

OSLO AND AKERSHUS  
UNIVERSITY COLLEGE  
OF APPLIED SCIENCES


# Operant Procedures for the Acquisition of Early Social Skills

National Autism Conference  
Penn State, 2016  
Per Holth

## Overview

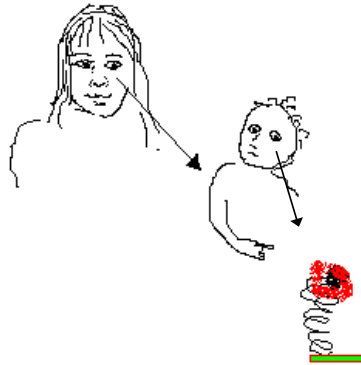
- Definition and illustrations of Joint Attention (JA)
- Research in developmental psychology
- JA deficits in children with autism
- Behavioral Perspectives
  - Basic behavioral principles overview
- JA and *Verbal Behavior*
- Novel behavior
- Implications for treatment

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## Definitions

- A Triad: A synchronizing of the attention of two or more persons with regard to some thing or event (e.g., Collis & Schaffer, 1975)



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## Definitions

- Although joint attention “typically refers to coordination of visual attention, . . . [it] may be achieved through other sensory modalities, such as vocalizations or physical contact” (Sarria, Gomez, & Tamarit, 1996, p. 49).

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## Examples



## Basic Distinctions

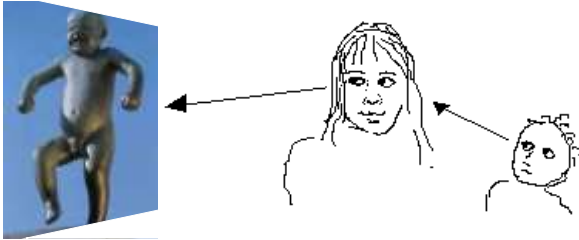
Responding (RJA) *“Listening”*

Initiating (IJA)

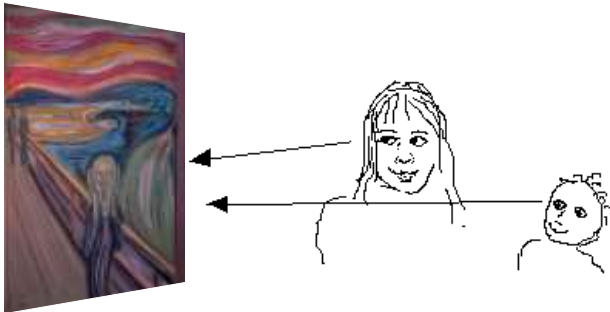
*Verbal*



### Gaze following 3



### Social referencing 3



## Initiating (IJA)

- Protoimperative
- Protodeclarative

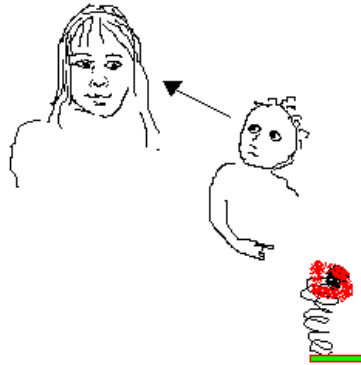


## Protoimperative

- “gestures intended to make another person do something for one’s benefit”
- sometimes preserved for cases that involve some type of “coordination of attention with other people”



## Protoimperative 8



## Protoimperative

- “gestures intended to make another person do something for one’s benefit”
- sometimes preserved for cases that involve some type of “coordination of attention with other people”

**MAND**

## Protodeclarative

- a preverbal effort to direct other's attention to an object or event
- “the purely social motive of sharing attention to something”



## Protodeclarative 10



# Protodeclarative

- a preverbal effort to direct other's attention to an object or event
- “the purely social motive of sharing attention to something”

TACT

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## Assignment 1e: Make behavioral sense of . . .

- Corkum & Moore (1995): “**joint attention plays an integral part in both the protodeclarative and protoimperative gestures**” (p. 64).
- Other's gaze direction .
- What does “share attention” boil down to?

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## Research in Developmental Psychology

- **Normative patterns** of emergence (e.g., Corkum & Moore, 1995; Scaife & Bruner, 1975)
- **Relation to later developing skills:**
  - **'symbolic abilities'** (Hobson, 1993; Mundy, Sigman, & Kasari, 1993),
  - **'language abilities'** (Baldwin, 1995; Bates et al., 1979; Bruner, 1975; Tomasello, 1988; Mundy & Gomes, 1998)
  - **'general social-cognitive processes'** (Baron-Cohen, 1995; Bruner, 1975; Mundy, 1995; Tomasello, 1995).
- **A syndrome-specific deficit** in autism (e.g., Baron-Cohen, 1989, Mundy & Crowson, 1997; Sigman & Kasari, 1995; Sigman, Kasari, Kwon, & Yirmiya, 1992).



## Usefulness of structural developmental approaches

- for identifying children with a deviant development
- for formulating intervention goals
- for evaluating intervention outcomes
  
- However, it has not identified independent variables and, hence, is not very useful for developing effective interventions



## Behavioral Perspectives

- **Whalen & Schreibman (2003)**
  - Joint attention training for children with autism using behavior modification procedures. *Journal of Child Psychology and Psychiatry*, 44, 456-468.
- **Jones & Carr (2004)**
  - Joint attention in children with autism: Theory and intervention. *Focus on Autism and other Developmental Disabilities*, 19, 13-26.
- **Dube, W. V., MacDonald, R. P. F., Mansfield, R. C., Holcomb, W. L., & Ahern, W. H. (2004).**
  - Toward a behavioral analysis of joint attention. *The Behavior Analyst*, 27, 197-207.



## Whalen & Schreibman (2003): Intervention Study

- Discrete trial training (DTT) and pivotal response training (PRT)
  - Child-chosen or child-preferred materials and activities
  - Natural reinforcers
  - Interspersal of easier tasks between more difficult instructional tasks

1. Responding
2. Initiating



## Results

- RJA skills were successfully established in all five children during RJA training
- Little or no change in IJA following RJA training
- When trained, the IJA skills, gaze shifting and pointing, were successfully established in four of the five children
- IJA skills generalized to different settings, including in the presence of the child's parent
- **Marked drop in IJA skills, both gaze alternating and "protodeclarative" pointing at 3-month follow-up compared to immediately post treatment**



## Differential response consequences

- Correct response → Choice of toys  
Toys kept
- Incorrect or no response → Toys removed



## Jones & Carr (2004): Form and Function

- JA is more than just a repertoire of gestural and gazing skills
- Intervention programs have effectively taught forms, but not function
- Functions:
  - “Share one’s experience”
  - “Social interaction concerning objects and events in the surrounding world”
- Suggestions for interventions
  - Pivotal response training
  - Establish the adult as a generalized reinforcer



## Pivotal response training

1. Child-chosen or child-preferred materials and activities
  2. Natural reinforcers
  3. Interspersion of easier tasks between more difficult instructional tasks
- However, (1) and (3) both seem to boil down to ways of ensuring effective sources of reinforcement, and
  - (2) only highlights the basic problem – that those “natural reinforcers” do not work



## Establish the adult as a generalized reinforcer

- “Repeatedly pairing the presence of the adult with a wide variety of highly preferred reinforcers”
  
- “Such a strategy, though possessing face validity, has yet to be tested empirically”
  
- Does it work?
  - Pairing
  - Adult as generalized reinforcer



## Jones, Carr, & Feeley (2006)

1. Basic RJA and IJA skills established and better maintained when
2. Parent training skills were taught
3. Natural social interactions were backed up by primary reinforcers
4. Maintenance contingencies were programmed
  - Unknown what would happen in the absence of contrived contingencies



## Dube et al., 2004: Contingency Analysis ABCs

- Antecedent stimuli
  - novel events
  - the line of regard of another person
- Behavior (forms)
  - head turning, altering of eye direction, gaze alternating, pointing, touching, and grabbing and lifting objects (showing)
- Consequences: Reinforcing social stimuli
  - “specific” reinforcers mediated by others
  - “mand compliance”
  - other’s line of regard
  - “sharing” and “approval”



## «Sharing» and «approval» – generalized reinforcers

- Other’s gaze - direction & shift
- Nod
- Smile
- Relevant comments (intraverbals)
- ”Yes”, ”sure”, ”oh”, ”uh-huh”



## How are new reinforcers most effectively established?

- correlate (pair) with primary reinforcer

or

- establish as  $S^D$  for responses that produce a primary reinforcer



## Conditioned reinforcer: $S^D$

- It is now quite certain that if a stimulus is to become a secondary reinforcer it must become a *discriminative* stimulus. (Keller, 1954, p. 58)



## Pairing? Lovaas et al., 1966

- “. . . empirical evidence shows (Kelleher and Gollub, 1962) that one can sometimes establish a previously neutral stimulus as an acquired reinforcer, via the classical conditioning paradigm”
- “. . . we failed to observe such effects in the two children with whom we worked.”
- “We did pair, in several hundreds of trials, the word ‘good’ with food delivery . . .”
- “Subsequent tests of ‘good’ for secondary reinforcing properties were negative; there were no modifications in the child’s behavior when that behavior was accompanied by ‘good’.” (p. 111)



## Take it to the lab 1

Pairing

SD Procedure

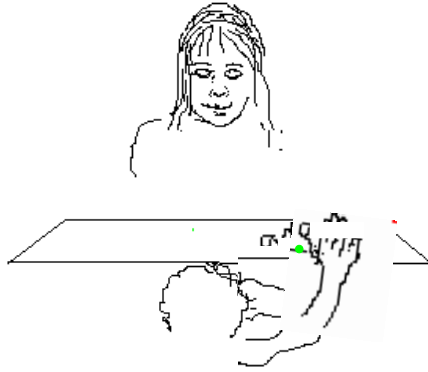


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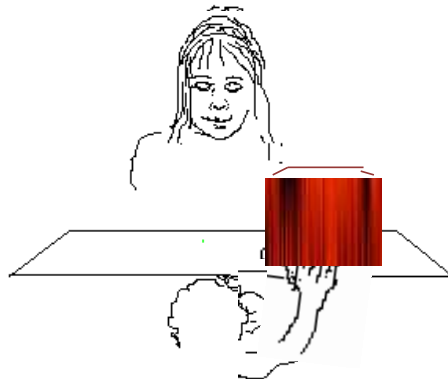




## Establish other's looking, smiling and nodding as S<sup>D</sup>

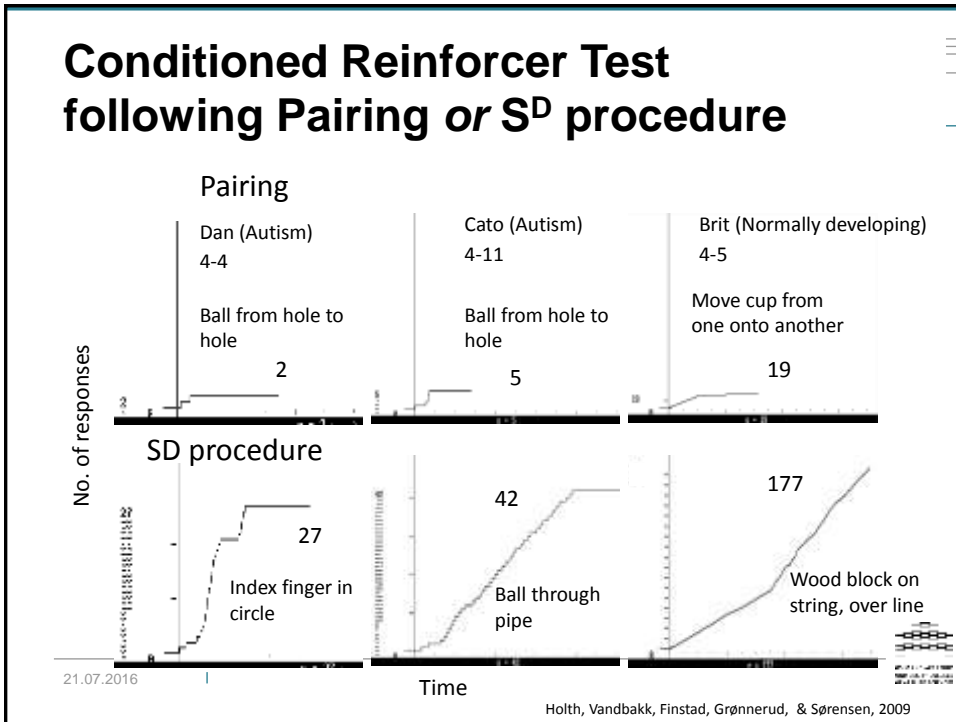


## Establish other's looking, smiling and nodding as S<sup>D</sup>



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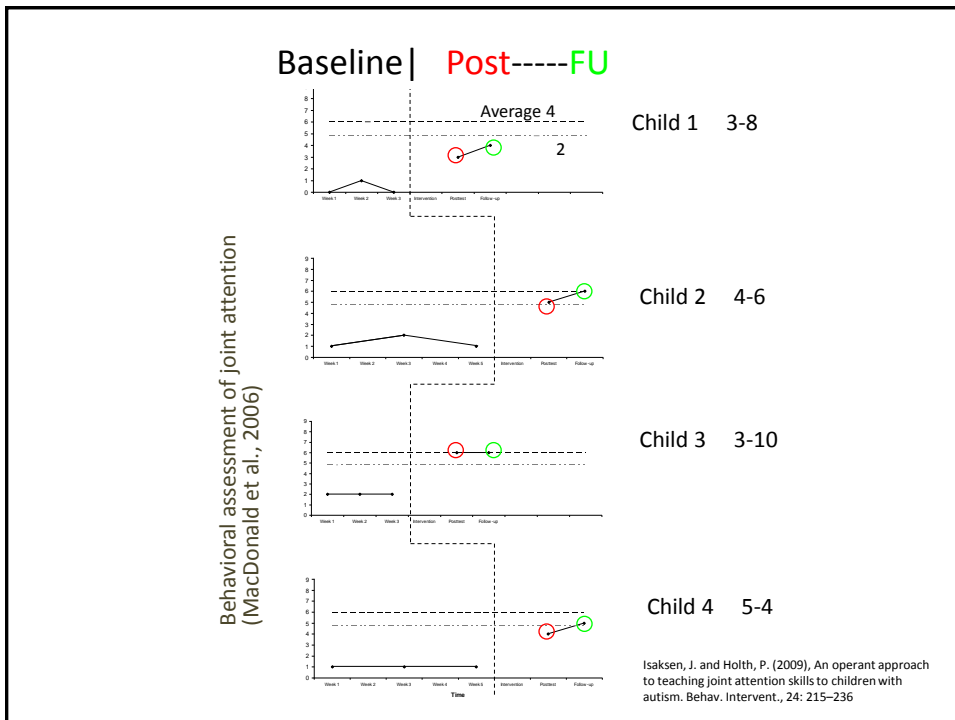


## Training extended to more natural environments

Go get that thing from over there

No, Not that one.  
Nod & Smile

The illustration shows a hand pointing to the left. Two cartoon figures in athletic wear are running towards the right. The figure in the front is nodding and smiling. To the right is a brown paper bag labeled 'Mystery Bag'. A date '21.07.2016' is in the bottom left, and 'PH' is in the bottom center.



## Natural reinforcers

- When natural social consequences (nods, smiles and comments) are established as reinforcing consequences for a child's behavior, explicit instruction and contrived consequences may be less needed
- Behavior may be automatically shaped by those natural consequences
- As Comenius put it, the more the teacher teaches, the less the student learns (Skinner, 1971)

## Take it to the lab 2



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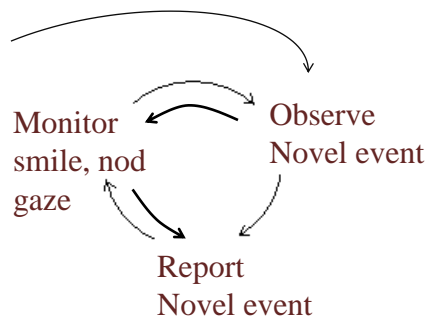


## Natural sources of a conditioning of social reinforcers

**S<sup>D</sup>s** for identifying other novel events

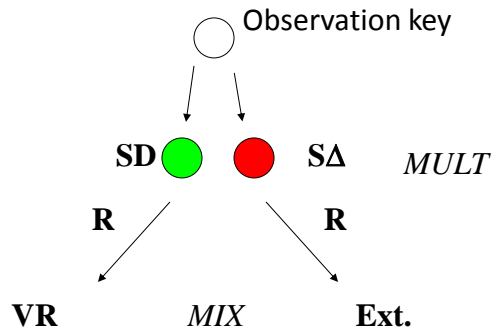
Lower frequency of **S<sup>A</sup>s** and **S<sup>R</sup>s**

Higher frequency of reinforcement



# Observing responses

Dinsmoor (1983)

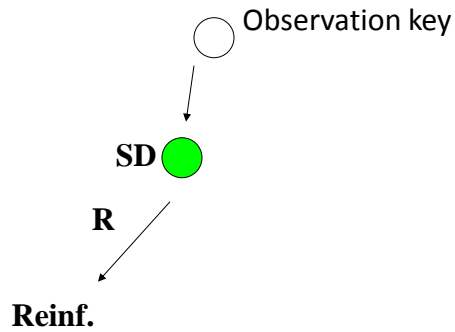


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# Observing responses

Dinsmoor (1983)

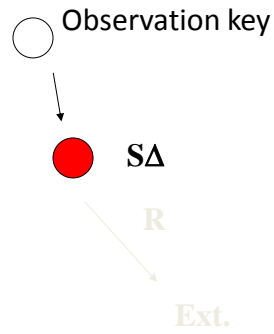


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# Observing responses

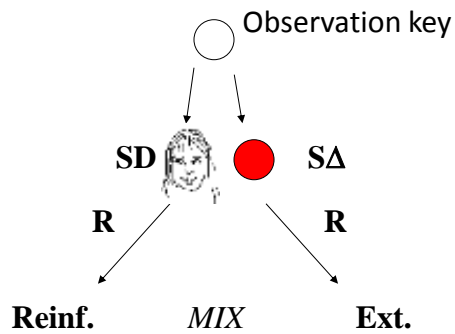
Dinsmoor (1983)



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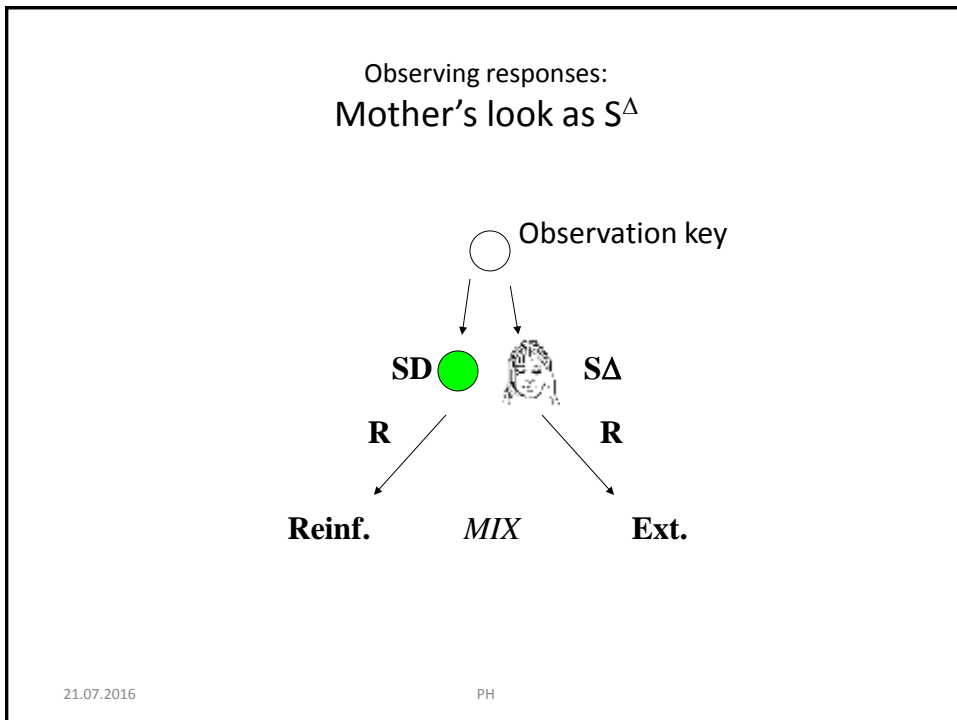
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## Observing responses: Mother's look as S<sup>D</sup>



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## Themes related to *Verbal Behavior*

### — VB issues important to JA

- Speaker – Listener
- Mands – Tacts
- Discrimination of novel events
- Autoclitics

### — JA issues important to VB

- 'Poverty of the stimulus' argument
- The definition of VB



## VB observation 1: Discrimination of novel events

- "Familiar objects lose their control because the community eventually withholds reinforcement except under special conditions. Only objects which are unusual in some respect or which occur in unusual surroundings, are important to the listener and hence provide the occasion for reinforcing the speaker[’s behavior]"

Skinner, 1957, pp. 89-90.



## Check outside the lab

### Hothead



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## Lack of discrimination of novelty

- Particularly conspicuous feature in children with autism
- A parent letter to the ME list

”Does anyone have any ideas on how to develop a program on teaching a child to comment? My son . . . does not make comments. A purple cow could walk by and he wouldn't mention it.”



## Novelty

Arrange for the reinforcement of responses to novel stimuli

- What's missing?
- What's new?
- What's changed?
- What's strange?



## VB observation 2: Autoclitics

- Attention-directing as autoclitic behavior
- Motivational Operations: Stimuli that are correlated with defective listener reactions - misunderstanding
  - "Look" (gaze/point)
  - Acoustic marking - intonation



## Acoustic markers



1. Reading: Put the glass/cup upon/under/in front of/behind /besides the bread bin.
2. Instruction following.
3. Reinforcement/Correction: New instruction if incorrect instruction following.



## Acoustic markers



1. "Put the cup in front of the bread bin."
2. Incorrect instruction following.
3. "Put the cup in front of the bread bin."



## Acoustic markers



1. "Put the glass in front of the bread bin."
2. Incorrect instruction following.
3. "Put the glass in front of the bread bin."



## VB criticism 1: The Poverty of the Stimulus

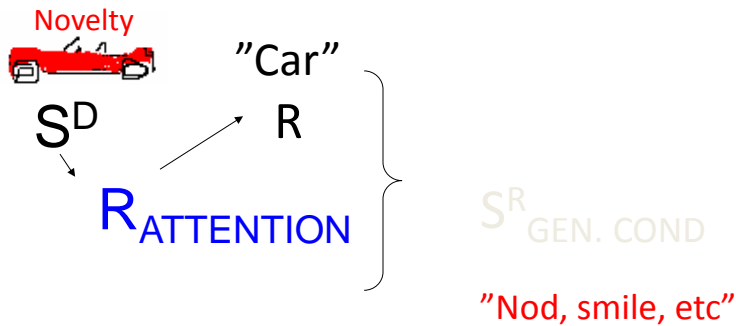
$$S^D \rightarrow R_V \rightarrow S^R_{\text{GEN. COND}}$$

- "We account for the strength by showing that **in the presence of** the object or event a response of that form is characteristically reinforced in a given verbal community."

## Poverty of the Stimulus Argument - "in the presence of" . . . a car?



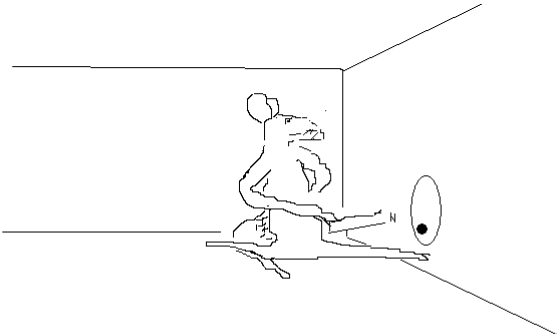
## The Contingency in Tact Training




## VB criticism 2: The Definition of Verbal Behavior

- The definition was far broader than the culture understands the term – it includes leverpressing in rats
- Leads to results that are "behaviorally bizarre" – behavior being defined as verbal depending on the sources of its independent variables even when those sources are irrelevant to the contingencies with which behavior makes contact

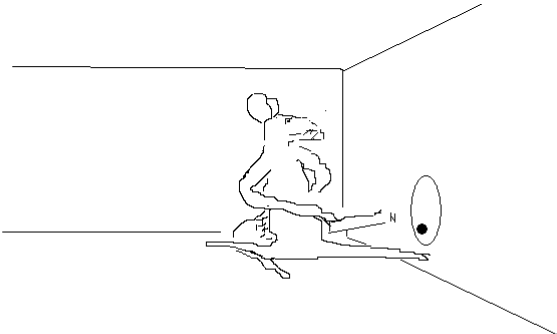
### Joint attention as a characteristic of verbal behavior




1



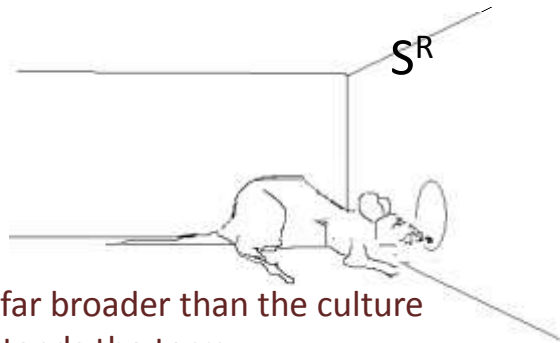
### Joint attention as a characteristic of verbal behavior



1



## Joint attention as a characteristic of verbal behavior



1. Not far broader than the culture understands the term
2. Not "behaviorally bizarre" – because no non-social contingencies could possibly produce such performance



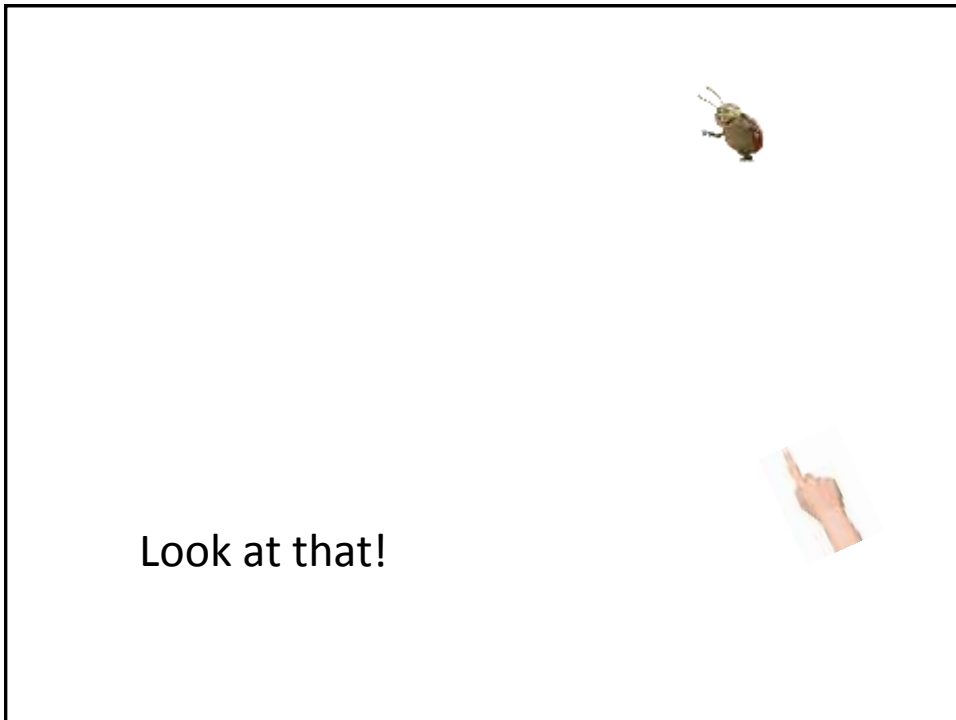
## IJA performances as Continuous Repertoires

- Pointing/gazing and Point-/gaze following are continuous repertoires – in which a slight change along some stimulus dimension is accompanied by a corresponding change in a response dimension



- Sufficient multiple exemplars





## Take it to the lab 3

[Lab rats playing](#)

— <http://www.youtube.com/watch?v=fyHjxZB3pMs>

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## Some of implications for applied behavior analysis

- 1. Establish normal social behavioral consequences as conditioned reinforcers, using S<sup>D</sup> procedures**
  - because simple pairing may not work that well
- 2. Whenever possible, keep any tangible "reinforcers" out of sight during training**
  - because if always visible, the conditioning of social reinforcers may be blocked
- 3. Teach discrimination of novel events**
  - because listeners will not reinforce comments on, or IJA's, regarding the obvious
- 4. Establish JA skills as continuous repertoires, using multiple exemplars**
  - because you cannot teach everything



**End**

Thank you



## Selected Readings

Baldwin, D. A. (1995). Understanding the link between joint attention and language. In C. Moore & P. J. Dunham (Eds.), *Joint Attention: Its Origin and Role in Development*, pp. 131-158. Hillsdale, N. J.: Lawrence Erlbaum.

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