

Instructional Pacing and Children with Autism Spectrum Disorders

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National Autism Conference
Thursday, August 1, 2013 - 9:00am to 12:00pm



Learning Objectives

- Describe Importance of Active Student Responding (ASR) to students with ASD
- Identify elements of the learning trial and pacing
- Describe procedures and results of pacing studies
- Identify considerations for implementing brisk pacing for students with ASD
- Describe strategies to increase the pace of teaching for students with ASD
- Identify areas for future research



Format for Today's Talk

- Lecture on core concepts
- Breaks for questions
- Breaks for activities



- Who am I?
- Who are you?
 - Professionals?
 - Researchers?
 - Students?
 - Parents?



The BIG Problem

- Students who display chronic challenging behavior are at greater risk of
 - academic difficulties
 - school failure and drop-out
 - aggression, truancy, vandalism
 - contact with the legal system



The BIG Problem

- Challenging behavior has negative impacts on teachers, as well
 - Reduced willingness to tolerate diversity in the classroom (Hamil & Dever, 1998)
 - Increased stress (Keiper & Busselle, 1996; Lewis, 1999)
 - Increased risk of attrition (National Commission for Teaching and America's Future, 2002)



Autism Spectrum Disorder

- Challenging behavior and students with ASD
 - Repetitive, stereotyped behaviors are a core deficit of ASD
 - "Restricted, repetitive patterns of behavior, interests, or activities" (APA, 2013)
 - Learning rates are significantly lower when children with ASD engage in self-stimulatory behaviors (Koegel & Covert, 1972)



One Solution?

- Implement **effective classroom instruction** with students with chronic behavior problems (Rosenberg, Wilson, Maheady, & Sindelar, 2003)
- Increase **Active Student Responding (ASR)** to improve instructional effectiveness



Active Student Responding

- "Observable student responses made to instructional antecedents." (Heward, 1994)
 - Learning is enhanced when students are **actively** engaged with instructional materials
 - Active responding correlates strongly with academic achievement (Good & Brophy, 2003)
 - Focuses on increasing students' **observable** and **repeatable** responses during instruction



Active Student Responding

- Benefits of increasing ASR (Justus, 2007)
 - enhancing student participation during instruction
 - decreasing off-task behavior
 - increasing accuracy of student responses during instruction
 - improving performance on quizzes and tests
 - enhancing retention and generalization of material



Active Student Responding

- Strategies to increase ASR
 - Response cards (Justus, 2007)
 - Choral responding (Kamps, Dugan, Leonard, & Daoust, 1994)
 - Peer tutoring and cooperative group methods (e.g., Stenhoff & Lignugaris/Kraft, 2007)
 - **Brisk instructional pacing**

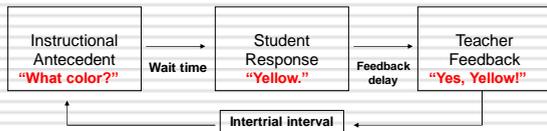


Instructional Pacing

- Instructional pacing
 - The **speed** with which a teacher delivers instruction
- Measured by
 - the rate or duration by which a teacher conducts discrete and repeatable elements within a sequence of **learning trials**



The Learning Trial



Discrete Trial / Learning Trial

- 3 components of a discrete trial
 - Discriminative stimulus (S^D)
 - Student response (R)
 - Delivery of reinforcement (S^{R+})



Instructional Pacing

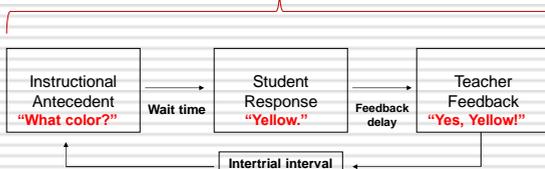
- Teacher controlled pacing variables within the learning trial
 - Speaking rate / WPM (Tincani, Ernsbarger, Harrison & Heward, 2005)
 - Teacher wait-time (Valcante, Roberson, Reid & Wolking, 1989)
 - Student response-delay (Dyer, Christian & Luce, 1982)

Instructional Pacing

- Feedback delay
- Duration of inter-trial interval (Carnine, 1976; Koegel, Dunlap & Dyer, 1980; Roxburgh & Carbone, 2012)

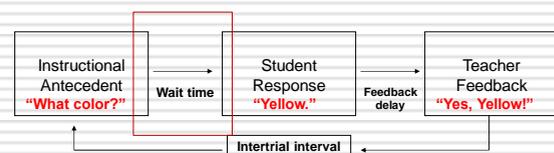
Speaking rate as WPM

- Simply, talking faster or slower



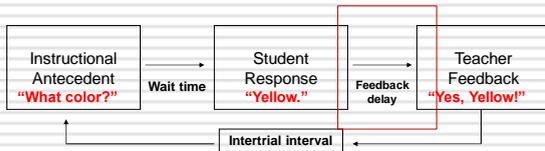
Teacher wait-time / Student response delay

- Often, using a cue or signal to control the student's response latency



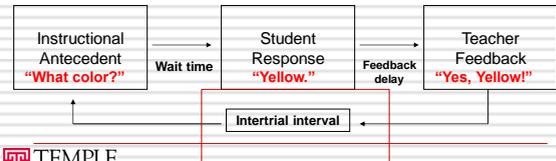
Feedback delay

- ❑ Should be as brief as possible to increase the likelihood of consequence functioning as S^R



Wait-time

- ❑ "Down time" in between learning / discrete trials



Questions?

Activity

- Identify a lesson for a student with ASD for which pacing is an alterable variable
 - ❑ Talk rate
 - ❑ Wait-time / response delay
 - ❑ Feedback delay
 - ❑ Duration of ITI
- Can you **modify** this lesson to increase or decrease the pace of instruction?
- If yes, how?

Traditional Views on Instructional Pacing

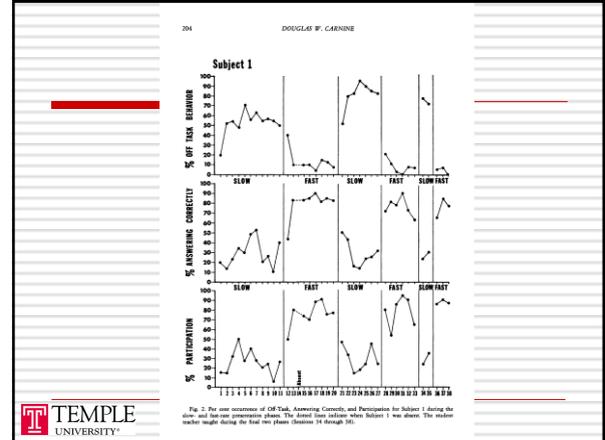
- ❑ Slower is better (Kauchak, Eggen, & Carter, 2002)
- ❑ Students need time to think and process information
 - This is especially the case for students with disabilities
- ❑ Increase wait-time and inter-trial interval

Traditional Views About Instructional Pacing

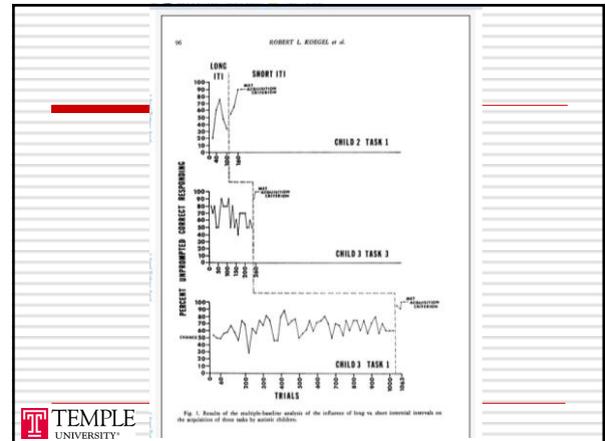
- ❑ BUT,
 - For students with disabilities, learning, or behavioral problems, research suggests that **increasing** the pace of instruction may improve classroom performance and learning (see Tincani, Ernsbarger, Harrison, & Heward, 2005)
 - ❑ Increased ASR
 - ❑ Improved response accuracy in some cases
 - ❑ Decreased off-task behavior

Previous Research

- Carnine (1976): Remedial reading lessons were presented to first graders at two paces: slow (ITI of 5 sec) and fast (ITI of 1 sec or less).



- Koegel, Dunlap, & Dyer (1980): Children with autism responded more accurately and learned tasks in fewer trials with 1-sec ITI than with ITI of 4-sec or longer.



- Darch & Gersten (1985): Students with learning disabilities made more correct responses and had higher levels of on-task behavior during fast-paced reading instruction (1-sec ITI) than during slow-paced teaching (5-sec ITI). Student performance was better still when fast-paced instruction was combined with teacher praise for participation and correct responding.

- Roxburgh and Carbone (2012) examined the effects of three presentation rates on
 - Problem behavior, teacher presented instructional demands, frequency of learner responses
 - time between the completion of a learner response to an instructional demand and the presentation of the next instructional demand
 - 1-sec, 3-sec, 10-sec
 - ITI

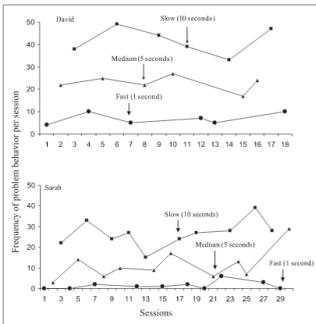
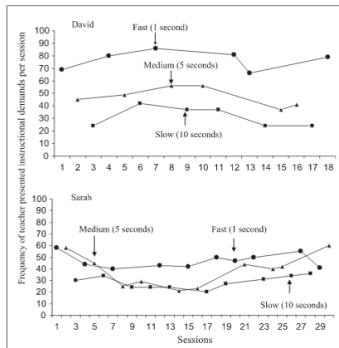


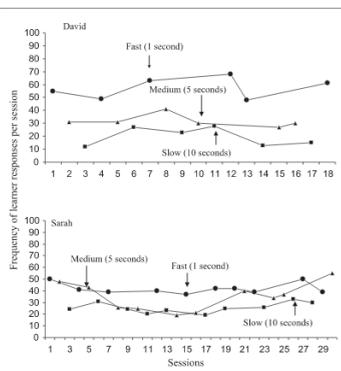
Figure 1. Frequency of problem behavior per session during fast, medium, and slow teacher presentation rates for David and Sarah.



Study 1

Effects of Inter-Trial-Interval and Talk Rate on Student ASR

Tincani, M., Ernsbarger, S., Harrison, T. J., & Heward, W. L. (2005). Effects of two instructional paces on pre-K children's participation rate, accuracy, and off-task behavior in the Language for Learning Program. *Journal of Direct Instruction*, 5, 97-109.



Students, Setting, Curriculum Content

- Four typically developing pre-K children; two boys and two girls; ages 5-6 years
 - Attending an inclusive summer school program in an urban charter school
 - High rates of disruptive and off-task behavior

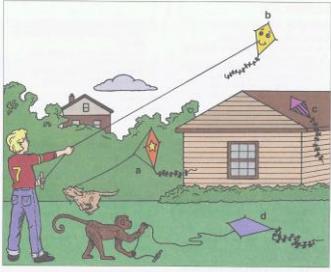
Students, Setting, Curriculum Content

- Experiment conducted during daily small-group language lessons
 - Student response mode: choral responding
 - Curriculum: **Language for Learning (A)** Lessons 33 - 46
 - Descriptions of objects, actions, pronouns, spatial relationships, **prepositions**

EXERCISE 6 Prepositions—On/Over

1. We're going to talk about the kite and a house.
 - (Point to a kite.) What is this? (Touch.) A kite.
 - (Point to the house.) What is this? (Touch.) A house.
2. One of these kites is on the house. (Point to each kite and ask.) Is this kite on the house? (The children answer yes or no.) (Repeat until all children's responses are firm.)
3. (Point to c.) Everybody, where is this kite? (Touch.) On the house.
 - Say the whole thing about where this kite is. (Touch.) This kite is on the house.
 - (Repeat until all children can make the statement.)
4. One of these kites is over the house.
 - (Point to each kite and ask.) Is this kite over the house? (The children answer yes or no.)
 - (Repeat until all children's responses are firm.)
5. (Point to b.) Everybody, where is this kite? (Touch.) Over the house.
 - Say the whole thing about where this kite is. (Touch.) This kite is over the house.
 - (Repeat until all children can make the statement.)

Individual Turns
(Repeat the exercise, calling on different children for each step.)



Lesson 34

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Research Questions

- What are the differential effects, if any, of fast and slow teaching during small-group instruction on
 - the number of **opportunities to respond** presented by the teacher per min?
 - students' **correct academic response rate**?
 - **off-task** behavior?

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Independent Variables

- **Slow Teacher** – Teacher read lesson script at 35 – 59 WPM with 5-sec inter-trial interval (ITI).
- **Fast Teacher** – Teacher read lesson script at 82 – 104 WPM with 1-sec or less inter-trial interval (ITI).

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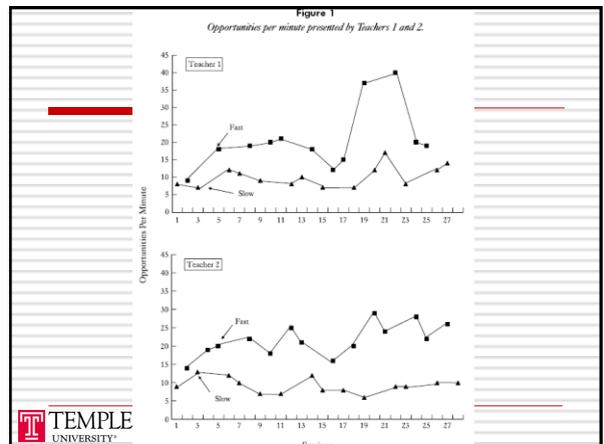
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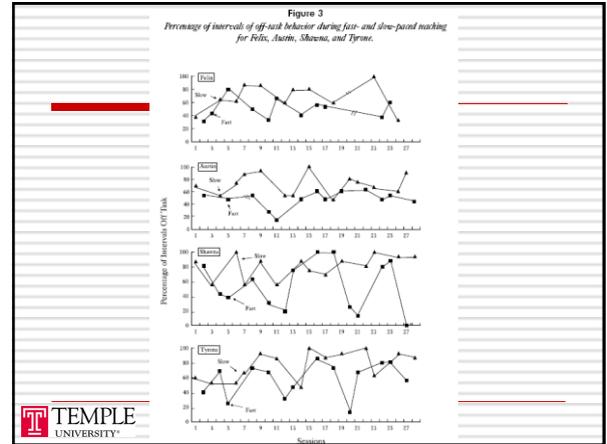
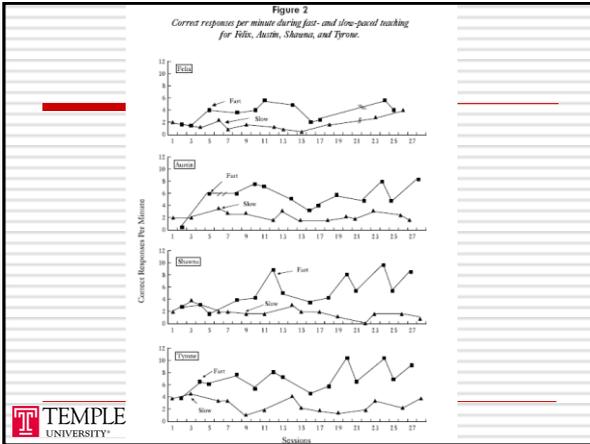
- Single-subject alternating treatments design

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Results

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Results

- ❑ Fast pacing increased teacher-presented opportunities to respond
- ❑ Fact pacing increased students' participation and correct responding
- ❑ Fast pacing decreased students' off-task behavior, though levels were variable and fairly high

Study 2

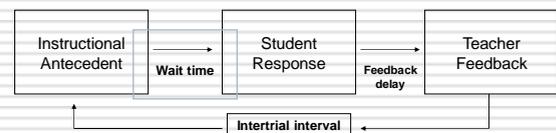
Effects of Wait-time on Student ASR

Tincani, M. & Crozier, S. (2008). Comparing brief and extended wait-time during small group instruction for children with challenging behavior. *Journal of Behavioral Education*, 16, 355-367.

Previous Research

- ❑ In contrast to ITI, research has shown that **longer** (3-5 sec) versus **shorter** (1 sec) wait-time is desirable for students with severe disabilities (e.g., Dyer, Christian, & Luce, 1982)
- ❑ However, no research has compared the effects of brief versus extended wait-time on students with mild – moderate disabilities who display high rates of challenging behavior.

The Learning Trial



Students, Setting, Curriculum Content

- Two boys (6 and 7 yrs.) with high rates of challenging behavior and language delays
 - **Michael**: No formal diagnosis (probable E/BD), BRP-2 score at 1st percentile
 - **Nathan**: Diagnosed with autism, BRP-2 score at 2nd percentile
- Lessons 31 – 40 of *Language for Learning*



Research Questions

- What are the effects of brief (1 s) and extended (4 s) **wait-time** on
 - Opportunities to respond per minute?
 - Academic responses per minute?
 - Accuracy?
 - Off-task behavior?



Independent Variables

- Brief wait-time
 - Teacher paused **1 second** after asking the question to deliver the response cue
- Extended wait-time
 - Teacher paused **4 seconds** after asking the question to deliver the response cue



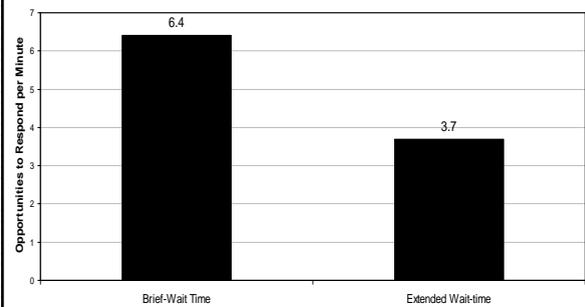
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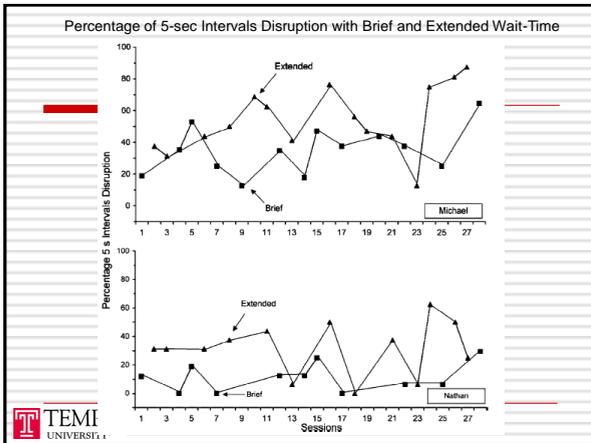
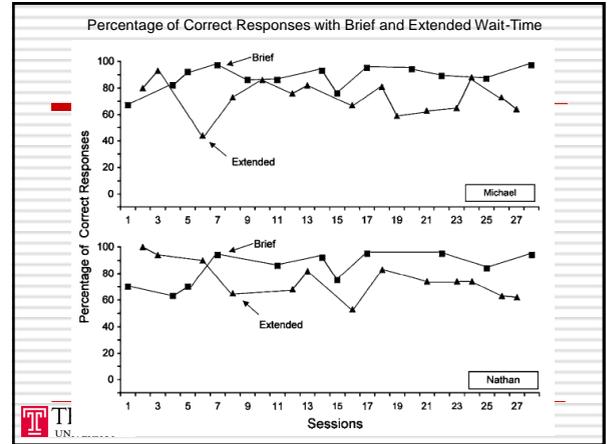
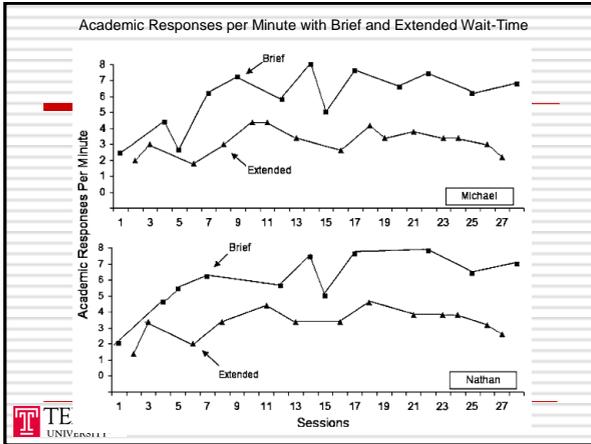
- Single-subject alternating treatments design



Results

Average Teacher Presented Opportunities to Respond Per Minute





Results and Implications

- Fast instructional pacing increased student participation, correct responding, and accuracy
- Fast instructional pacing decreased off-task behavior, though it remained at variable high levels
 - Function based interventions?
- Fast instructional pacing increased the **efficiency** of instruction

Results and Implications

- Results support the use of brisk pacing to increase ASR of students with challenging behavior
- However,
 - Brisk instructional pacing is more feasible with scripted Direct Instruction curricula and requires **precise instructions, prompting, and error correction**

Study 3

Brief Wait-Time and Students with ASD

LaMela & Tincani (in press). Brief wait time to increase response opportunity and correct responding of children with autism spectrum disorder who display challenging behavior. *Journal of Developmental and Physical Disabilities*.

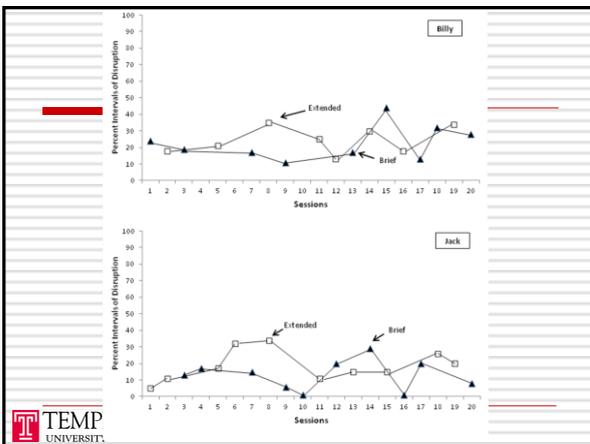
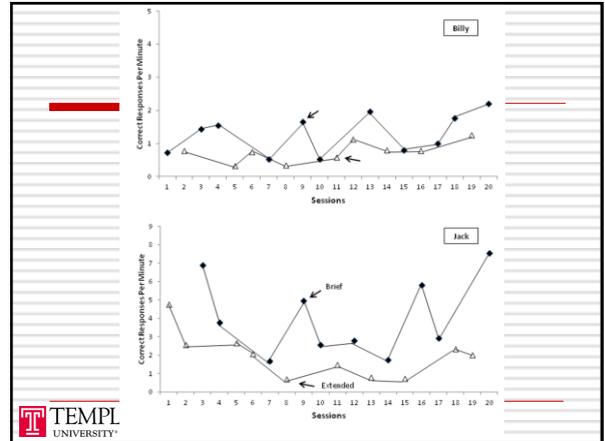
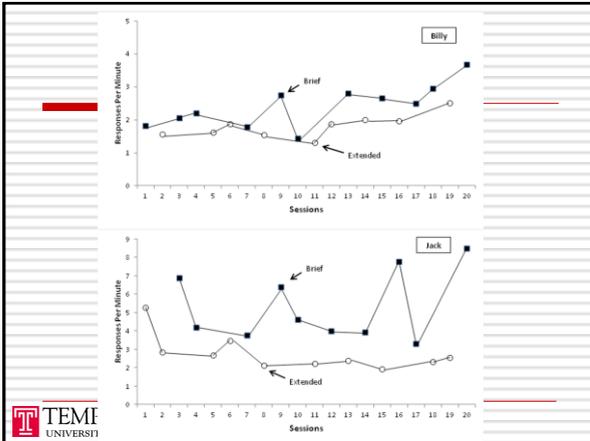
Students, Setting, Curriculum Content

- Billy, 5-year-old with PDD-NOS
- Jack, 5-year-old with autism
- Center-based early intervention program
- Discrete trial programming, e.g., expressively identifying (tacting) picture cards



Research Questions & Procedures

- What are the effects of brief (1 s) and extended (4 s) **wait-time** on
 - Response per minute?
 - Correct responses per minute?
 - Disruption?
- Training instructor to use a cue for responding
 - "Go" card; pointing with an index finger

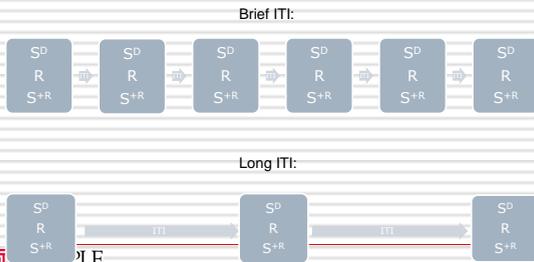


Collective Findings

- Pacing increases rate of active student responding
 - Participation, correct responding



Duration of ITI



- In some cases, brisk pacing may enhance response accuracy
- Brisk pacing may have some effect on challenging behavior, but it is not necessarily a stand alone intervention

Questions?

Activity

- Consider the lesson for a student with ASD you identified in the previous activity
- How could you modify this lesson to **increase** the pace of instruction?

Caveats

- Pacing should be used in conjunction with **individualized, function-based** interventions
- Pacing should be used in conjunction with **secondary prevention strategies**
 - Posting rules and expectations
 - Increasing ratio of praise-to-behavior correction
 - Other high ASR strategies

Table 2. Classroom Management Assessment

	Practice	Rating	
1.	I maximized structure and predictability in my classroom.	Yes	No
a.	I explicitly taught and followed predictable routines.	Yes	No
a.	I arranged my room to minimize crowding and distraction.	Yes	No
1.	I posted, taught, reviewed, monitored, and reinforced a small number of positively stated expectations.		
a.	I operationally defined and posted a small number of expectations (i.e. school wide rules) for all routines and settings in my classroom.	Yes	No
a.	I explicitly taught and reviewed these expectations in the context of routines.	Yes	No
a.	I prompted or pre-corrected students to increase the likelihood that they will follow the expectations.	Yes	No
a.	I actively supervised my students.	Yes	No
1.	I actively engaged students in observable ways.		
a.	I provided a high rate of opportunities to respond during my instruction.	Yes	No
a.	I engaged my students in observable ways during teacher directed instruction (i.e. I use response cards, choral responding, and other methods).	Yes	No
a.	I used evidence-based methods to deliver my instruction (e.g. Direct Instruction).	Yes	No
a.	I used a continuum of strategies to acknowledge appropriate behavior.		

Fast-paced teaching *does not mean*:

- ❑ Teachers should hurry their presentation
- ❑ Teachers should rush students in terms of the time they are given to respond
- ❑ Teachers should rush or eliminate praise and/or corrective feedback to students after they respond
- ❑ A *rapid presentation pace* DOES mean reducing the time between learning trials and, where appropriate reducing wait time.



What Contributes to Slow Teaching?

- ❑ Insufficient preparation prior to lesson
- ❑ Unnecessary transition and management time
- ❑ Long inter-trial
- ❑ Time-consuming error correction



General strategies for increasing the pace of instruction

- ❑ Prepare and practice the lesson beforehand
- ❑ Develop a system of cues to mark your place during lesson, provide needed details, or indicate next step
- ❑ Limit transition time during lesson.
- ❑ Use short ITI
- ❑ Correct students' errors directly and efficiently



Specific strategies

- ❑ Decreasing the duration of student response latency (LaMela & Tincani, 2012)
 - After presentation of an instructional antecedent, present cue stimulus to the student
 - Block or ignore responses prior to the cue
 - Provide reinforcement when the student responds on cue
 - Gradually decrease time between the antecedent stimulus and response cue, shaping successively quicker responses



Specific strategies

- ❑ Decreasing ITI (Klatka, 2013)
 - Gather and prepare materials for each program / lesson ahead of time
 - Organize the teaching area so materials are close at hand
 - Keep inter-trial commenting to a minimum
 - Increasing the number of discrete trials in between each token delivery
 - Maintain silent count of ITI in between trials

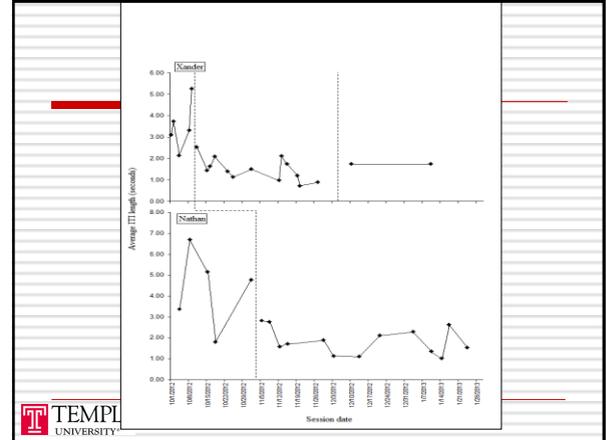


Specific strategies

- ❑ Use feedback and goal setting (Klatka, 2013)
 - Keep a timer in the instructional area, visible to the teacher
 - Record the total duration of ITIs during the session and number of instructional antecedents presented by the teacher during the session
 - Divide # instructional antecedents / total duration of ITIs to determine average ITI duration



- Graph daily average duration of it is
- Have teacher set reasonable goal for decreasing ITI below baseline duration (e.g., from 5-sec to 1-sec)
- Provide daily feedback on average duration of ITI relative to the goal



Future Research

- Pacing as a classroom-level intervention
- Focus on teachers who are struggling with slow pacing
 - Feedback and goal setting to increase pacing
- Optimal duration of wait-time depending on instructional material
- Effects of wait-time / pacing on student accuracy

- Effects on learning and retention of information
- Extension to general education and other classrooms in the context of School-wide positive behavior support

Questions

Activity

Contact

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