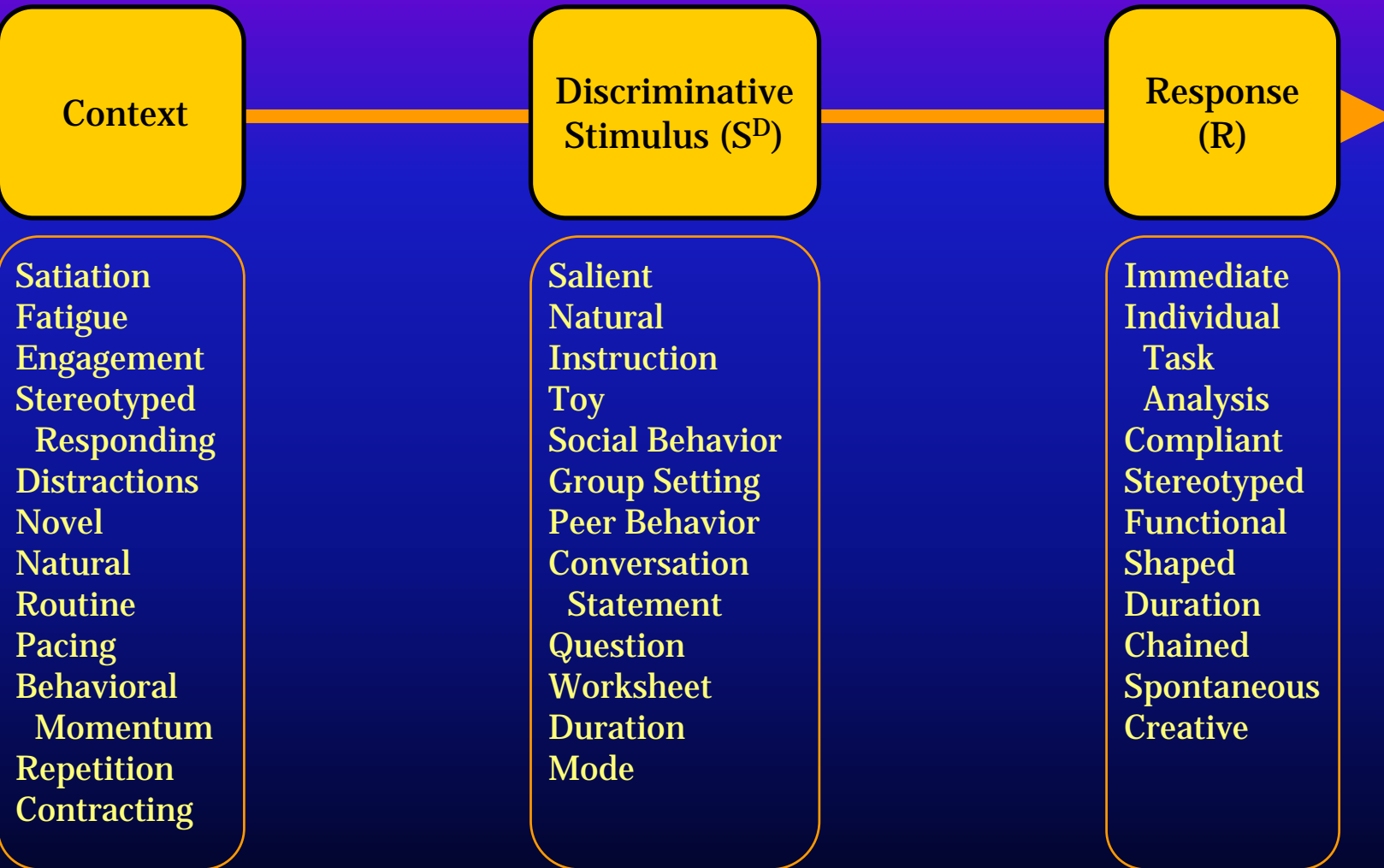
**Discriminative  
Stimulus ( $S^D$ )**

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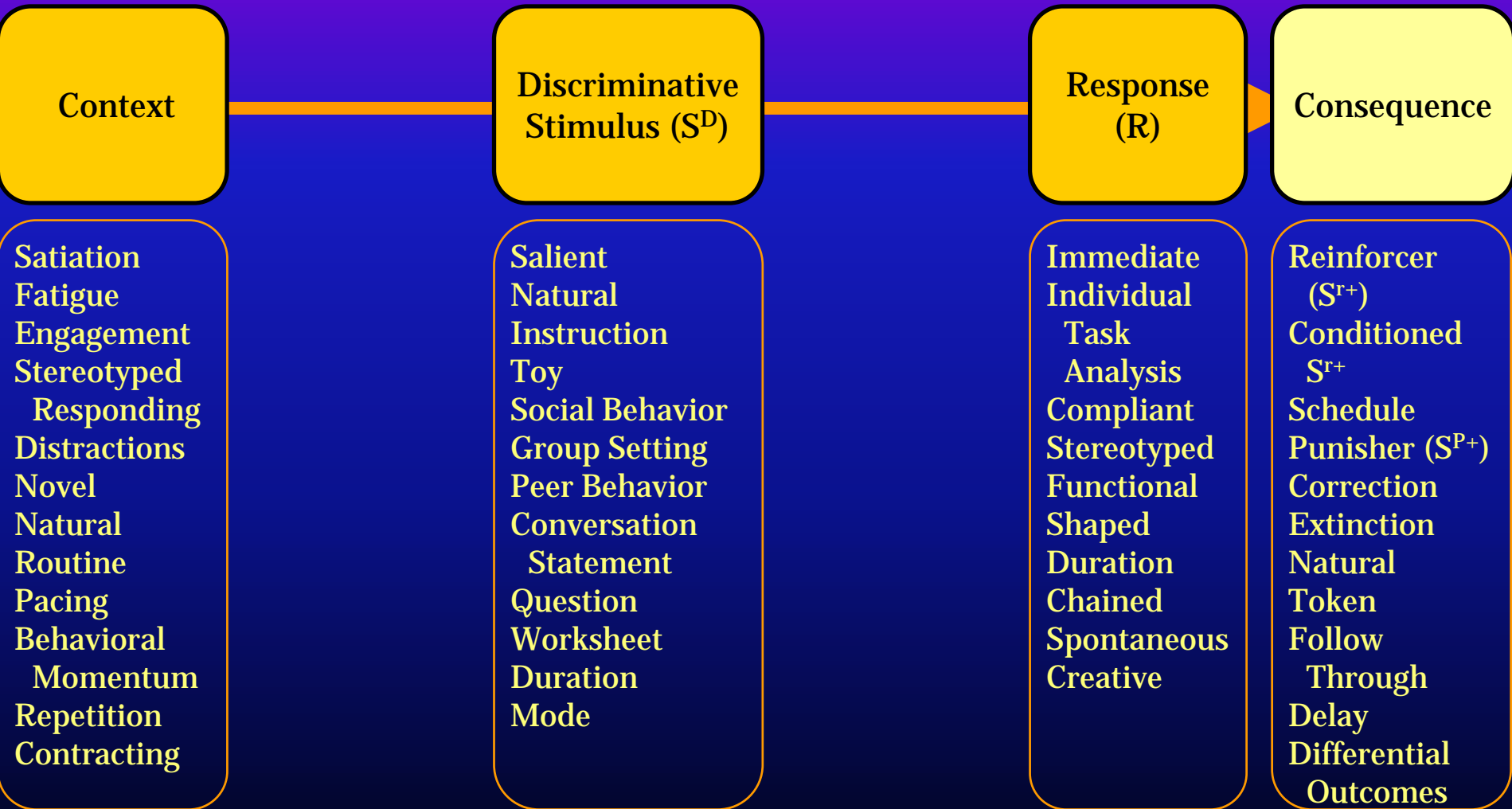
**Response  
(R)**

Immediate  
Individual  
Task  
Analysis  
Compliant  
Stereotyped  
Functional  
Shaped  
Duration  
Chained  
Spontaneous  
Creative

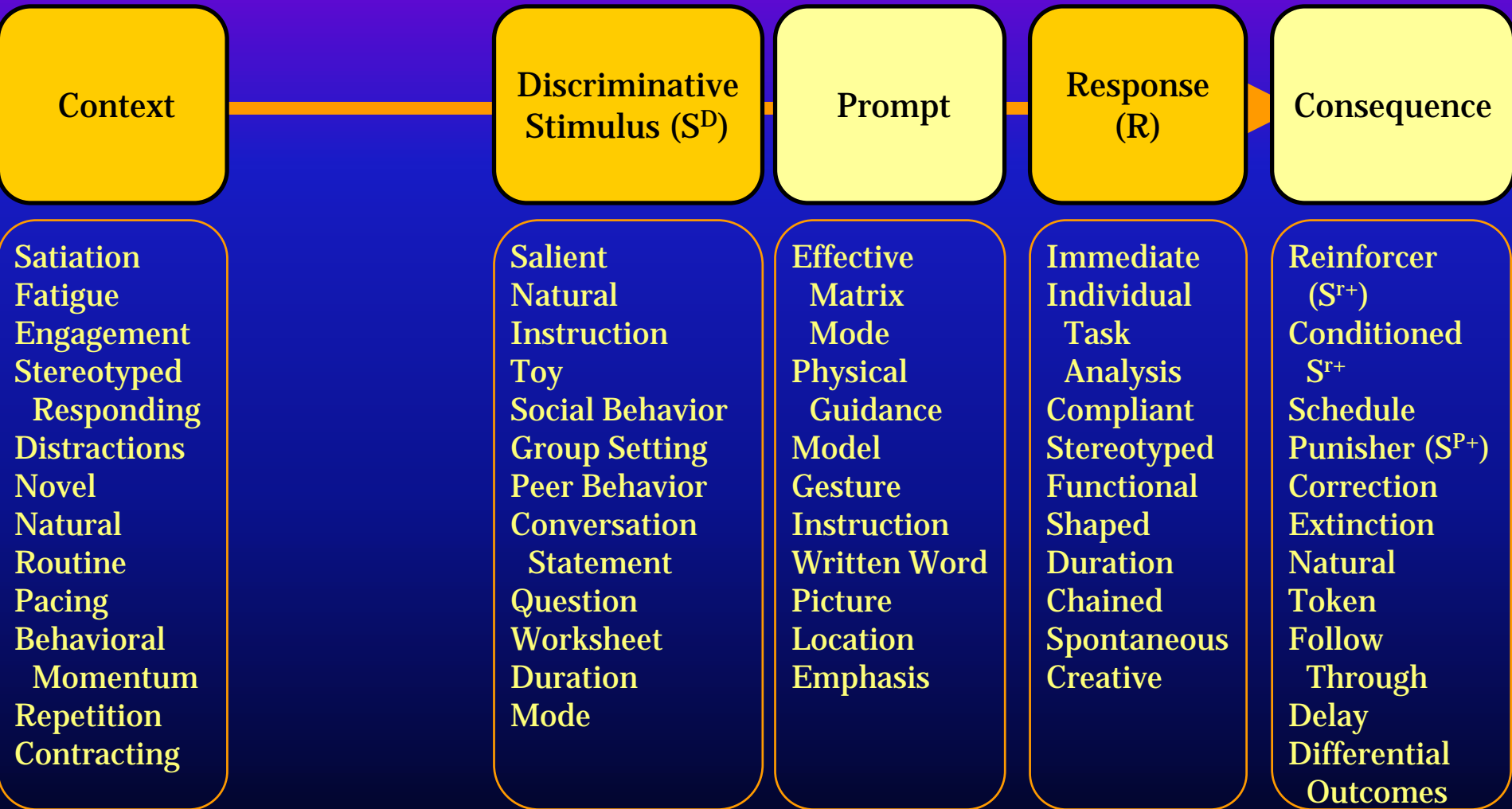
# The Discrete Trial



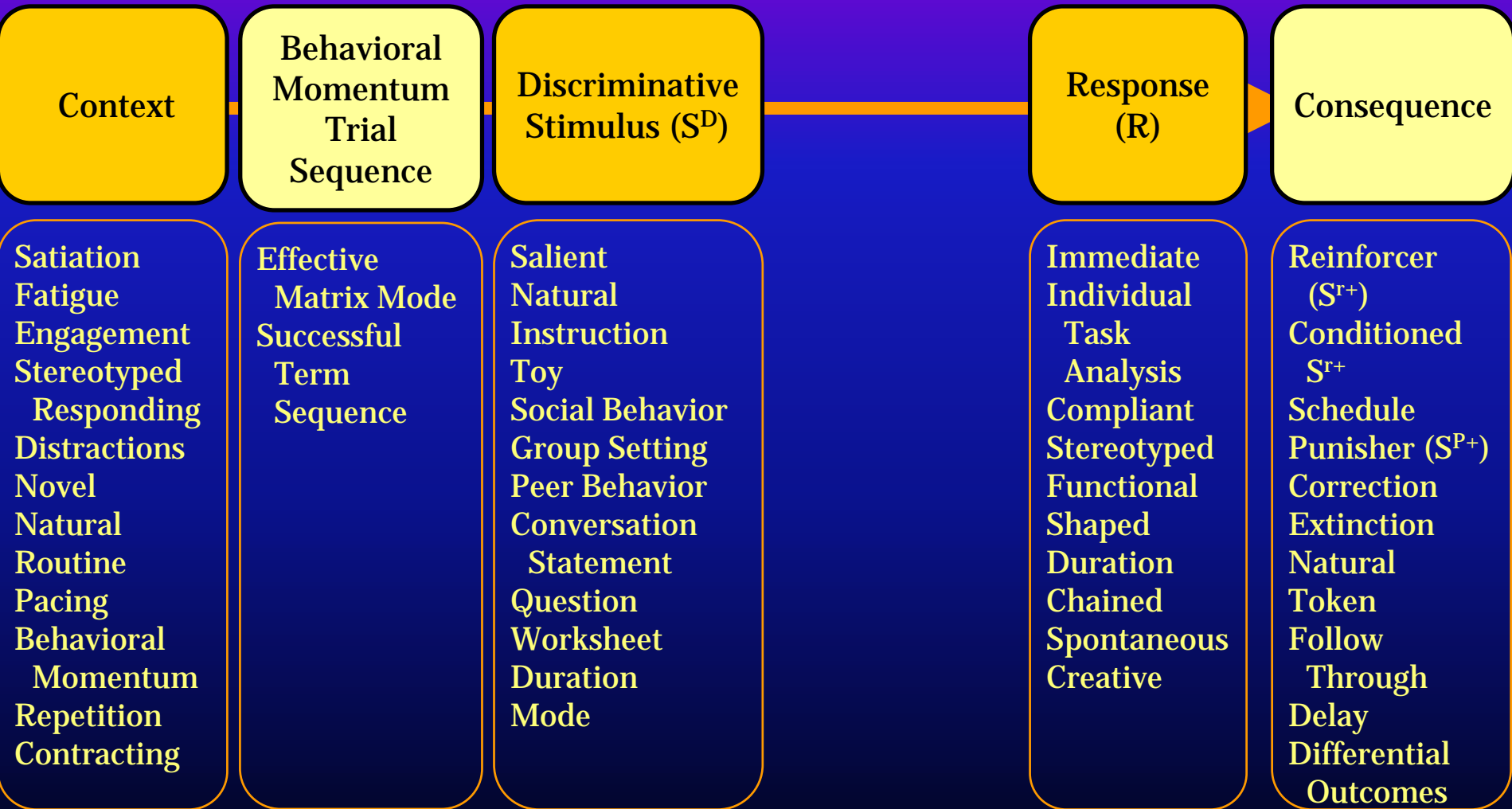
# The Discrete Trial



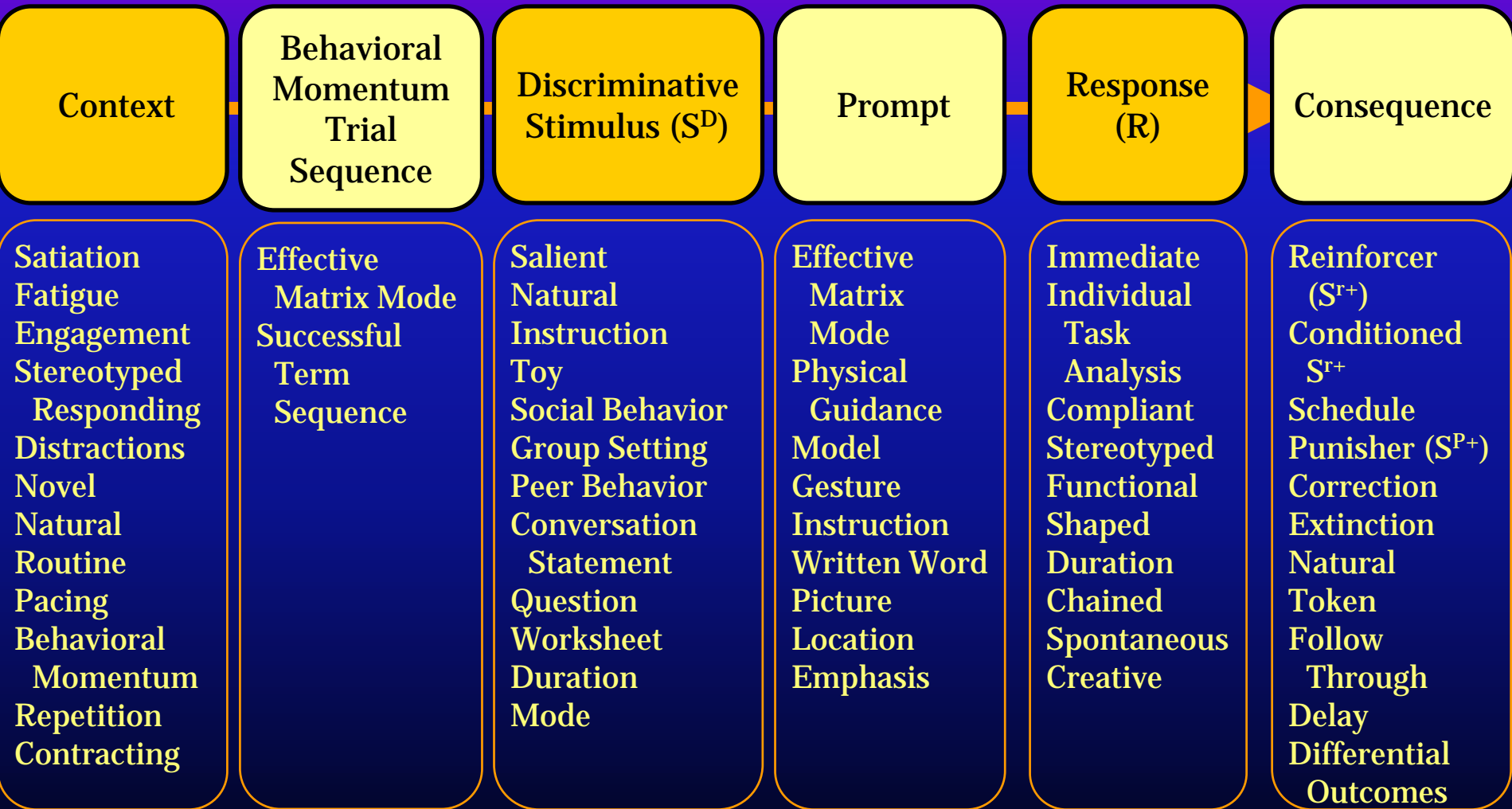
# The Discrete Trial



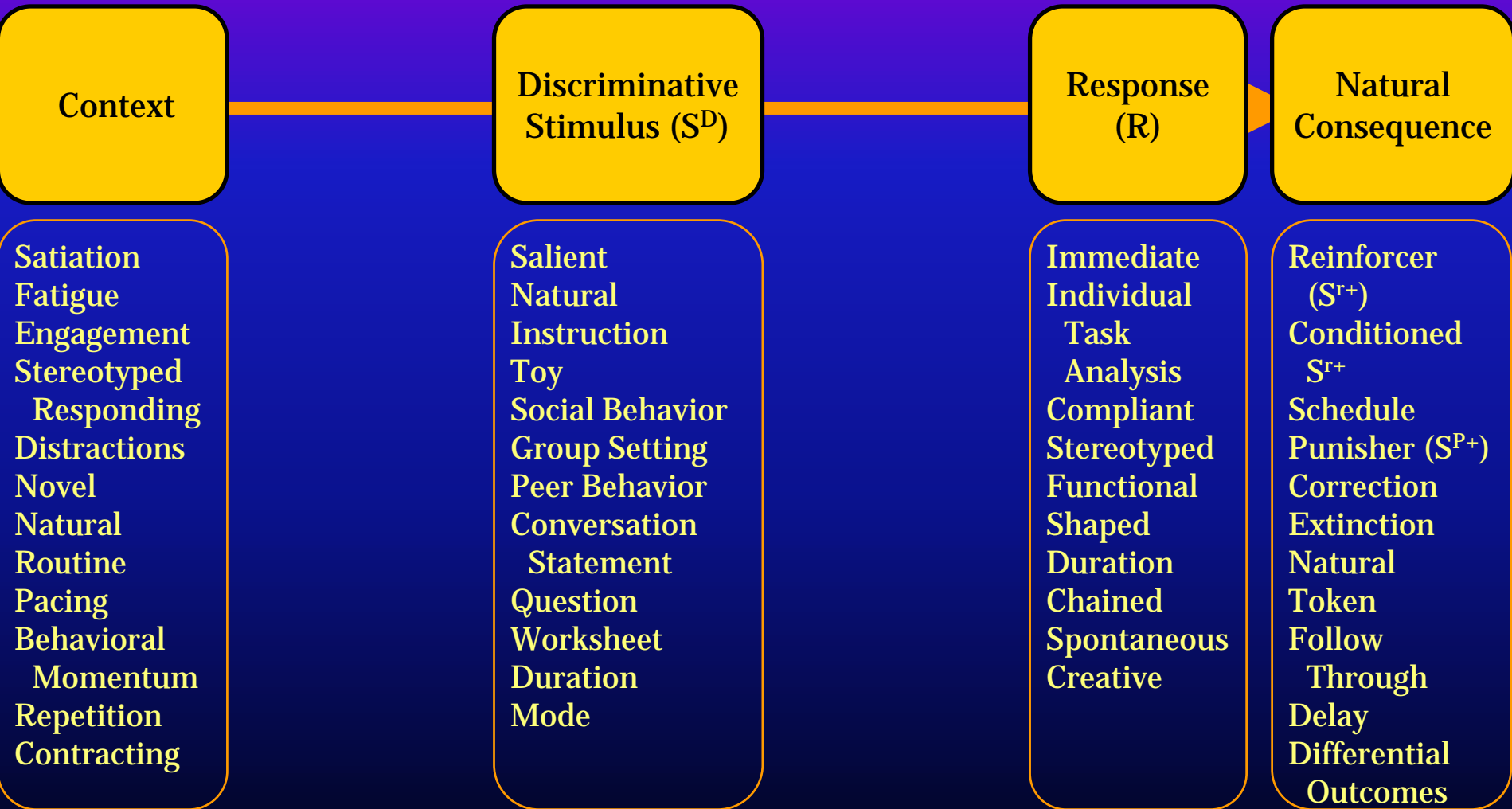
# The Discrete Trial



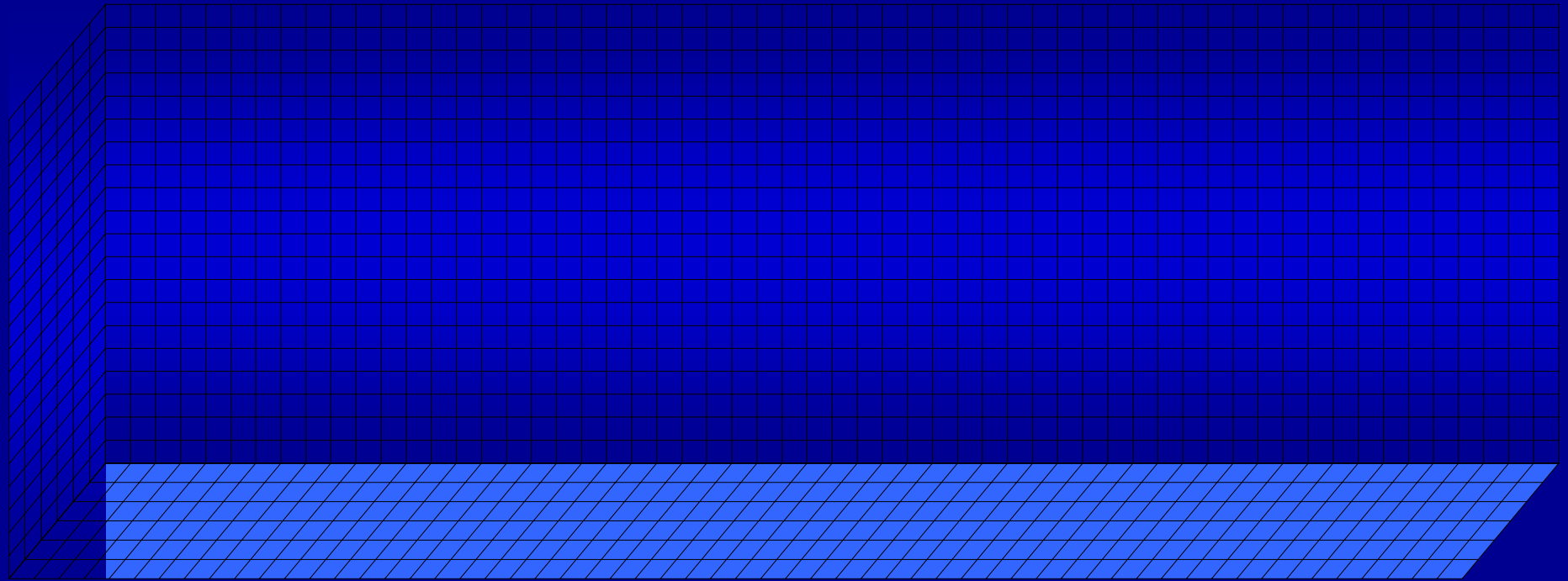
# The Discrete Trial



# The Discrete Trial



# Progress of the Discrete Trial



Complexity

# Significant Language Deficits I

## Development of Imitation Skills

Significant Researchers:

Baer, Sherman, Garcia, U. of Kansas; Lovaas, UCLA;

Salient Research Studies: 19

Time Span: 1964 – 1994

Sample Study:

Baer, D.M., Peterson, R.F., & Sherman, J.A. (1967). The development of imitation by reinforcing behavioral similarity to a model. *Journal of the Experimental Analysis of Behavior*, 10, 405-416.

# Significant Language Deficits II

## Development of Basic Language Skills

Significant Researchers:

Michael, U. of Arizona; Salzinger, Columbia U.; Risley, Wolf, U. of Washington; Sloane, Mithaug, Charlop, Claremont College; Foxx, Southern Illinois U.;

Salient Research Studies: 28

Time Span: 1965 – 1987

Sample Study:

Schumaker, J., & Sherman, J.A. (1970). Training generative verb usage by imitation and reinforcement procedures. *Journal of Applied Behavior Analysis*. 3, 273-287.

# Significant Language Deficits III

## Development of Complex Language Skills

Significant Researchers:

Guess, Baer, Sailor, Garcia, U. of Kansas; Krantz, McClannahan, Princeton Child Development Center; Smith, Lovaas, UCLA;

Salient Research Studies: 32

Time Span: 1968 – 1992

Sample Study:

Stevens-Long, J, & Rasmussen, M. (1974). The acquisition of simple and compound sentence structure in an autistic child. *Journal of Applied Behavior Analysis*. 7, 473-479.

# Significant Social Deficits I

## Development of Social Play Skills

Significant Researchers:

Baer, Allen, Hart, Rogers, Rowbury, Fowler, Kohler, Greenwood, U. of Kansas; Koegel, Dunlap, Dyer, UCLA; Strain, U. of Pittsburgh; Carr, SUNY Stony Brooke; McEvoy, Vanderbilt;

Salient Research Studies: 31

Time Span: 1968 – 1994

Sample Studies:

Haring, T.G. (1985). Teaching between-class generalization of toy play behavior to handicapped children. *Journal of Applied Behavior Analysis*. 18, 127-140.

Pierce, K., & Schreibman, L., (1995). Increasing complex social behaviors in children with autism: Effects of peer-implemented pivotal response training. *Journal of Applied Behavior Analysis*, 28. 285-296.

## Significant Social Deficits II

### Development of Creativity and Spontaneity

#### Significant Researchers:

Baer, U. of Kansas; Charlop, Schreibman, Claremont College;  
Dunlap, Marshall U; Haring, U. of Washington; Van Houten,  
Halifax U.; Harris, Rutgers;

Salient Research Studies: 18

Time Span: 1972 – 1995

#### Sample Studies:

Goetz, E.M., & Baer, D.M. (1973). Social control of form diversity and the emergence of new forms in children's block building. *Journal of Applied Behavior Analysis*. 6, 209-217.

Ingenmey, R., & Van Houten, R. (1991). Using time delay to promote spontaneous speech in an autistic child. *Journal of Applied Behavior Analysis*, 24, 591-596.

# Significant Social Deficits III

## Development of Social Conversation Skills

Significant Researchers:

Garcia, Kamps, U. of Kansas; Strain, U. of Pittsburgh; Neef, Western Michigan State; Charlop, Claremont College; Koegel, U.C. Santa Barbara; Krantz, McClannahan, Princeton Child Development Institute;

Salient Research Studies: 32

Time Span: 1974 – 1995

Sample Studies:

Charlop, M.H., & Milstein, J.P. (1989). Teaching autistic children conversational speech using video modeling. *Journal of Applied Behavior Analysis*. 22, 275-286.

Camarata, S. (1993). The application of naturalistic conversation training to speech production in children with speech disabilities. *Journal of Applied Behavior Analysis*, 26. 173-182.

# Significant Social Deficits IV

## Development of Group / Classroom Skills

Significant Researchers:

Koegel, Rincover, Russo, UCLA; Favell, U. of North Carolina; Fowler, Baer, Guess, Kamps, U. of Kansas; Strain, U. of Pittsburgh; Sasso, U. of Iowa;

Salient Research Studies: 26

Time Span: 1967 – 1994

Sample Studies:

Odom, S.L., & Strain, P.S. (1986). A comparison of peer-initiation and teacher-antecedent interventions for promoting reciprocal social interaction of autistic preschoolers. *Journal of Applied Behavior Analysis*. 19, 59-72.

Werts, M.G., Caldwell, N.K., & Wolery, M. (1996). Peer modeling of response chains: Observational learning by students with disabilities. *Journal of Applied Behavior Analysis*, 29, 53-66.

# Significant Social Deficits V

## **Staff and Parent Training Procedures**

### Significant Researchers:

Guess, Baer, Spradlin, U. of Kansas; Koegel, Schreibman, Russo, Rincover, Glahn, UCLA; O'Dell, U. of Mississippi; McClannahan, Krantz, McGee, Princeton Child Development Center; Strain, U. of Pittsburgh; Dyer, Luce, The May Institute;

Salient Research Studies: 41

Time Span: 1968 – 1993

### Sample Studies:

Koegel, R.L., Glahn, T.J. & Nieminen, G.S. (1978). Generalization of parent-training results. *Journal of Applied Behavior Analysis*, 11, 95-109.

# Stereotypy: Restricted Range of Interests I

## Positive Reinforcement to Remediate Stereotyped, Perseverative Tendencies

Significant Researchers:

Ferster, Indiana U.; Wolf, Risley, U. of Washington; Koegel, Dunlap, Rincover, Newsome, Carr, Lovaas, UCLA; Hall, U. of Washington; Sajwaj, U. of Tennessee; Baer, U. of Kansas; Repp, Dietz, U. of Georgia; Iwata, Florida State U.; Dyer, The May Institute;

Salient Research Studies: 39

Time Span: 1961 – 1990

Sample Study:

Charlop, M.H., Kurtz, P.F., & Casey, F.G. (1990). Using aberrant behaviors as reinforcers for autistic children. *Journal of Applied Behavior Analysis*. 23, 163-182.

# Stereotypy: Restricted Range of Interests II

## Effects of Structure on Stereotyped, Perseverative Tendencies

Significant Researchers:

Lovaas, Schreibman, Koegel, Dunlap, Newsome, UCLA; Foxx, Azrin, U. of Southern Illinois; Iwata, Bailey, Florida State U.; Repp, Northern Illinois U.; Dyer, The May Institute;

Salient Research Studies: 31

Time Span: 1965 – 1991

Sample Study:

Koegel, R.L, Dunlap, G., & Dyer, K. (1980). Intertrial interval duration and learning in autistic children. *Journal of Applied Behavior Analysis*, 13, 91-99.

# Stereotypy: Restricted Range of Interests III

## Development of Social Compliance

Significant Researchers:

Whitman, Notre Dame; Baer, Rowbury, Allen, U. of Kansas; Forehand, U. of Georgia; Neef, Russo, Cataldo, Johns Hopkins U.; Mace, U. of Utah;

Salient Research Studies: 18

Time Span: 1964 – 1988

Sample Study:

Larsson, D. G., & Larsson, E. V. (1983). Manipulating peer presence to program the generalization of verbal compliance from one-to-one to group instruction. *Education and Treatment of Children*, 6, 109-122.

# Stereotypy: Restricted Range of Interests IV

## Development of Effective Teaching Strategies

Significant Researchers:

Risley, LeBlanc, Spradlin, U. of Kansas; Touchette, Columbia; Schreibman, Russo, Lovaas, Dunlap, Rincover, Koegel, UCLA; Dyer, Christian, Luce, The May Institute; Repp, Northern Illinois U.; Charlop, Claremont College; Heward, Heron, Ohio State U.;

Salient Research Studies: 42

Time Span: 1965 – 1996

Sample Study:

Schreibman, L. (1975). Effects of within-stimulus and extra-stimulus prompting on discrimination learning in autistic children. *Journal of Applied Behavior Analysis*, 8, 91-112.

# Stereotypy: Restricted Range of Interests V

## Generalization of Treatment Gains

Significant Researchers:

Wolf, Sulzbacher, U. of Washington; Sulzer, U. of Massachusetts; Sailor, Walker, Baer, Hart, Risley, U. of Kansas; Wahler, U. of Tennessee; Rincover, Koegel, UCLA; Handleman, Rutgers; McGee, Krantz, McClannahan, Princeton Child Development Center;

Salient Research Studies: 29

Time Span: 1966 – 1996

Sample Study:

Gena, A., Krantz, P., McClannahan, L.E., & Poulson, C.L. (1996). Training and generalization of affective behavior displayed by youth with autism. *Journal of Applied Behavior Analysis*, 29, 291-304.

# Staff and Parent Training Procedures

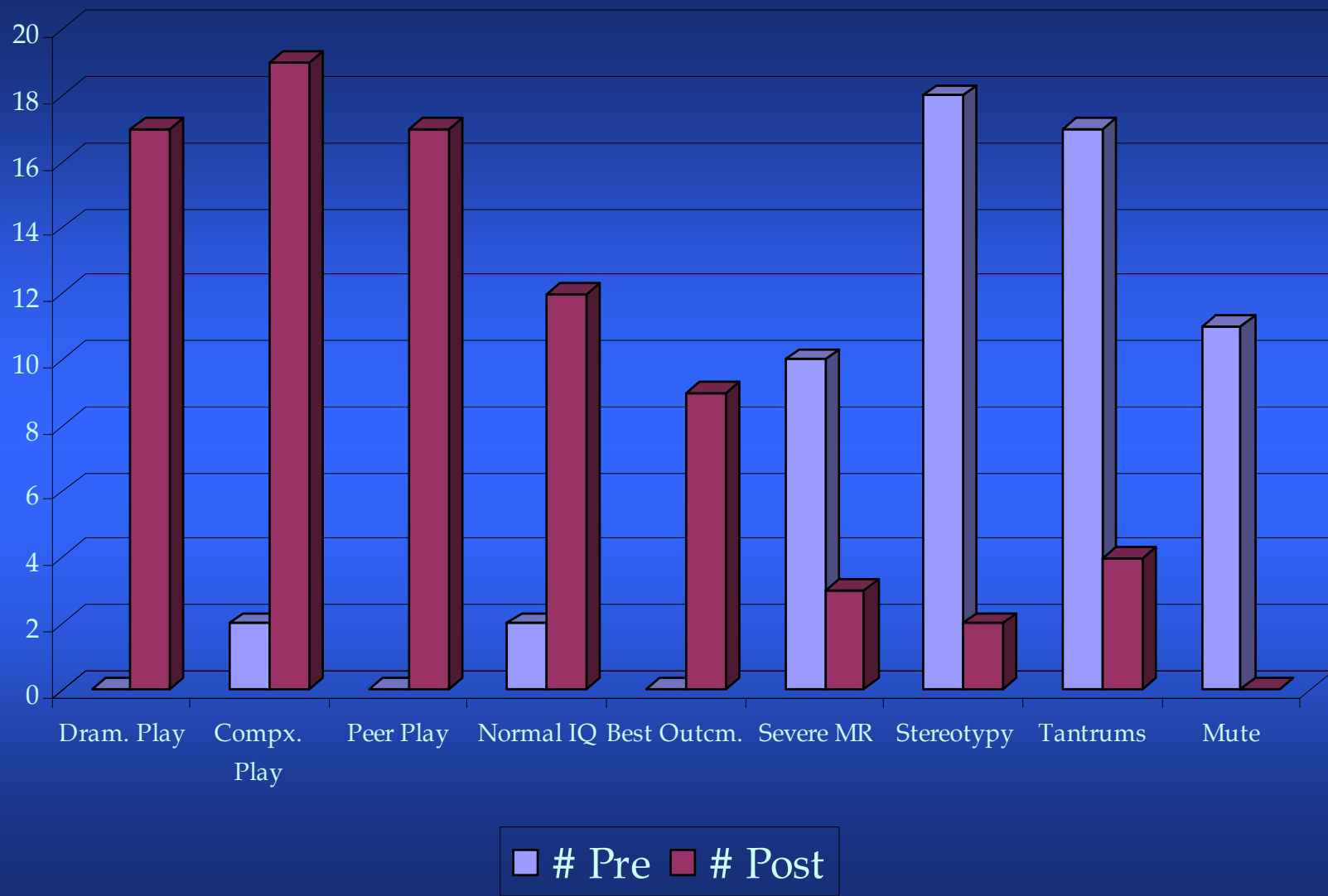
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**Significant Researchers:** Guess, Baer, Spradlin, U. of Kansas; Koegel, Schreibman, Russo, Rincover, Glahn, UCLA; O'Dell, U. of Mississippi; McClannahan, Krantz, McGee, Princeton Child Development Center; Strain, U. of Pittsburgh; Dyer, Luce, The May Institute

**Salient Research Studies:** 41

**Time Span:** 1968-1993

Koegel, R.L., Russo, D.C., & Rincover, A. (1977). Assessing and training teachers in the generalized use of behavior modification with autistic children. *Journal of Applied Behavior Analysis*, **10**, 197-205.



Lovaas, 1987, Children

L I F E

## Long-Term Outcome Studies of Behavior Therapy with Young Children with Autism Spectrum Disorders

Replication Study Groups	Intake Age	Hours per Week of Treatment	Length of Involvement	Principal Treatment Site	Percent Best Outcomes	Percent Substantial Improvement	Percent Achieving IQ Above 76
Lovaas 1987	35 mo.	40-60 hrs.	2-6 yrs.	Home	47	89%	63%
Lovaas 1987	41 mo.	< 10 hrs.	2-6 yrs.	Home/Sch.	0	42%	16%
Lovaas 1987	37 mo.	0 hrs.	4 yrs.	School	5	5%	10%
Anderson, et al. 1987	44 mo.	15-25 hrs.	1-2 yrs.	Sch./Home	NA	75%	23%
Birnbrauer & Leach, 1993	39 mo.	19 hrs.	2 yrs.	Home	NA	89%	44%
Sheinkopf & Siegel, 1998	35 mo.	19 hrs.	1-2 yrs.	Home	NA	70%	60%
Perry et al., 1995	30 mo.	10-35 hrs.	2 yrs.	Home	100	100%	100%
Fenske et al. 1985	< 60 mo.	27 hrs.	2+ yrs.	School	NA	67%	NA
Fenske et al. 1985	> 60 mo.	27 hrs.	2+ yrs.	School/Institution	NA	11%	NA
Harris et al. 1991	50 mo.	19 hrs.	1 yr.	School	NA	78%	33%
Smith et al. 2000	35 mo.	24 hrs.	2 yrs.	Home	0	89%	56%

# ABA for the School-Age Child

**The May Institute    Before ABA    After ABA**

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<b>Number of Students</b>	<b>38</b>	<b>52</b>
<b>Percent of Students Treated with Medication</b>	<b>21%</b>	<b>2%</b>
<b>Average percentage of active teaching</b>	<b>40%</b>	<b>89%</b>
<b>Average length of stay in years</b>	<b>4</b>	<b>2.9</b>
<b>Percent of Students transitioned to home</b>	<b>19%</b>	<b>55%</b>
<b>Percent of students who remained in their homes after transition</b>	<b>0%</b>	<b>90%</b>

**Students aged 7 to 16**

# Extending the UCLA young autism project

- Commitment to effectiveness
- Focus on quality
- Well organized, comprehensive program
- Insightful task analysis
- Extend treatment effectiveness to additional children
- Treat children with lower cognitive measures
- Address language deficits
- Address social deficits
- Address the clinical needs of children
- Complete the therapeutic framework through parent training

# Best Outcome Goals (1)

- Generalized compliance
- Distal compliance
- Respond to novel adults
- Comply with group instructions
- Intelligible speech
- Generalized speech
- Colloquial speech
- Creative story telling
- Joint attention
- Generalized imitation
- Independent observational learning
- Cooperative play with adult
- Cooperative play with a typical age-peer
- Congruent social play
- Social responsiveness

# Best Outcome Goals (2)

- Small-group attending
- Large-group attending
- Participate in a group conversation responsively
- Social comprehension
- Complete an errand
- Walk with adult
- Appropriate nutrition
- Appropriate sleep
- Independent toileting
- Stereotypy during play
- Waiting
- Self-control of health-threatening behavior
- Maintain two mutual friendships
- Learn without specialized therapy
- Attain typical developmental milestones
- Parent Mastery

# The Implications of Research in Applied Behavior Analysis

- Behavior constantly responds to its environment
  - Resulting in all of the learned behavior patterns of life
  - Inconsistent or maladaptive treatment does not easily result in progress toward normalcy
- Therefore to alter the course of autism
  - We must transform the child's home and community into a 24-hour therapeutic environment

L I F E

# The implications of autism

- The child with autism is capable of constantly learning.
  - The child will learn maladaptive behavior patterns as readily as they learn adaptive.
  - Therefore significant intensity of early intervention is critical in order to deliver therapy which will over-balance against the inevitable maladaptive learning events that occur on a daily basis.

# The implications of autism

- The child with autism does not readily generalize.
  - Rather they discriminate between inconsistent therapists.
  - Therefore the team requires an extensive level of clinical direction for the purpose of generating consistency.

# The implications of autism

- The child with autism shows significant variation in behavior pattern and controlling influences in the many different environments and activities of their life.
  - Behavior disorders are best remediated by services which rely on direct functional assessment and direct treatment.
  - Therefore the clinical supervisors are required to be present at the times and locations at which the behaviors are being treated.

# The implications of autism

- The population of children with autism is highly heterogeneous.
  - In treatment, the child's behavior develops in many clinically significant and diverse directions.
  - Therefore the team requires significant weekly treatment planning in order to adequately analyze the child's needs and prescribe the most effective treatment.

# The implications of autism

- The child with autism is developing more and more solidified behavior patterns as they age.
  - While in their early years, while their brain is developing and more plastic, the child is more susceptible to learning adaptive patterns of behavior.
  - Therefore the program should be delivered in a very timely and intensive early intervention approach to capitalize on the malleability of the child's nervous system.

L I F E

# The implications of autism

- The parent of the child is subject to the child's counter-control.
  - The parent requires significant training and support in order to achieve the clinical changes necessary to provide a 24-hour therapeutic milieu.
  - Therefore significant family therapy and training is required in order to teach and support the parent in changing their parenting behavior.

# A Complete Program of Services

- Therefore the program needs to be delivered as an integrated system of highly supervised therapy, rather than in piece-meal fashion.
- Thorough direct observation and training is required due to the very nature of the disorder being treated - Autism.

# The Core Aspects of Effective Treatment

- Behavior Therapy
- Dynamic Programming
- Intensity
- Comprehensive Parent Therapy
- Early Intervention
- Accountable Treatment

# From Autism to Typical Social Interactions

- effective behavior therapy: establish natural behavioral interactions in their typical environments
  - direct teaching: establish the prerequisite skills necessary for natural programming
  - clinical focus: remediate the behavior problem which prevents typical development

# Direct teaching: Establish the skills necessary for typical social interactions

generalization deficits	language deficit	social deficit	cognitive deficit
parent training	easy prerequisite tasks based upon strengths	independent play	simple matching tasks
staff training	generative words	structured play	generative response classes
sibling training	generative sentences	play language	generative concepts
peer training	concrete auditory comprehension	cooperative play	abstract concepts
school training	abstract auditory comprehension	social comprehension	tell stories

# Clinical focus I: Remediate the behavior problem which prevents typical development

rigidity	overwhelmed by complex environments	social disengagement	autistic behaviors are readily reinforced	self-motivated rather than socially oriented	distracted / seeking stereotyped stimulation
	brief teaching interactions		(early intervention prevents significant behavior problems)	compliance	conditioned reinforcement of socialization
waiting		duration	differential reinforcement		effective differential reinforcement
tolerance	naturalization of programming	attention span	parent training		self control
patience	peer tutoring	simple cooperation	staff training	comply with novel demands	
flexibility	community behavior				
empathy		conversations			
	independent learning in school	effective cooperation	community training	comply with natural expectations	fade schedules of reinforcement till normal

# Clinical focus II: Remediate the behavior problem which prevents typical development

social responsiveness is blocked by echolalia	preference for sameness & perseveration	frustration avoidance leading to withdrawal	failure to learn from the environment	sleep disorder / inattention & irritability	overselectivity
receptive compliance	operant reinforcement	effective social reinforcement	imitation	compliance	imitation
compliant imitation	discrimination training	set up for success		waiting	generative responding
waiting	expansion		basic observational learning	parent training	conditional responding
generative language	spontaneity				
appropriate play language	creativity		complex observational learning		resistance to stereotyped responding
cooperative play					
effective social play		effective social responding			

# Why the two different focuses?

- Do we want to develop a “smart autistic kid” or do we want to treat autism?

# Rigidity

- Progression of behavior therapy
  - Waiting
  - Tolerance
  - Patience
  - Flexibility
  - Empathy

# Preference for sameness

- The progression of behavior therapy
  - Operant reinforcement
  - Discrimination training
  - Expansion
  - Spontaneity
  - Creativity

# Perseveration

- The progression of behavior therapy
  - Discrimination training
  - Expansion
  - Distal compliance
  - Random responses

Frustration avoidance  
leading to withdrawal

- The progression of behavior therapy
  - Effective social reinforcement
  - Structure for success
  - Effective social responding

# Overwhelmed by complex environments

- The progression of behavior therapy
  - Brief teaching interactions
  - Naturalization of programming
  - Peer tutoring
  - Community behavior
  - Independent learning in school

# Social disengagement

- The progression of behavior therapy
  - Duration programming
  - Attention span
  - Simple cooperation
  - Conversation
  - Effective cooperation

# Failure to learn from the environment

- The progression of behavior therapy
  - Imitation
  - Basic observational learning
  - Complex observational learning

# Autistic behaviors are readily reinforced

- The progression of behavior therapy
  - Differential reinforcement
  - Parent training
  - Staff training
  - Community programming

# Self-motivated rather than socially compliant

- The progression of behavior therapy
  - Compliance training
  - Comply with novel demands
  - Distal compliance
  - Comply with novel adults
  - Comply with natural expectations

# Seeking stereotyped stimulation

- The progression of behavior therapy
  - Conditioned reinforcement of socialization
  - Effective differential reinforcement
  - Self control
  - Fade schedules of reinforcement to natural rates

# Severe aggression, destruction, and self- injury

- The progression of behavior therapy
  - Early intervention prevents significant damage

# Failure to learn from the environment

- The progression of behavior therapy
  - Imitation
  - Basic observational learning
  - Complex observational learning

# Generalization deficits

- The progression of behavior therapy
  - Generative programming
  - Parent training
  - Staff training
  - Sibling training
  - Peer training
  - School training

# Language deficits

- The progression of behavior therapy
  - Easy prerequisite tasks based upon strengths
  - Generative words
  - Generative sentences
  - Concrete auditory comprehension
  - Abstract auditory comprehension

# Cognitive deficits

- The progression of behavior therapy
  - Simple matching tasks
  - Generative response classes
  - Generative concepts
  - Abstract concepts
  - Tell stories

# Language Matrix Overview

The Language Matrix																									
Match	Request	Stimulus Generalization Modes						Stimulus Generalization Modes						Stimulus Generalization Modes						Stimulus Generalization Modes					
		Two Dimensional	Three Dimensional	First Person (Child's Body)	Second Person (Other's Body)	Free Operant Spontaneous	Written	Concept Formation (Categories)	Label Characteristic	Generative Vocabulary	Comprehension	Productive Lang. (Story Telling)	Language in Natural Social Activities	Observational Learning	Conversations	Academic/Factual Statements									
Initiate	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Comprehension	Visual - Auditory	Auditory - Auditory	Visual	Auditory	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive		
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Generalizing the language program throughout the day

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# Language Matrix Overview

The Language Matrix										The Language Matrix										The Language Matrix										The Language Matrix									
Match Imitate	Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes														
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An increasing hierarchy of language complexity:  
 Single term sentences  
 Multiple term sentences  
 Language comprehension





# Language Matrix Overview

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Modes of expressive and receptive labeling

Generalizing the language program throughout the day

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# Language Matrix Overview

The Language Matrix										The Language Matrix										The Language Matrix										The Language Matrix									
Match	Request	Stimulus Generalization Modes				Free Operant Spontaneous	Stimulus Generalization Modes				Generative Vocabulary Mixed	Comprehension				Productive Lang. (Story Telling)				Language in Natural Social Activities				Stimulus Generalization Modes															
		Two Dimensional	Three Dimensional	First Person (Child's Body)	Second Person (Other's Body)		Written	Comprehension	Label Characteristic	Descriptor		Category	Visual - Auditory	Response	Stimulus	Auditory - Auditory	Visual	Auditory	Play	Home	Community	Observational Learning	Reciprocal	Comprehension	Academic/Factual														
Initiate	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Comprehension	Receptive	Expressive	Descriptor	Category	Stimulus	Response	Stimulus	Question	Response	Visual	Auditory	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive					
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Free operant spontaneous language

Generalizing the language program throughout the day

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# Language Matrix Overview

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Match	Request	Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes				Stimulus Generalization Modes																													
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Initiate	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive	Receptive	Expressive															
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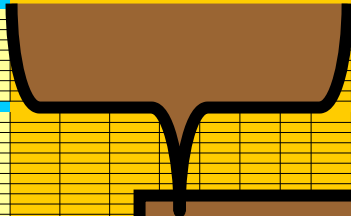
Cognitive Basis of Language Skills

Generalizing the language program throughout the day

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Comprehension and language production

# Language Matrix Overview

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Natural social language

Generalizing the language program throughout the day

L I F E

# Language Matrix Overview

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Observational learning

Generalizing the language program throughout the day

L I F E

# Language Matrix Overview

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Conversations

Generalizing the language program throughout the day

L I F E

# Language Matrix Overview

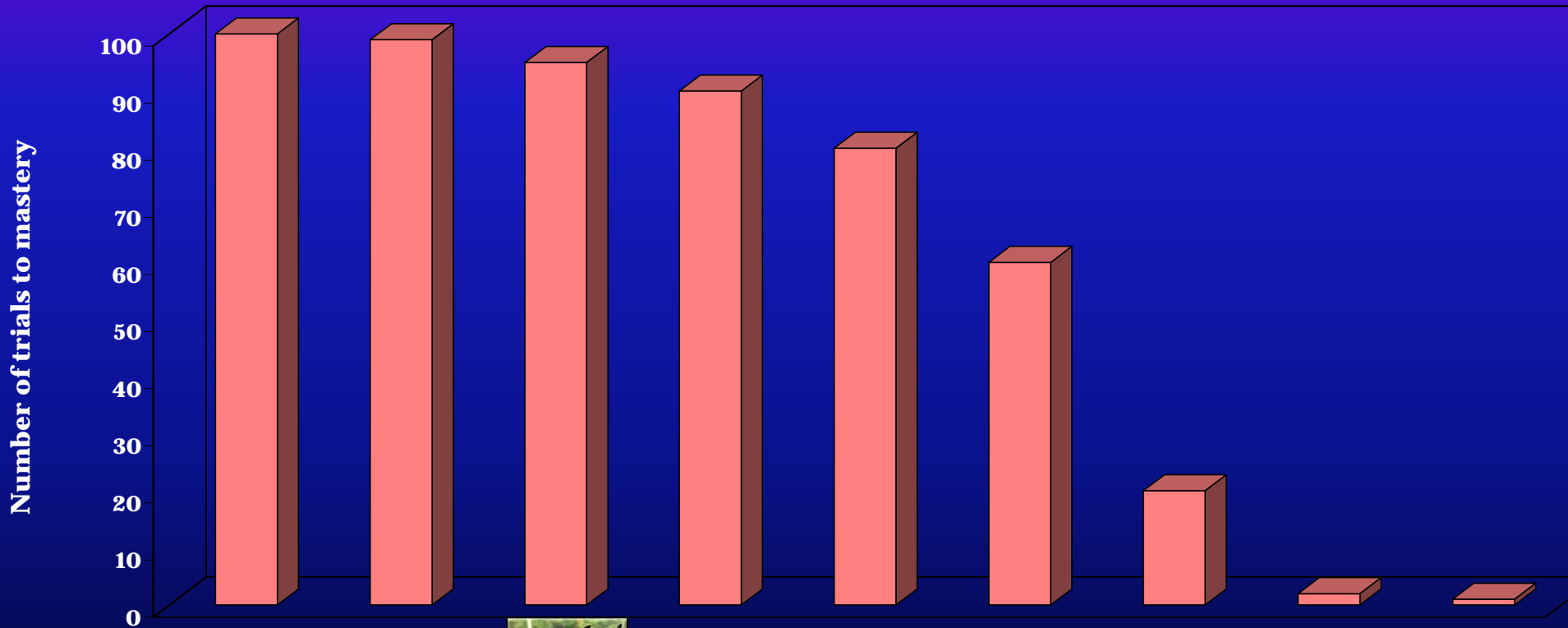
The Language Matrix										The Language Matrix										The Language Matrix										The Language Matrix											
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<p style="text-align: center; font-size: 2em; font-weight: bold;">Carefully coordinated parallel programming</p>																																									
<p><i>(The following rows represent the detailed structure of the Language Matrix, including categories like 1-Term Response Classes, 2-Term Conditional Discrimination, etc., as listed in the image.)</i></p>																																									

Generalizing the language program throughout the day

L I F E

# Generative Response Class

Development of the Generative Class: Horse

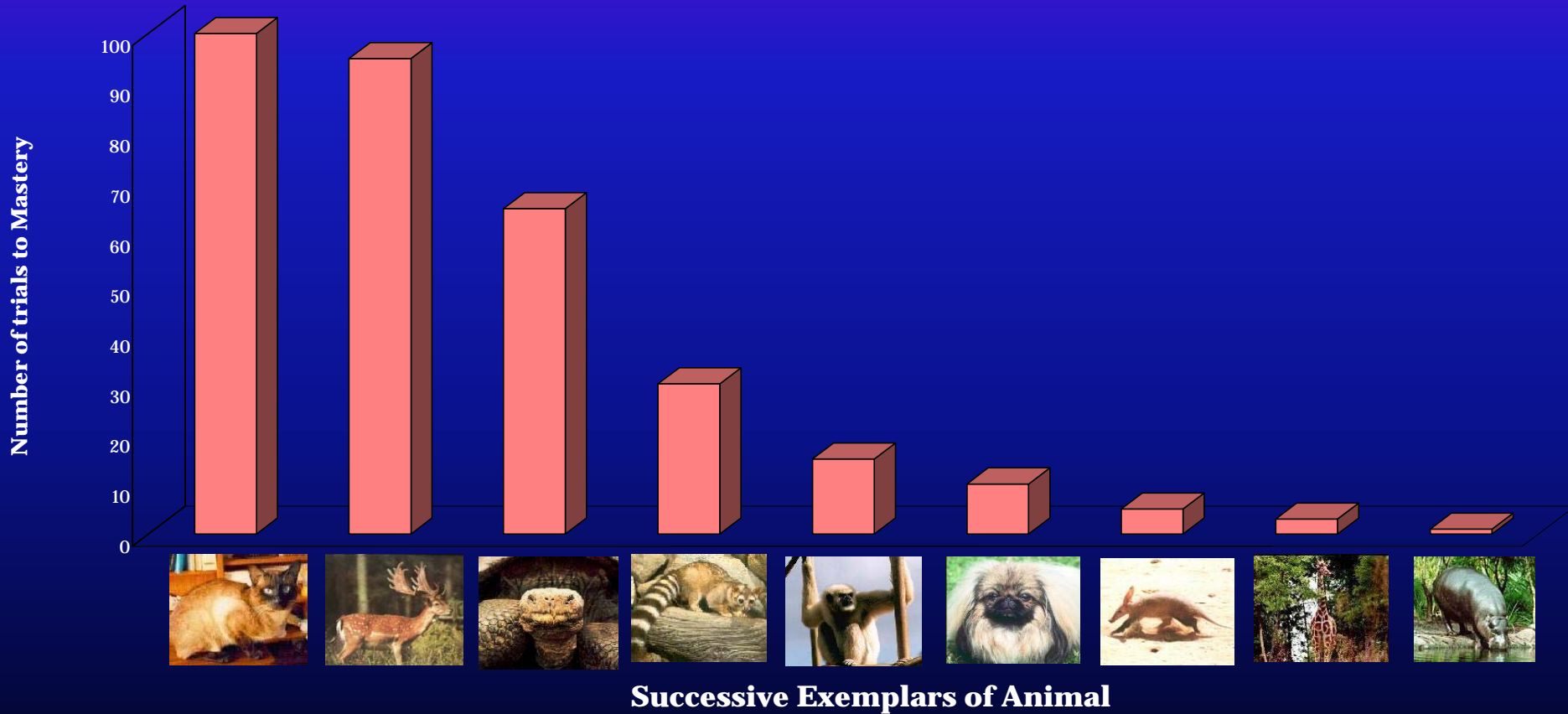


Successive Exemplars of Horse

L I F E

# Generative Concept Development

## Development of the Generative Concept: Animal



# Social deficits

- The progression of behavior therapy
  - Independent play
  - Structured play
  - Play language
  - Cooperative play
  - Social comprehension
  - Advanced social programming

# Flowchart of social programming

Peer tutoring discrete trials	Compliance training	Imitative play	Independent play	Group programming	Language skill development	Punishment	Contingency management
	Distal compliance	Observational learning of vocabulary	Shaping play duration and creativity	Shaping work duration	Play language	Waiting	Differential reinforcement for self control
Peer play dates	Compliance with group instructions	Observational learning for problem solving	Video taped modeling	Simulated groups with adult	Operant spontaneous language	Time out	Conditioned social reinforcement
Peer Tutoring	Comply in community	Shaping complexity of observational learning	Simulated play with adult	Turn-taking in groups	Requesting		Token reinforcement
Compliance with peers in natural play	Respond to novel adults	Strategic observational learning	Parallel play	Attending in small groups	Respond to listening cues of others		Behavior contracting
Sharing with peers		Observational learning of games	Associative play	Social priming	Reciprocals		Advanced cooperation
Responsive peer tutoring		Complex observational learning	Cooperative play	Peer programming	Social comprehension		Advanced competition
		Learning in groups	Dramatic play	Naturally structured group activities	Play organizing		
	Discriminate appropriate assertiveness			Multiple step instructional activity	Group conversation		Fading tangible reinforcement

# Dynamic Programming

- Accountable management framework
- Sufficient staff and parent training
- Observation of complete therapy process (20-minute session)
  - Immediate therapist self-feedback
    - 80-90% evaluation window
  - Teaching procedures (fading, momentum and shaping) are immediate
  - Immediate reinforcement is differential and follow through occurs within the therapy session
  - Error practice and frustration are minimized
  - Stimulus control is managed to ensure consistency
  - Mastery requires generalization to novel exemplars
- Each therapist has a mechanism for developing clinical judgment at their level
- Optimum progress through dynamic evaluation
  - Daily, Weekly, Six-Month
- Continuous probing for learning level
- Developmental focus on long-term goals
- Optimal time is given to each objective daily
- Task analysis for daily success

# Dynamic Individualization by Supervisor

- Direct analysis of optimum procedure
  - Dynamic probe
    - Skill acquisition should be evaluated to progress through the dimensions of the matrix at optimum speed
  - Ongoing data analysis
    - The choice of procedure (ex.: behavioral momentum vs. prompt) should result in the least number of trials to daily acquisition
- Analytical isolation of procedures
  - There should be only one effective prompt or behavioral momentum procedure used
  - Only one skill should be taught at once
  - The procedure should be at least 90% effective in pragmatically producing the target in each trial
  - The procedure should be dynamically used to prevent side-effects (prompt dependency)

# Dynamic Programming

- Accountable management framework
- Sufficient staff and parent training
- Analyzing the therapy process (20-minute dynamic session)
  - Immediate therapist self-feedback
    - 80-90% evaluation window
  - Teaching procedures (fading, momentum and shaping) are immediate
  - Immediate reinforcement is differential and follow through occurs within the therapy session
  - Error practice and frustration are minimized
  - Stimulus control is managed to ensure consistency
  - Mastery requires generalization to novel exemplars
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- Continuous probing for learning level
- Developmental focus on long-term goals
- Optimal time is given to each objective daily
- Task analysis for daily success

# Intensity

# Comprehensive Parent Therapy

- The procedural objective of treatment is to train the parent so well that they could train their own staff
  - Train in the same manner as staff
  - Genuine involvement in evaluation, analysis and planning of therapy
  - Develop independent clinical judgment
  - Achieve criterion as behavior therapist
  - Treat the parents' clinical focus
- The outcome objective of treatment is to reach a state where the parents are naturally maintaining typical behavior

# Early Intervention

- Secondary Prevention
- Brain is more malleable at a younger age
- Brain develops quickly until 8 years of age
- Behavior of an older child is much harder to change
- Behavior of an older child is usually more severely challenging
- The logistics of working with the school system is more challenging

# Accountable Treatment

- Effective Evaluation of Therapy
  - Functional Data Collection
  - Direct Supervisory Observation
    - Dynamic probing of learning level
  - Responsive Analysis of Data
- Optimal Training and Supervision of Staff and Parents
  - Effective Prompting of Therapy Behavior
    - Sufficient modeling of individualized procedures
      - Type of mode, prompt, response requirement, and reinforcer
      - Consistent schedule of reinforcement and follow-through
      - Dynamic expansion, pacing, randomization, generalization, and naturalization
  - Effective Fading of Training Stimuli
    - Training of clinical judgment
      - Self-feedback mechanisms
      - Functional written directions
      - Active learning requirements
  - Ongoing Maintenance of Therapy Skills
    - Supervisory Overlaps and Contingencies
      - High standards
      - Direct reliability observation

# Comprehensive Staff Training System

- Pyramidal hierarchy of integrated staff training and management
  - BACB Certification
  - ABA Academic Training
    - Class participation or On-line
  - Pre-Service Competency-based Training Practicum
    - University or Internal
  - Orientation
  - Competency-based Training and Promotion System
    - Pyramidal hierarchy of synchronized clinical supervision, training and line of authority to empower trainers
  - Ongoing Clinical Management System
    - Individual Staff Accountability
  - Ongoing ABA Research Training
  - Needs-Focused Intensive Internal Consultation Workshops
  - External Training Services
  - External Site Reviews

# Evaluate Dynamic Behavior Therapy

- Six-Month ITP Progress Review
- Clinical ITP Review Meeting Prep Notes
- Discrete Trial Observation Sheet
- Dynamic Daily Organization Sheet
- Short-Term Objective Sheet
- Dynamic Data Sheet

# Behavior Therapist (BT)

Intensity	Competencies	Behavior Therapy	Dynamic Behavior Therapy
<p><b>Team delivers 41 hour per week:</b></p> <ul style="list-style-type: none"> <li>○ Four BT's deliver a total of 33 1:1 hours</li> <li>○ Four BT's each attend the 2-hour Clinical Review</li> </ul>	<p><b>Demonstrate Behavior Therapist:</b></p> <ul style="list-style-type: none"> <li>○ Clinical competencies</li> <li>○ Case management competencies</li> </ul> <p><b>Meet professional standards</b></p>	<p><b>Deliver direct therapy (i.e., implement programming) in:</b></p> <ul style="list-style-type: none"> <li>○ Structured Discrete Trial Training</li> <li>○ Natural Environment Training</li> <li>○ Clinical Review Meeting</li> </ul>	<p><b>Dynamic Therapy:</b></p> <ul style="list-style-type: none"> <li>○ Evaluate the momentary rate of acquisition per exemplar via data sheet</li> </ul>

# Core Behavior Therapist Clinical Competencies

- Identify, Implement, and Evaluate Effective Reinforcement
- Mass, Expand and Discriminate with Errorless Training
- Accurate Data Collection
- Accurate Data Analysis

# Behavior Therapist:

## Demonstrate Core Clinical Competencies

- Structured Environment Training
- Natural Environment Training
- Clinical Review Meeting

# Behavior Therapist Core Competency:

Identify, Implement and Evaluate  
Effective Reinforcement

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