The Role of the Conditioned Reflexive Motivating Operation (CMO-R) During Discrete Trial Instruction of Children with Autism

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Brief History of Motivation In Behavior Analysis

- Motivation in behavior analysis has frequently been confused with the role of reinforcement as a consequence.

- The clear identification of motivation as an antecedent environmental variable event began with the publication of B. F. Skinner’s *Behavior of Organisms* (1938).

- Skinner included two chapters devoted to motivation.

- He argued against the term “drive.” Skinner asserted that, “The ‘drive’ is a hypothetical state interpolated between operation and behavior and is not actually required in a descriptive system.” (p. 368)

- Moreover, he differentiated between motivational control and stimulus control by declaring that a “Drive is Not a Stimulus”.

- He relied on the operations of deprivation/satiation and presentation of aversive stimuli to describe motivation.

- Keller and Schoenfeld’s book *Principles of Psychology* (1950)
  - This book contained a chapter devoted to and titled “Motivation.” It contained several refinements to the topic of motivation (Sundberg, 2005)
    - They further developed the analysis of deprivation/satiation and response strength.
    - They provided detailed analysis of how an aversive stimulus can function as a motivational variable.
• Keller and Schoenfeld gave a name to a newly discovered behavioral variable, “The establishing operation is our independent variable, the behavior our dependent variable; the former is specifiable as to kind and degree, the latter is measured by the extent of change. The concomitant variation of the two gives rise to, and defines, the concept and problem of motivation” (Keller & Schoenfeld, 1950, p. 273).

• In the book Verbal Behavior (1957) Skinner provided a comprehensive analysis of how motivational variables contribute to a human’s initial acquisition of language (Sundberg, 2005).

• It is here that he introduced the concept of the mand and argued that it was separate from the other operants because of its control by motivational variables, rather than discriminative stimuli. He also described how motivational variables could be manipulated to evoke verbal behavior.

Refinement of the Concept of the EO

• Through a series of writings, Michael (1982; 1988; 1993; 2000; 2007) refined the concept and principle of the establishing operation (EO) and defined it as an “environmental event, operation, or stimulus condition that affects an organism by momentarily altering a) the reinforcing value of other events and b) and alters the frequency of behavior that has produced what is now valued.

• Michael (1993) described two (2) types of EOs: Unconditioned and Conditioned.
  Unconditioned EOs (UEOs) are “events or operations or stimulus conditions whose value altering effects are unlearned,”

  Conditioned EOs (CEO s) “value altering effects have been learned during the individual organism’s learning history.”
Michael (2007) lists nine main unconditioned motivating operations (UMOs) for humans, e.g. food, water, pain, etc. By manipulating UMOs in the form of deprivation, satiation, and conditions of aversion, learners can be taught many important skills.

For example, a teacher who takes advantage of the deprivation of food that occurs just prior to lunch would be more easily able to now teach a child to mand (request) a food item by saying its name.

However, much of the reinforcement that leads to children learning important skills is conditioned. Therefore, a thorough understanding of conditioned motivation operations (CMO) is crucial.

There are three types of CMOs as described by Michael (1993, 2007):
1. Conditioned Transitive Motivating Operation (CMO-T)
2. Conditioned Reflexive Motivating Operation (CMO-R)
3. Conditioned Surrogate Motivating Operation (CMO-S)

All three (3) have been implicated as behavioral variables within the applied research related to the treatment of persons with autism and developmental disabilities.

Several review articles have appeared in the literature describing the clinical implications of the motivating operation:

Smith & Iwata, 1997
Wilder & Carr. 1998
McGill, 1999
Langthorne, McGill & O’Reilly, 2007
Langthorne & McGill, 2009
Carbone, Morgenstern, Tirri, & Kolberg, 2010
Simo-Pinatella, Font-Roura, Planella-Morato, McGill, Alomar-Kruz & Gine, 2013
Carbone, 2013
Laprive, 2013
Laraway, Syncerski, Olson, Becker & Poling, 2015
Effects of the High-Probability Request Sequence on the Latencies to Compliance and Break Requests in Children with Autism during Discrete Trial Instruction

Amanda P. Laprime

Dissertation

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of Social Work

Simmons College

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The Motivating Operations Concept: Current Status and Critical Response

Sean Laraway · Susan Snyerski · Ryan Olson · Bernd Becker · Alan Poling

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Abstract This paper reviews the current status of the Motivating Operation Concept (MOC), followed by a critical response to Whelan and D. Barnes-Holmes (2010), who argued against the MOC and proposed an alternative analysis of motivation, the Consequence-Fusing Operation (CFO). In this paper, we: (a) review the MOC and discuss its conceptual and empirical status, (b) clarify certain aspects of the MOC, (c) correct Whelan and D. Barnes-Holmes’s inaccurate descriptions of the MOC, and (d) critique the CFO and related concepts. We demonstrate that the MOC is a high-impact innovation in behavior analysis that provides a useful theoretical framework for analyses of operant (instrumental) behavior. In contrast, the case made by Whelan and D. Barnes-Holmes for the competing CFO concept suffers from a range of problems. We, therefore, conclude that the MOC provides a superior and more useful behavioral analysis of motivation.

Keywords Motivating operations · Conditioned motivating operations · Establishing operations · Abolishing operations · Evocative effect · Abusive effect · Motivation · Consequence valuing operations

Behavior-analytic formulations of motivational concepts have evolved since the field’s founding. For example, Skinner (Skinner 1938, 1953, 1957) described motivational variables such
DEFINITION

- **Establishing Operation** - An environmental event, operation, or stimulus condition that affects an organism by momentarily altering (a) the reinforcing effectiveness of other events, and (b) the frequency of occurrence of the type of behavior that had been consequated by those other events (Michael 1993).

- As a result of Michael’s writings on the topic and the terminological revision from “establishing operation” (EO) to “motivating operation” (MO), (Laraway, Syncerski, Michael & Poling, 2003) the concept gained recognition as an important variable in clinical practice.
The Reflexive Conditioned Motivating Operation

- Understanding and applying the concept of the motivating operation (MO) is essential to teaching verbal behavior and other skills to children with autism.

- Research and manualized treatment packages emphasize the importance of motivation in teaching children with autism especially during high demand situations, (Koegel, Carter, & Koegel, 1998; Koegel, Koegel, Shoshan, & McNerney, 1999).

- The typical set-up for discrete trial instruction (i.e., high rate of demands, presence of specific materials associated with demands, presence of the teacher, etc.) may evoke problem behavior maintained by escape or avoidance.

- Using methods that increase the motivation to respond, thereby decreasing the tendency of children with autism to engage in behaviors maintained by escape or avoidance, may be critical to positive long-term outcomes (Koegel, Koegel, Frea, & Smith, 1995).
• Let’s first look at an non-human experimental preparation related to the CMO-R.

• To paraphrase Michael’s (1993, 2007) definition, any stimulus which has been repeatedly correlated with a worsening set of conditions will come to function as a CMO-R, in that the onset of this stimulus will establish its own termination (removal) as a form of reinforcement and will evoke any behaviors that have previously produced such reinforcement.

• Then we’ll discuss an applied clinical example.
• The following two diagrams depict an experimental preparation related to the development of a discriminated avoidance response. In other words, they show an analysis of how stimuli might be engendered with aversive properties and conditioned as CMO-R.

• The first diagram presents an analysis of how this occurs in the animal laboratory setting.

• The second diagram presents an analysis of how this occurs in the context of teaching.

• Both examples show how a previously neutral stimulus, after being consistently followed by a worsening set of conditions, comes to function as a warning stimulus for that worsening set of conditions. As a result, an avoidance response comes to be evoked by the presentation of the warning stimulus.
CEO-R
ANIMAL LABORATORY EXAMPLE

**Reflexive MO Definition: Warning Stimulus**
When a previously neutral stimulus is correlated with a worsening set of conditions, presentation of that stimulus:

- **Value Altering Effect** - establishes termination of the stimulus as a reinforcer.
- **Behavior Altering Effect** - evokes all behaviors that have terminated the stimulus

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**Diagram**

- **tone off**
- **shock off**
- **R1 = lever press**, the **avoidance** rsp.
- **R2 = chain pull**, the **escape** rsp.
- **30”**
- **tone on**
- **shock off**
- **5”**
- **tone on**
- **shock on**

J. Michael
### Development of the CMO-R in the Laboratory

<table>
<thead>
<tr>
<th>Neutral Stimulus</th>
<th>“Painful Stimulation”</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Tone) Presentation of Stimulus, Object or Event</td>
<td>(Shock) Worsening Set of Conditions</td>
<td>Termination of Worsening Condition is a Reinforcer &amp; Evokes Behavior That Has Been So Reinforced</td>
</tr>
</tbody>
</table>

After repeated correlations in the above sequence…

<table>
<thead>
<tr>
<th>Warning Stimulus (CMO-R)</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Tone) Presentation of Stimulus, Object or Event</td>
<td>Establishes Termination of Warning Stimulus (tone) as a Reinforcer and Evokes Behavior That Has Led to its Termination</td>
</tr>
</tbody>
</table>

### Applied Example

- **For example, a parent’s frown** when a child is misbehaving will sometimes evoke a more acceptable response in the child which in turn leads to the termination of the parent’s frown. The frown is a warning signal that has a history of being correlated with more severe unpleasant consequences. Therefore the frown, in the moment, may evoke a response that terminates it AND the response that terminates it will be negatively reinforced. In this case, the frown functioned as a CMO-R.

- An analysis of the typical instructional setting for many learners with autism provides an example of the development of CMO-R during instruction.

  - The teaching of some children with autism requires the presentation of many instructional demands each day.
As a result many of these learners have a history that has established the presence of the teacher, the teaching context, and the presentation of the instructional demand as an aversive condition due a history of being correlated with the unpleasant circumstances that come with extended periods of instruction and therefore evokes problem behavior that terminates or interrupts instruction but also interferes with learning. Michael (1993, 2000) identifies these antecedent stimuli as conditioned reflexive establishing motivating operations.

Consistent with this analysis, teacher presence, instructional materials, and teacher instructional demands may all act as CMOs-R for some learners and therefore evoke problem behavior that interferes with learning. The reported high rates of problem behavior evoked by discrete trial training with some children (Lovaas, 1982, 2003) may be related to the CMO-R.

Discrete Trial Instruction

A widely recommended teaching method, discrete trial instruction (DTI), has been demonstrated to be an effective method of treatment, (Smith, 2001), but can lead to high rates of problem behavior in some children with autism.

The instructional method includes a teacher presenting instructional material in a precise and sequenced manner so that it evokes frequent responses to the material by the learner.

Following each learner response the teacher presents a consequence that usually takes the form of some type of feedback that either indicates the responses are correct or incorrect.

Correct responses usually result in a suspected form of reinforcement to strengthen the responses.
• Following incorrect responses the teacher provides feedback indicating an error and usually conducts an error correction procedure.

• The instructional demands could be in the form of presentation of verbal responses of the teacher (What is it? Touch your nose, etc.), presentation of nonverbal stimuli (pictures, objects to match), or some combination of both (Tell me which one you drink from).

  • WHAT SKILLS ARE TAUGHT USING DTI?

• DTI instruction can be used to teach almost any skill in any environment.

• In this context we are talking about teaching skills that are representative of the core deficits of persons with autism at a desk or instructional table.

The skills taught during DTI at an instructional table usually include the following:

1. listener behavior (commands and selection)
2. tacting (labeling)
3. motor imitation
4. visual performance (matching, sorting, etc.)
5. intraverbal behavior (responding to what is said)
6. echoic responses

• Lets look at the causes of problem behavior during discrete trial instruction and how the CMO-R may be implication
### Development of the CMO-R During Instruction

<table>
<thead>
<tr>
<th>Neutral Stimulus</th>
<th>“Painful Stimulation” (Worsening Set of Conditions)</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation of Instructional Demands, Instructional Materials and Presence of Teacher</td>
<td>- Session Begins with Removal of Positive Reinforcement&lt;br&gt;- Low value Positive Reinforcement&lt;br&gt;- Low rate of Positive Reinforcement&lt;br&gt;- Frequent Social Disapproval&lt;br&gt;- Effortful Responses Required&lt;br&gt;- Difficult Responses Required&lt;br&gt;- High Rate of Demands&lt;br&gt;- Frequent Learner Errors&lt;br&gt;- Delayed Positive Reinforcement&lt;br&gt;- Low magnitude Positive Reinforcement</td>
<td>Termination of Worsening Condition is a Reinforcer &amp; Evokes Behavior That Has Been so Reinforced</td>
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After repeated presentations of the above sequence……..

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<tr>
<td>Presentation of Instructional Demands, Instructional Materials and Presence of Teacher</td>
<td>Establishes Termination of the Warning Stimuli as a Reinforcer and Evokes all Responses That Have Led to Their Removal</td>
</tr>
</tbody>
</table>
• A thorough conceptual understanding of motivation and a well-developed practical repertoire related to modifying instructional variables that will reduce the aversiveness of teaching and reduce problem behavior maintained by escape or avoidance can result in a more comprehensive analysis of an instructional situation and improved selection of appropriate instructional methods. (Michael, 2000).

**Implications for Instruction**

• When trying to reduce problem behavior that occurs during instruction, two methods of treatment are frequently used:
  • Differential reinforcement plus extinction
  • Functional communication training (FCT) plus extinction

Less often practitioners:
• Abolish the CMO-R

• Michael (2000) suggests a **practical solution** to this problem may involve the use of escape extinction (i.e., maintain demands when problem behavior occurs). In fact, escape extinction along with differential reinforcement of alternative behaviors (DRA) is the most common form of intervention for learners with autism who emit problem behavior when instructional demands are presented (Lovaas, 2003). Practitioners sometimes refer to this process as “working through” the problem behavior.

• Failure to recognize certain antecedent stimuli as reflexive MOs or mischaracterization of them as discriminative stimuli for problem behavior may stall attempts to reduce the problem behavior or may result in an over reliance on extinction (EXT). In most cases, alternative methods which do not reduce the aversiveness of the setting, such as DRA with extinction or FCT with extinction, have frequently been recommended.
TREATMENT CHOICES

• Differential reinforcement + extinction

• Functional communication training (FCT) + extinction

• Abolish the conditioned reflexive motivating operation (CMO-R)

  • DRA involves reinforcing alternative (i.e., appropriate or desirable) behaviors. Simultaneously, reinforcement is typically withheld for occurrences of the problem behavior (EXT).

    Kyle

    • One problem with this may be that if problem behavior is occurring at a high rate, there may be little opportunity to reinforce alternative appropriate behaviors.

  • FCT involves the replacement of problem behavior with behavior that produces the same reinforcer that has maintained the problem behavior (Durand and Carr, 1991). Simultaneously, reinforcement is typically withheld for occurrences of the problem behavior (EXT).

    Peter Video

    • McGill claims that merely replacing problem behavior and not altering the EO may raise ethical concerns since FCT methods leave in place a “counterhabilitative environment” and may lead to only temporary changes in behavior since the circumstances evoking the behavior remain in place.

    • In addition, FCT results in high rates of manding for removal of CMO-R (demands). If this response is not reinforced problem behavior usually occurs. If it is reinforced then very few learning opportunities are provided therefore rendering the procedure impractical.
Notwithstanding these concerns, practitioners will frequently choose to implement either of the following procedures when instructional demands during discrete trial training evoke problem behavior:

1. **DRA + EXT** – maintain the demand after problem behavior occurs as a form of extinction and then reinforce when correct responding occurs.

2. **FCT + EXT** – teach the learner to request removal of the task requirement following delivery of a demand as an alternative to problem behavior.

The decision to use of either one of these approaches, FCT or DRA, combined with EXT is typically based upon an assumption that: 1) the demands must be presented because of the importance of the skills being taught and/or 2) that the instructional setting (i.e., demands) cannot be made less aversive.

Michael (2007) suggests the following instead:

...one should not assume that the ultimate phases of the demand cannot be made less aversive. Increasing instructional effectiveness will result in less failure, more frequent reinforcement, and other general improvements in the demand situation to the point at which it may function as an opportunity for praise, edibles, and so forth, rather than a demand. (p. 387)

In other words, an analysis of the learning history of a child in which demands have come to function as reflexive MOs, such as the one presented earlier, may suggest interventions to abolish the value of escape as a reinforcer and, consequently, methods to abate problem behavior.

**Abolishing the CMO-R in the Classroom**

- **TEACHER, DEMANDS, & MATERIALS**
- **USE TEACHING PROCEDURES THAT ENSURE:**
  - Teacher is paired with Sr+
  - Higher value of Sr+
  - Higher rate of Sr+
  - Greater magnitude of Sr+
  - More immediate Sr+
  - Less effortful R
- **EVOKES COOPERATIVE BEHAVIOR THAT PRODUCES TEACHER MEDIATED POSITIVE REINFORCERS**
  - (RESPONSES TO TEACHER PRESENTED INSTRUCTION DEMANDS)
In the ABA literature, antecedent curricular revisions (Dunlap, G., Kern-Dunlap, L., Clarke, S., & Robbins, F.R., 1991; McGill, 1999) have been used to abolish the CMO-R of teacher instructions and demands by:


- Mixing and varying the skills taught (i.e., mixed verbal behavior sessions) (Dunlap, 1984; Dunlap & Dunlap, 1987; Dunlap, Dyer, & Koegel, 1980; Dunlap & Koegel, 1980; McComas, Hoch, Paone, & El-Roy, 2000; Winterling, Dunlap, & O’Neil, 1987)


- Gradually increasing the number of demands (Kennedy, 1994; Pace, Ivanic, & Jefferson, 1994; Pace, Iwata, Cowdery, Andree, & McIntyre, 1993; Piazza, Moses, & Fisher, 1996; Weld & Evans, 1990; Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994; Zaracne, et al., 1993)

- Gradually increasing the difficulty or effort of responses (Horner & Day, 1991; Iwata, Smith, & Michael, 2000; Richman, Wacker, and Winborn, 2001; Wacker, et al., 1990; Weld & Evans, 1990)

- Immediately reinforcing alternative behaviors (Horner and Day, 1991)

• For a review of the literature on the application of the motivating operation to the reduction of problem behavior and discussion of the methods outlined in the section above see Carbone, Morgenstern, Zecchin-Tirri, & Kolberg, 2010; McGill, 1999; Smith & Iwata, 1997; and Wilder & Carr, 1998.

• The following two tables summarize these teaching procedures and provide a self-assessment tool that can be used to determine what antecedent curricular revisions you need to make to your current instructional methods in order to more effectively abolish the CMO-R and abate the problem behavior exhibited by your learners.

<table>
<thead>
<tr>
<th>TEACHING METHODS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESENT A STIMULUS THAT ACTS AS AN ABOLISHING OPERATION</td>
<td>Use strong competing reinforcers. Initially correlate the teaching environment with highly valuable and high-density reinforcement relative to the conditions that have typically been interrupted at the start of teaching sessions.</td>
</tr>
<tr>
<td>FADE IN EFFORT AND DIFFICULTY OF RESPONSES</td>
<td>Present instructional demands in which the stimuli and response requirements vary from trial to trial. Do not mass trial across one skill or one operant.</td>
</tr>
<tr>
<td>FADE IN # OF DEMANDS</td>
<td>Use errorless teaching methods that incorporate time delay prompting procedures. In other words, use methods that insure high levels of correct responding.</td>
</tr>
<tr>
<td>INTERSPERSE EASY AND HARD TASKS</td>
<td>Try to keep a ratio of about 80% known (i.e., easy) tasks to about 20% unknown (i.e., difficult) tasks.</td>
</tr>
<tr>
<td>REDUCE LEARNER ERRORS</td>
<td>Use a VR schedule of reinforcement, but initially start by presenting a lower number of demands before delivering reinforcement. Then, gradually increase the number of demands presented before delivering reinforcement until reaching the desired VR schedule.</td>
</tr>
<tr>
<td>MIX &amp; VARY TASKS</td>
<td>While fading in number of demands, also gradually fade in the effort related to responding by slowly increasing the difficulty of the demands being presented. In other words, start with demands that require low effort responses and gradually increase to demands that require more effortful (i.e., more difficult) responses.</td>
</tr>
<tr>
<td>EXTINCTION</td>
<td>When problem behavior occurs, treat with extinction. For behaviors typically maintained by positive reinforcement, do not deliver the reinforcer. For behaviors typically maintained by negative reinforcement, do not allow escape to occur (i.e., maintain the demand).</td>
</tr>
<tr>
<td>IMMEDIATELY DELIVER Sr+</td>
<td>Immediately deliver reinforcement for appropriate behaviors.</td>
</tr>
<tr>
<td>PACE INSTRUCTION PROPERLY</td>
<td>Initially use the shortest inter-trial interval (ITI) possible. This should typically start off around 1 – 2 seconds.</td>
</tr>
</tbody>
</table>

Sylvia Video
How To Abolish The CMO-R

- While abolishing the CMO-R appears to be an effective method of reducing problem behavior during instruction, in practical application infrequent use is made of this independent variable.

- Here are several examples of how to apply these antecedent manipulations to abolish the CMO-R, thereby increasing the effectiveness of instruction:

  - The first situation is one where all stimuli associated with an instructional environment initially acted as reflexive MOs. Here the CMO-R was abolished through pairing with strong competing reinforcers or through presentation of an abolishing operation. Note the difference in learner cooperation.

  Jack Part 1

  Part 2

  Jack MVB
Kelly et al, 2015

A second, related explanation is that presession pairing may have altered the instructor (or other stimulus elements of the instructional setting) from a CEO-R (or conditioned aversive stimulus, as described previously) correlated with a worsening condition characterized by a high rate of demands and a low rate of reinforcement to stimuli correlated with the delivery of positive reinforcers (Carbone et al., 2010; Hineline, 1977; McGill, 1999; McLaughlin & Carr, 2005; Michael, 2000). The immediate reduction in challenging behavior seems to support this hypothesis as presession pairing may have momentarily altered the aversiveness of stimuli associated with the instructional setting, a defining characteristic of the motivating operation (Michael, 2007). This explanation could be tested by measuring the effects of pairing with some adults and not others on evoking problem behavior or evaluating the effects of pairing and then ‘unpairing’ the same adult.
Here is a video of a teacher abolishing the CMO-R during a discrete trial training session with an uncooperative learner. Take note of how prior to these curricular revisions escape from the instructional situation was the most valuable reinforcer. Following the curricular revisions, however, the learner quickly returns to the instructional environment without problem behavior.

**Britt Case Study**

**Josh**

**Josh MVB**

**Vincent and Emily**

Finally, here are several different learners of varying skill levels whose instructors are using procedures that reflect manipulation of the variables that abolished the aversive nature of the teaching setting. Note in particular the use of errorless instruction which reduces the frequency of errors, intersperse of high rate of mastered items, the mixing of all the skills being taught (mixed VB), the relatively brisk pace of the instruction, the high rate of reinforcement, etc.

**MVB Videos**

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**The Effect of Varying Teacher Presentation Rates on Responding During Discrete Trial Training for Two Children With Autism**

**Carole A. Roxburgh** and **Vincent J. Carbone**

**Abstract**

Recent research has emphasized the importance of manipulating antecedent variables to reduce interfering behaviors when teaching persons with autism. Few studies have focused on the effects of the rate of teacher-presented instructional demands as an independent variable. In this study, an alternating treatment design was used to evaluate the effects of varied rates of teacher-presented demands (1 s, 5 s, 10 s) on the occurrence of problem behavior, opportunities to respond, responses emitted, accuracy of responding, and magnitude and rate of reinforcement for two children with autism. Results indicated that fast presentation rate (1 s) resulted in lower rates of problem behavior, higher frequencies of instructional demands, higher frequencies of participant responding, and greater magnitudes and rates of reinforcement. Differential effects on accuracy of responding across conditions were not observed. Implications for manipulating the rate of teacher-presented instructional demands as an antecedent variable to reduce problem behavior are discussed.

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Email: drvjc@aol.com
Figure 2. Frequency of problem behavior per session by suspected function during fast, medium, and slow teacher presentation rates for David and Sarah.

Figure 1. Frequency of problem behavior per session during fast, medium, and slow teacher presentation rates for David and Sarah.
If you are interested in a more comprehensive coverage of this topic go to the following URL and scroll to the date July 31, 2013:

http://autism.outreach.psu.edu/archive/conference-schedule-2013

This is a video of a 3 hour presentation I did on July 31, 2013 at the National Autism Conference Penn State University. Jack Michael was in the audience and made some comments during the presentation.

THE END

References


