An Extension of the Effects of Praising Positive Qualifying Autoclitics on the Frequency of Reading

Mahmoud Sheyab · Josh Pritchard · Mark Malady

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Abstract In the current study, we reinforced tacts with positive qualifying autoclitics for reading and evaluated the subsequent effect on the allocation of reading behavior. Participants were four typically developing children between 9 and 12 years of age whose primary language was Arabic. We exposed each participant to pre- and posttreatment sessions to assess behavior allocation across activities and materials using a multiple-baseline design. During treatment, the experimenters praised positive statements about reading by each participant. Following treatment, four out of four of participants increased their allocation towards reading.

Keywords Autoclitics · Reading · Tact · Verbal behavior

A number of scientists have investigated correspondence between verbal behavior and related nonverbal behavior in young children (Lovaas 1961; Sherman 1964; Birch 1966; Bem 1967; Risley and Hart 1968; Hubner et al. 2008). Their results suggest that reinforcement of verbal descriptions can exert powerful control

over nonverbal behavior, as much and sometimes more than do the actual contingencies of reinforcement for those nonverbal behaviors.

One of the explanations for this correspondence between verbal and nonverbal behavior is the repeated reinforcement of correspondence between behavior and tacts of that same behavior (Catania 2007; Horne and Lowe 1996). Catania suggests that this history of reinforcement for say-do correspondence (and conversely, punishment for say-do discordance), once established, can exert control such that a change in the verbal side (say) can also effect a change in the nonverbal side (do). In cases like these, there is much practical value in shaping verbal behavior to make socially significant changes in nonverbal behavior. Horne and Lowe (1996) suggested that repeated exposure to contingencies of reinforcement for describing and then engaging in behavior leads to a bidirectional relation in which descriptions of performances lead to more of those performances, and vice versa. One way to study this bidirectional relation is to manipulate one side while measuring the other (Risley and Hart 1968; Israel and O’Leary 1973; Israel and Brown 1977; Karlan and Rusch 1982).

It is possible that shaping verbal behavior with the inclusion of autoclitics may be an efficient method for verbal behavior to exert control over children’s nonverbal behavior. An autoclitic is a verbal operant that functions to change the effect of prior verbal behavior on listener behavior (Skinner 1957; Hubner et al. 2008). According to Skinner, some specific functions of

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M. Sheyab
Shafallah Center for Children with Special Needs,
Doha, Qatar

J. Pritchard (✉) · M. Malady
School of Behavior Analysis, Florida Institute of Technology,
150 W University Blvd, Melbourne, FL 32901, USA
e-mail: jkp@fit.edu

autoclitics are to organize, select, and modify the speaker's own verbal behavior which increases the precision of control exerted on the listener's behavior. In situations in which the speaker also occupies the role of listener, it could be expected that the emission of certain autoclitics would change the impact of the speaker's verbal behavior on his/her own nonverbal behavior. For instance, if a speaker tacts his/her own behavior, the inclusion of a positive autoclitic on this tact may imbue the response (and its corresponding verbal product) with automatic reinforcing value (Hübner et al. 2008). A simple example is the description of what one is doing ("I'm reading this paper") with the addition of a positive autoclitic ("and I like it!"). This may occur by virtue of stimulus-stimulus relations created in this self-talk (transforming the response with appetitive stimulus functions). If this is the case, and unless these verbal behaviors are exposed to *extinction or punishment* contingencies, it should follow that more of that behavior would occur in the future (even if there were no socially mediated consequences for engaging in it). This suggests that reinforcement of positive autoclitics of tacts and its corresponding nonverbal behavior may involve verbal self-regulation; that is, a speaker's own verbal responses may come to control his/her nonverbal responding.

Hübner et al. (2008) investigated the effects of reinforcing the inclusion of positive qualifying autoclitics of tacts about reading on time engaged in reading. A qualifying, or descriptive, autoclitic is one in which the speaker emits collateral responses describing the controlling relations upon his or her behavior (naming one's own behavior or feelings). They demonstrated this effect with five typically developed children between 9 and 10 years old who often avoided reading, but could read and comprehend text. Using an AB design, the researchers exposed each child to one pretreatment session and three posttreatment sessions during which they were instructed to independently choose among play activities (i.e., doing nothing, playing, painting, drawing, cutting papers, reading books, or gluing). Between these sessions, participants were exposed to four treatment sessions (duration for each session ranged from 13 to 15 min) during which the experimenter praised each positive reading-related statement emitted by the participant. A positive reading-related statement included a description of the activity (reading), as well as an autoclitic that indicated

some positive aspect (e.g., enjoyment) such as, "reading book helped me create ideas for drawing, and that is awesome!" Following these treatment sessions, four out of five children increased their leisure-time allocation to reading by selecting and spending more time reading books over other available activities (playing with toys, painting, drawing, etc). This suggests that the automatic reinforcing value of reading may have been increased by providing praise contingent on these positive reading-related verbalizations. Hübner et al. noted two limitations to their findings: the use of an AB design and the short baseline during which the presence of the adult might have exerted stimulus control over the reading behavior. The present study attempted to replicate the study by Hübner et al. while addressing its limitations by utilizing a multiple-baseline design across participants and incorporating a longer baseline to control for the potential influence of the presence of adults.

Method

Participants

Participants included four typically developing children (three girls and one boy) between 9 and 12 years old. All children attended a regular public schools located in Irbid, Jordan. Amar was a 13-year-old boy, Rama a 12-year-old girl, Ragad a 10-year-old girl, and Hadeel an 11-year-old girl. All four were typically developing children who spoke and read Arabic as their primary language. Although all of the participants could read at grade level, none of them were reported to enjoy reading by their teachers and parents, and none exhibited reading behavior during the free operant sessions prior to any intervention.

To formally demonstrate their reading comprehension level, each participant was asked to silently read one excerpt from an Arabic text appropriate to his or her reading level (taken from their school's books), during a 10-min session, and then required to answer seven comprehension questions in the presence of the experimenter. All children had to score at least 85 % on the assessment questions to be included in the study; Ammar scored 100 %, Rama scored 85.7 %, Ragad scored 100 %, and Hadeel scored 85.7 %.

Setting and Materials

The first author conducted all pre- and posttreatment (i.e., free operant) sessions for each participant individually, whereas either the first author or an elementary-education teacher trained in the research protocol conducted the treatment sessions. It was important to ensure that the experimenter did not exert discriminative control over reading or suppressive effects on nonacademic behaviors (see Hübner et al. 2008). By including both the researcher (novel adult) and the education teacher, any performance changes associated with the presence of a specific adult would have been detected.

During pre- and posttreatment sessions, the experimental room contained a large round table on which the following materials were randomly positioned equidistant to the participant each session: books, colored, pencils, play-doh, several toys, papers, and scissors. The experimenter provided books that were not available during their school classes to avoid confounds introduced by in-class discussions or experiences with a specific book. Comfortable mattresses were arranged around the table for the participant to sit on. The items varied across sessions, but there was always at least one novel item present (this included books and other items) on the table. We used this arrangement to control for the effects of familiarity and novelty on time spent reading or time spent engaging with other activities.

Treatment sessions were conducted in the same room. During these sessions, all materials were removed from the room except the table, mattress, and camera. Each treatment session ranged in duration from 2 to 5 min. Sessions were conducted from 3 to 5 days per week, depending on participants' availability, but the minimum time between sessions was 24 h. All sessions were video-recorded for data collection purposes.

Data Collection, Dependent Variable, and Experimental Design

Sessions were recorded using a laptop video camera and data were scored from video by two independent observers at a later time. While scoring videos, observers recorded the total duration of book-related behavioral allocation for each student. We used the same operational definition of reading as Hubner

et al (2008): "orienting, holding response, and/ or page turning response with regard to available books" (p. 57).

We used a multiple baseline design across participants with pre and post treatment free-operant sessions. The experiment started with free-operant sessions until the child demonstrated stable baseline allocation towards reading and then the treatment sessions began for the first subject.

Interobserver Agreement

Interobserver agreement (IOA) was assessed on 100 % of sessions. IOA was calculated using total duration IOA (i.e., dividing the shorter duration reported by the observers by the longer duration and multiplying by 100) for each session. Agreement on reading duration (i.e., total duration in seconds spent reading) averaged 98.5 % across all participants. Mean IOA was 98.3 % for Hadeel (range, 94.7–100 %), 99.2 % for Amar (range, 98.7–100 %), 98.6 % for Ragad (range, 97.3–100 %), and 98.5 % for Rama (range, 95.6–100 %).

Procedure

Pre- and Posttreatment Free-Operant Sessions

We exposed each child to several free-operant sessions ranging in duration from 8 to 12 min prior to (baseline) and after treatment. Before each pretreatment session, the experimenter read aloud the following script (in Arabic) to the participant.

The room contains a table; there are various materials on it such as toys, books, play-doh, paper scissor, and other things. Go do whatever you want for about 10 min.

During these sessions, no other instructions were given and no scheduled consequences were delivered. The experimenter was neither present in the room with the child, nor were there any verbal interactions between participant and experimenter. These sessions were conducted until the participant had experienced at least five sessions with the last three sessions having met stability (no more than 25 % variance from session to session in percentage of time spent allocated to reading).

Treatment (Differential Reinforcement of Positive Autoclitics)

During treatment sessions, the experimenter prompted a discussion about the advantages of reading: “Today, we are going to talk about reading. I’d like to hear from you anything about reading.”

During the resulting conversation, each positive autoclitic about reading (i.e., each descriptive and reading-related statement) emitted by the participant was immediately praised. Examples of these statements include: “I *like* reading stories and science books” and “I *like* reading science books very much” (autoclitic emphasized). Non-examples include: “I do not like reading much” and “No, I don’t like reading history” because the autoclitic is not positive towards the value of reading.

Statements of approval (i.e., praise) were delivered by the experimenter contingent upon the child’s statement. Experimenter’s statements included, “It’s good to hear that you like reading,” “I’m very happy hearing that you like reading,” and “It’s excellent that you liked reading science books,” by rephrasing or paraphrasing the students’ statements. Negative reading-related statements received no programmed consequences (i.e., withholding praise and retaining neutral facial expressions). Likewise, statements about anything other than reading were ignored. In either case, the experimenter would redirect the conversation, for example, by saying, “what else do you like about reading?”

The experimenter terminated the treatment session after the child stopped responding to experimenter’s questions for 30 s or if the child indicated to terminate the session (e.g., saying, “That is all,” or “nothing else”). Session length ranged from 2 to 5 min.

Treatment Integrity

Treatment sessions were video recorded for later analysis by the authors to determine the number of instances in which reinforcement (praise) was delivered and extinction (i.e., withholding praise and maintaining neutral facial expressions) implemented appropriately by the experimenter during treatment sessions. Appropriate praise was defined as praise delivered immediately (within 1 s) following a participant’s positive autoclitic tact about reading. All participants received multiple praise statements (as described above). Treatment integrity was calculated by dividing the number of correctly

delivered consequences by the number of all potential consequences and multiplied by 100. Treatment integrity was analyzed for at least 50 % of treatment sessions per participant. Across participants, the experimenter accurately delivered the consequences with a mean accuracy of 98 %.

Results and Discussion

For all participants, the allocation of time engaging with books (nonverbal behavior) increased as a function of praise being delivered contingent on positive reading-related autoclitics (verbal behavior). These results replicate those found by Hubner et al (2008).

Table 1 depicts the number of positive reading-related autoclitic statements by each child in their first seven treatment sessions, as well as the number of prompts provided by the experimenter. As shown in this table, the number of tacts increased while experimenter prompts decreased throughout the seven sessions. This indicates potential reinforcement by praise of tacts with positive qualifying autoclitics.

Figure 1 represents the total time spent engaging with books and engaging in other activities during free-operant sessions for all participants. For all participants, the time allocated to books increased dramatically when social praise was provided contingent upon positive reading-related autoclitics. All participants chose largely nonbook options during the pretreatment baseline. The average percent of time allocated towards reading during baseline was 0 % for Ammar and Hadeel, 23 % for Rama, and 6 % for Ragad. Once treatment began, each participant demonstrated a reversal in allocation, increasing to near 100 % for all four participants. The average percent of time allocated towards reading after treatment sessions was 78 % for Amar, 83 % for Hadeel, 95 % for Rama, and 84 % for Ragad.

In short, this study bolsters the evidence that the nonverbal behavior of children can be modified by praising their autoclitic behaviors about it. With these four children, the correspondence between verbal and nonverbal behavior appeared to be in a functional relation of a “say/do” type (Lloyd 2002). That is, differential reinforcement of “saying” something positive about reading affected the nonverbal behavior of “doing” something about reading. As suggested by Hubner et al. (2008), it seems that book-related behavior can be changed by shaping the verbal behavior surrounding it.

Table 1 Participants' positive autoclitics and adults' prompting during treatment sessions

Session	Ammar		Hadeel		Rama		Ragad	
	Positive statements	Prompts	Positive statements	Prompts	Positive statements	Prompts	Positive statements	Prompts
1	5	28	3	33	5	9	5	15
2	10	21	6	30	4	10	5	15
3	6	28	5	22	5	15	4	15
4	14	29	4	16	4	13	6	17
5	13	19	8	15	5	20	7	13
6	20	14	9	16	7	14	7	12
7	20	12	10	14	9	13	7	11

To produce reliable say-do correspondence between verbal and nonverbal behavior, several conditions may be critical. The difficulty or probability of occurrence of the nonverbal behavior and need for continuous reinforcement of the nonverbal behavior (reading) may contribute to the maintenance and generalization of both verbal and related nonverbal behavior. There may be automatic reinforcing properties to reading (Skinner 1957), and as a result, the behavior of choosing a book may have increased simply because this contingency was contacted. If this was the case, these results may have been due to natural contingencies being contacted that were powerful enough to maintain the behavior. The differential reinforcement of autoclitics would then serve as a catalyst facilitating contact with these contingencies rather than changing the reinforcing value of reading. However, since maintenance probes were not collected during this study, it is unknown if participants would have continued to engage in the nonverbal behavior for long periods after the intervention was no longer in place. As such, we cannot be certain whether automatic reinforcement would have maintained reading behavior over time in the absence of social reinforcement. However, at least two participants (Rama and Ragad) engaged in reading behavior during baseline; if automatic reinforcement for reading behavior was responsible for the observed increase in behavior, we would have expected to see an increasing trend in reading during baseline, which was not the case. The fact that their reading behavior increased dramatically only after applying reinforcement to their tacts with positive qualifying autoclitics for reading suggests that the change in their behavior was a function of treatment.

Regarding the possible relations between verbal and nonverbal behavior, the shaping of the first has been

considered a powerful technique to modify human behavior. If the verbal community establishes the contingencies of the correspondence between saying and doing, it is likely that this approach may be successful in modifying nonverbal behavior through instructions (Catania et al. 1982). However, this does not mean that all nonverbal behavior can be easily changed by simply shaping related verbal behavior, especially if there are no environmental consequences to maintain the nonverbal behavior. Additional research should be conducted examining the relevant variables such as response effort, effects of simply contacting the natural contingencies, and a measure of change in motivating variables before and after the differential reinforcement of verbal behavior.

Two important limitations of the current study are worth noting. First, we did not evaluate the effects of this intervention on long-term reading preferences by children. Maintenance and generalization probes were not conducted, but it would be helpful to determine whether the treatment must be continued or whether the effect will be sustained without booster sessions. Additionally, the positive autoclitics were not isolated from the tacts they modified. Future studies should seek to identify the minimal verbal units that may exert control on nonverbal behavior. In the current study, the experimenter delivered praise immediately contingent on reading-related tacts with positive qualifying autoclitics, but it is unclear if the praise affected the tact, the autoclitics, or some combination of both. For example, if a child says, "I read many stories and liked them because they helped me draw," this unit (i.e., statement) involves two types of verbal behavior, a tact (*I read many stories*) and also an autoclitic about the tact (*I liked them...*). In this study, the experimenter delivered

Fig. 1 Total percentage of time spent reading and engaging in other activities during free-operant sessions for participants Ammar, Hadeel, Rama, and Ragad during baseline and after treatment

praise contingent on the whole unit (i.e., “I read many stories and like them because they helped me draw”). As

such, it is unclear whether the observed effect could be seen if we created a treatment in which the child simply

modified a statement by another in a positive direction (isolate the autoclitic) or whether reinforcing facts about books (regardless of positive or negative autoclitics) would yield similar results. Additionally, it is possible that the reinforcement of these verbal operants led to the development of self-rules such as, “I’m supposed to read so I will have something to talk about to my teacher tomorrow” or “reading is good because my teacher said so,” or that participants were selecting books because they thought it was expected of them (a form of negative reinforcement). Future studies could examine the impact of directly reinforcing autoclitics about other activities in a reversal design to see whether behavior allocation follows the activities about which autoclitics are reinforced. Additionally, an examination of explicitly training a rule about reading could be compared to the differential reinforcement treatment in this study.

Despite the aforementioned limitations and the fact that several processes could potentially serve to explain the results, an important practical implication of the present study is that these verbal procedures offer a replicated evidence-based approach for a socially important behavioral change: getting children to spend more time reading.

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