

## Functional Analysis and Treatment of Socially Stigmatizing Ambulation

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A brief functional analysis was conducted in an analogue setting to identify the maintaining variables for upright walking in a woman with developmental disabilities supported in an outpatient setting. All conditions required modification, since treatment outcomes were intended to increase, rather than decrease, the target behavior. The participant displayed a significantly greater duration of upright walking during the attention condition, which initially indicated that the desired behavior was maintained by positive reinforcement. Treatment of socially stigmatizing ambulation was implemented during natural transition times in a reversal design and consisted of differential reinforcement of an incompatible response. Results of treatment indicated that physical assistance delivered by staff produced an immediate and large increase in upright walking while verbal attention from staff was ineffective. During treatment conditions, duration of socially stigmatizing ambulation was significantly greater in baseline. These results indicate that socially stigmatizing ambulation was maintained by automatic reinforcement, rather than socially or access-based positive reinforcement, and treatment initially chosen to function as differential reinforcement of incompatible behavior may have also functioned as sensory matching and sensory extinction.

*Keywords:* Socially stigmatizing ambulation, functional analysis, automatic reinforcement.

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Functional analysis has most often included multielemental manipulation of environmental conditions in order to determine motivational variables of a response intended to decrease as a result of treatment. The original method of functional analysis, determined by Iwata, et al. (1982 & 1994) measured the environmental effects on self-injurious behavior and set the standard for the field of Applied Behavior Analysis. The development of this standardized operant method has been used to identify functional relationships between an independent and dependent variable in numerous studies. The four standard conditions used in this method were social disapproval, academic demand, unstructured play and alone. Further expansion of the method of functional analysis has included more idiosyncratic variables to determine specific causal relationships and to narrow the four general assessment conditions previously identified, in order to decrease inappropriate responses in a variety of participants (Carr, 1994).

Although functional analysis has began to narrow the four standard conditions in order to tailor the assessment to the specific subjects under study, further expansion of the method is possible. A study by Northup, et al. (1991) studied aggression and an alternative behavior (a mand) in an out clinic setting with significant results, particular to this present functional analysis. First, the study helped to “provide further replication of the feasibility of conducting a brief functional analysis of behavior” (Northup et al., p. 518) using 5-10 minute analogue conditions. Most importantly, the results “demonstrated that the contingencies identified as maintaining aggressive behavior also served to reinforce an alternative, replacement behavior” (Northup et al., p. 518). This study was based on a previous supposition by Carr (1988) that “communicative responding and some severe behavior problems may be functionally equivalent...if both responses result in the same outcome (i.e., are functionally equivalent), strengthening one response should weaken the other” (Northup, et al., 1991, p. 519). Establishing this type of functional relationship between two incompatible or alternative responses would enhance an experimenter’s ability to develop effective treatment strategies, particularly if it can be determined that both behaviors are maintained by the same contingency. “Failure to provide a replacement behavior might increase the probability, by default, that another inappropriate behavior will emerge to serve the

same function, especially with individuals who have very restricted repertoires of appropriate behavior” (Northup et al., p. 510).

The primary purpose of this study therefore, was to conduct a brief functional analysis and treatment of an incompatible response for a woman with developmental disabilities in an outpatient setting. The inappropriate response exhibited most frequently by the participant was socially stigmatizing ambulation. Since upright walking is both an incompatible response and the appropriate, desired treatment result, it was chosen as the target behavior for the functional analysis. A series of five different analogue conditions were selected to measure the environmental effects on duration of upright walking. Assessment conditions were modified in order to appropriately measure the response, which was intended to increase as the result of future treatment. Prior descriptive assessments, including the Motivation Assessment Scale (Durand and Crimmins, 1988) as well as direct observations concluded that the inappropriate, socially stigmatizing response was motivated by positive reinforcement in the form of social-attention. It was hypothesized that the two different behaviors were functionally equivalent and therefore, strengthening upright walking should decrease socially stigmatizing ambulation for the participant.

Based on the results of the previous studies and descriptive assessment results for the inappropriate response (socially stigmatizing ambulation), the following hypothesis was formed:

Differential reinforcement of an incompatible response (social attention for upright walking) should decrease socially stigmatizing ambulation because the incompatible responses are functionally equivalent. This hypothesis was then evaluated through functional analysis and treatment.

### Study 1: Functional Analysis

#### *Method*

##### *Participant*

A brief functional analysis was conducted with 1 female participant with developmental disabilities who exhibited ambulation issues that were socially stigmatizing. Becky was a 53-year-old woman who had been referred for behavioral services while attending an outpatient day program for adults with mental retardation. Becky had been diagnosed as functioning in the severe range of mental retardation, had adequate expressive and receptive verbal skills, and displayed a variety of other socially inappropriate behaviors, such as hitting and teasing others. Becky’s socially stigmatizing ambulation consisted of crawling on her hands and knees, squatting while moving (*duck-walking*) and dragging her legs and knees along a surface to transition from one location to another. This form of ambulation was observed to occur almost all the time during transitions and across all environments, including the outdoors. This behavior was specifically problematic during winter months because of rain, snow, sand and salt located on the ground, and during emergencies in which quick transitions had been required. The behavior also posed a safety concern in the community, particularly while crossing a street or in a parking lot. In addition, the behavior had been exhibited for many years, although reports from staff indicated that she was capable of upright walking and would occasionally initiate the response independently. Reports also indicated that Becky had been capable of participating in the Special Olympics when she was much younger. Becky had no known physical limitations that would prevent her from maintaining upright walking during transitions. Due to the extended amount of time spent duck-walking and crawling during the past few years, Becky had formed large calluses on both her knees and had ruined numerous pairs of shoes and pants. Becky was not taking any behavior modification medications at the time of the evaluation. Numerous formal treatment programs had been implemented, including contingent attention, active ignoring and contingent positive reinforcement in the form of a token economy. All programs were met with minimal success. At the time of evaluation, Becky resided with two other women with

developmental disabilities in a group home setting, supported by the same agency as her day program. She had previously resided at a state institution for 17 years prior to living in a community residence.

### *Setting and Materials*

All conditions of the functional analysis were completed at Becky's day program in a large classroom regularly used as a gymnasium. The classroom was a large open space with chairs located along the perimeter of the room. The classroom had three doors that led to either another classroom or a hallway. All doors were kept closed during the evaluation. A 12-foot line of masking tape was adhered to the floor in the middle of the classroom. A can of Cola was placed at the end of the tapeline during each condition. Three observers were present during each condition; two recorded data, each using a stopwatch and a data sheet, while the other served as the experimenter. A 10-minute timer was used to ensure each condition did not exceed 3 minutes and to signal the start of a new condition. In addition, 4 ounce Dixie cups were used during the tangible condition to deliver the soda.

### *Dependent Variable and Response Definition*

The target behavior measured in the evaluation for Becky was upright walking, which was the incompatible, desired response during ambulation. Upright walking was defined as any instance in which at least one step was taken in a forward direction while the trunk of the body was in an upright position, and the legs were straight, with both feet alternating contact with a surface beneath. Upright walking may have occurred independently or may have included assistance through the use of a handrail, inanimate surface or object, or it may have included assistance by holding onto another person's arm or hand for support. Upright walking did not include walking backward, crawling, squatting or dragging one or both legs along a surface in any direction. In the natural setting, upright walking may have included ambulating up or down stairs or across other uneven surfaces, not limited to indoor flooring; however, the last part of this operational definition did not apply to the setting and was omitted for the functional analysis.

### *Independent Variables*

There were three categories of independent variables, either presented or withdrawn contingently on the measured response: attention, escape and tangible. The specific tangible used was Cola because reports indicated it had been effective in increasing upright walking when delivered contingently. The cola was delivered contingent for upright walking in the tangible condition of the functional analysis. It was also made available non-contingent in all other conditions of the assessment. Social attention was defined as verbal praise and encouragement as well as physical contact with the participant in the form of assistance during upright walking. Escape was defined as termination of staff attention and the verbal demand to *walk* and was placed contingent on exhibiting upright walking.

### *Measurement*

Duration of upright walking was measured in each condition using a stopwatch. Total number of minutes and seconds of upright walking was recorded simultaneously, but independently by two observers. The results were manually documented on separate data sheets for each of the sessions. The timer signaled the start of a new 3-minute interval for data collection. All sessions were conducted with both the experimenter and observers present in the classroom. The observers consisted of familiar staff who had previous training in the data collection methods and in which reliable inter-observer agreement had been achieved for measurement of baseline levels of the target behavior.

### *Interobserver Agreement*

Inter-observer agreement data were obtained for 100% of the sessions. Overall measure of agreement was calculated using two different methods. First, the total number of seconds of upright walking recorded across all sessions was added separately for each observer. Then, the smaller of the two duration measures was divided by the larger and multiplied by 100. Overall inter-observer agreement was

calculated at 99% using this method Inter-observer agreement was also calculated for each separate session between observers using the same formula. Overall inter-observer agreement using this method averaged 97.9% for all sessions and ranged from 93.75% and 100% across sessions.

### *Experimental Conditions*

A multielement design was conducted which consisted of five analogue assessment conditions, each lasting 3 minutes: active ignoring, attention, control, demand and tangible. The conditions were conducted in this exact sequence to limit the carry-over effects between each condition (Iwata et al., 1982&1994). Seven sessions were conducted sequentially during the late morning, after Becky had eaten lunch. After the initial five conditions were presented, the active ignoring condition and attention condition were repeated to lend greater certainty to the maintaining variable. Becky drank a small quantity (2 ounces) of soda with her lunch; the rest was saved for use during the analogue conditions. Due to logistical and ethical considerations, it was impossible to conduct an alone condition because a one-way mirror was not available and Becky could not be left unattended. Subsequently, active ignoring was substituted for the alone condition. The variables in all the conditions had to be modified in order to effectively evaluate potential functional relationships between the environment and the measured response, which was intended to increase, rather than decrease, as a function of future treatment.

In order to measure upright walking in an analogue condition, the sessions had to be conducted in a way that would present Becky with the motivation to ambulate. In addition to a tangible (soda) being placed at the end of the tapeline, a teaching session was completed with Becky prior to the start of the functional analysis. The experimenter pointed to the soda at the end of the tape and modeled upright walking along the tapeline from one end to the other during this initial teaching session. The teaching session was completed in order to increase the probability of ambulation in the classroom setting, in which it was not typically required.

*Active ignoring.* Becky was shown the soda at the end of the tapeline by the experimenter, and then actively ignored for the duration of the session. Both the experimenter and the observers turned around and faced the wall. If movement was heard, the observers had been instructed to direct their eye contact toward Becky, who had her back facing the observers, in order to record any upright walking. No verbal or physical interaction was permitted. Becky had access to the soda at the end of the tapeline if she ambulated in its direction and retrieved it independently. No demand to walk was delivered during the condition. This condition served to determine if upright walking was maintained by automatic reinforcement.

*Attention.* Becky was shown the soda at the end of the tape line by the experimenter, and then given a verbal cue *do you need some help*, while holding out an arm for physical assistance. If after 10 seconds, Becky did not attempt to stand up, the experimenter directed all attention to paperwork. If she stood up and began upright walking, the experimenter delivered verbal praise and encouragement using the cue *great walking*. The experimenter was instructed to walk away and ignore Becky contingent on any other form of ambulation or no ambulation. No demand to walk was delivered during the condition. This condition served to determine if upright walking was maintained by positive reinforcement in the form of social attention.

*Control.* Becky was shown the soda at the end of the tape line by the experimenter, and then given a verbal cue *do you need some help*, while holding out an arm for physical assistance. Attention was delivered contingent for all other forms of ambulation, or no ambulation. The attention delivered during this condition was in the form of social disapproval, using the following verbal cue: *don't do that, you'll hurt yourself*. The experimenter was instructed to stop assisting and actively ignore Becky contingent on upright walking. No demand to walk was delivered during the condition. This condition served as the

control and a contingency reversal for positive reinforcement in the form of social attention for two separate incompatible responses.

*Demand.* Becky was shown the soda at the end of the tape line by the experimenter, and then given the verbal cue *stand up and walk*, while holding out an arm for physical assistance. Attention continued in the form of the repeated demand to walk every 5 seconds until upright walking was exhibited. The experimenter was instructed to withdraw physical assistance and demand to walk, contingent on upright walking, for 30 seconds. This condition served to determine if upright walking was maintained by negative reinforcement in the form of escape from the demand to walk, an/or escape from staff physical assistance.

*Tangible.* Becky was shown the soda at the end of the tapeline by the experimenter, and then given the verbal cue *do you need some help*, while holding out an arm for physical assistance. The experimenter poured a small amount of Cola into a Dixie cup and held the cup while giving this cue. Soda was delivered contingent on upright walking. The experimenter was instructed to withdraw physical assistance and the Cola contingent on any other form of ambulation or no ambulation. No demand to walk was delivered during the condition. This condition served to differentiate between tangible reinforcement (Cola) delivered by the experimenter and tangible reinforcement (Cola) available independent of social-attention during all conditions.

The above procedures were completed for seven total sessions. Significant differentiation occurred between one condition and all others after only one session of each condition. In order to further validate the results, an additional active ignoring and attention session was completed.

*Results*

A summary of the results of each completed session is displayed in Figure 1.

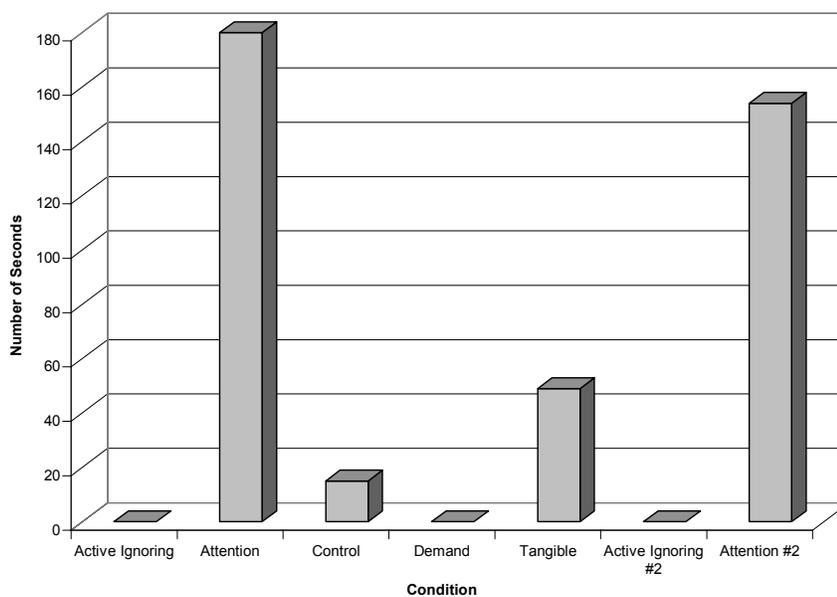


Figure 1. Duration of upright walking across five analogue conditions.

. Condition-by-condition comparison indicates the occurrence of a significantly greater duration of upright walking during the attention condition. An additional session of active ignoring and attention confirmed this differentiation. Upright walking was not exhibited in either one of the active ignoring conditions or the demand condition, but was exhibited for almost the entire duration in each of the attention conditions. Upright walking occurred at a low rate during both the demand and tangible conditions. Results of the functional analysis conclude that upright walking was maintained primarily by positive reinforcement in the form of social attention.

During the active ignoring condition, Becky made numerous attempts to access the attention of the experimenter and the observers; she asked for help to walk and exhibited inappropriate verbal remarks. During the first active ignoring session, Becky ambulated toward the Cola by crawling, but then stopped after 5 seconds to turn around and look at the observers; no further ambulation occurred in this session. These results indicate that upright walking was not maintained by automatic reinforcement.

During both of the attention sessions, Becky was offered assistance by the experimenter, but requested assistance from an additional observer. Due to this unexpected response during this condition, a second observer was allowed to assist with upright walking, while collecting interobserver agreement. With assistance from two people, Becky walked up and down the tapeline during the entire session. This identical response was exhibited during the second attention session. Becky did not attempt to ambulate toward the Cola during the first attention session, but picked up the soda and hid it in her pocket at the end of the functional analysis, after the second attention session ended. These results conclude that upright walking was maintained by positive reinforcement in the form of social-attention.

During the control condition, Becky again sought assistance from an additional observer. Once upright walking occurred and staff attempted to leave and ignore Becky, she dropped to the floor and became physically aggressive by slapping and grabbing at both the observer and experimenter. When assistance was offered and removed, the same response was exhibited. Becky did not ambulate toward the Cola during this condition. Duration of upright walking in the control condition was exhibited at a low rate (15 seconds) due to the repeated assistance offered. Duration measurement started as soon as Becky took one step in an upright position. Therefore, it may be concluded that upright walking exhibited in the control condition was functionally related to the attention from the experimenters because of the physical assistance offered.

During the demand condition, Becky refused assistance from staff repeatedly and did not exhibit any upright walking or ambulation in the direction of the Cola. In addition, Becky became physically aggressive by slapping and grabbing at the experimenter. These results indicate that upright walking was not maintained by negative reinforcement in the form of escape from the demand to walk.

During the tangible condition, Becky again solicited assistance from an additional observer, even while the experimenter held additional Cola. A small duration of upright walking was recorded during this condition (49 seconds). Becky was delivered Cola contingent on upright walking every 5 seconds. Becky did not attempt to ambulate toward the soda at the end of the tapeline during the entire session. For the last minute of the session, one observer was directed to stop physically assisting Becky, in order to determine if she would continue upright walking with only one person. Upright walking continued for 4 seconds, and then Becky lowered herself to the floor and crawled across the room, in the opposite direction of the Cola on the tapeline; she sat on the floor for the remainder of the session. Becky refused any further assistance offered from the experimenter. Results of this condition indicate that upright walking was maintained by positive reinforcement in the form of social attention, or social attention with delivery of a tangible.

Becky had free access to a preferred tangible (Cola) in every session; however the only occasion in which she showed any movement toward obtaining it was after all the sessions had been completed. In addition, Becky hid the soda instead of drinking it, even after being offered assistance. These results indicate that the delivery of a preferred tangible may be reinforcing not because of its own properties, but because of the social attention with which it is delivered. Therefore, it can be concluded that the small duration of upright walking that occurred in the tangible condition was a function of the social attention received, and not merely an independent function of the tangible.

### *Discussion*

Results of the functional analysis indicate that the maintaining variable for Becky's upright walking was positive reinforcement in the form of social attention. In addition, the amount of social attention appeared to be positively correlated with duration of upright walking; the more staff who were involved in the attention condition, the more likely upright walking would occur and be maintained. During the functional analysis, socially stigmatizing ambulation was not observed or measured because the analogue setting did not set the occasion for it to occur. Although motivation for upright walking was identified as social reinforcement, the functional analysis did not separate staff attention from physical assistance in the attention condition. Based on these results and those of the descriptive assessment, upright walking and socially stigmatizing ambulation are functionally equivalent because they are both maintained by positive reinforcement in the form of staff attention.

### Study 2: Treatment Analysis

There are many treatments available for behavior that is maintained by positive reinforcement. "Differential reinforcement and extinction procedures can be developed most easily when the reinforcer is within the control of the therapist (i.e. social reinforcement)" (Piazza et al., p. 437). Additional treatment methods have included functional communication training and non-contingent reinforcement. In dealing with behavior that is "topographically incompatible with the behavior selected for reduction," differential reinforcement of incompatible behavior (DRI) is typically selected as treatment (Cooper, Heron & Heward, p. 392). Differential reinforcement of incompatible behavior is most efficient if the incompatible behaviors are already in the participant's repertoire of responses, if consequences have been demonstrated to "function as reinforcers and able to be presented contingently, consistently and immediately following the behavior", if an initial CRF schedule of reinforcement is implemented and if it is combined with other reductive procedures such as functional communication (Cooper, Heron & Heward, p. 394). Since upright walking and socially stigmatizing ambulation cannot be emitted at the same time and almost all of the above listed criteria could be met, DRI was selected as the treatment for this study. In addition, studies have shown that all forms of attention may not be functionally equivalent and require further extension of a functional analysis to separate the specific maintaining variables i.e. verbal praise may be different than verbal reprimands (Piazza et al., 1999). Since the specific attention variable maintaining upright walking during the functional analysis remains unclear, two separate treatment conditions were implemented to separate verbal attention from physical assistance.

### *Method*

The effects of differential reinforcement of an incompatible response to socially stigmatizing ambulation were evaluated using a reversal design in a naturalistic setting. All sessions were conducted during a natural transition time in which Becky was expected to ambulate from the residence to the agency vehicle. The van was parked in the same location during every session. Each transition began at the threshold of the front door and ended at the door of the agency vehicle. Natural transition times were selected for treatment in order to set the occasion for socially stigmatizing ambulation. As in the functional analysis, treatment occurred in an "open" environment in which use of handrails or other

walking aids were unavailable. During all sessions, two observers were present in order to record duration of upright walking. A total of 50 sessions was completed; each session averaged two minutes in duration.

#### *Data Collection & Interobserver Agreement*

Data collection was completed similar to the functional analysis, except that the session length was not standardized. Total duration of upright walking and total session duration was calculated for each session. This data was converted to a percent duration of upright walking for each session. Interobserver agreement was calculated similar to the functional analysis and was obtained for 100% of all sessions. Overall measure of agreement was calculated using two different methods. First, the total percent duration recorded across all sessions was added separately for each observer. Then, the smaller of the two percent duration measures was divided by the larger and multiplied by 100. Overall inter-observer agreement was calculated at 99% using this method. Inter-observer agreement was also calculated for each separate session between observers using the same formula. Overall interobserver agreement using this method averaged 99% for all sessions and ranged from 93.25% and 100% across sessions.

#### *Treatment Conditions*

##### *Baseline*

These sessions were similar to those of the active ignoring condition of the functional analysis. This condition served as the control for the subsequent physical assistance and verbal attention conditions because it did not provide either contingent on upright walking. Both observers were nearby during this condition; however they did not interact in any way during the sessions. Active ignoring was chosen as baseline because it produced the least amount of upright walking during the functional analysis and was most similar to the staffing pattern provided to Becky during natural transition times, due to the needs of the other woman with whom she was matched.

##### *Physical Assist*

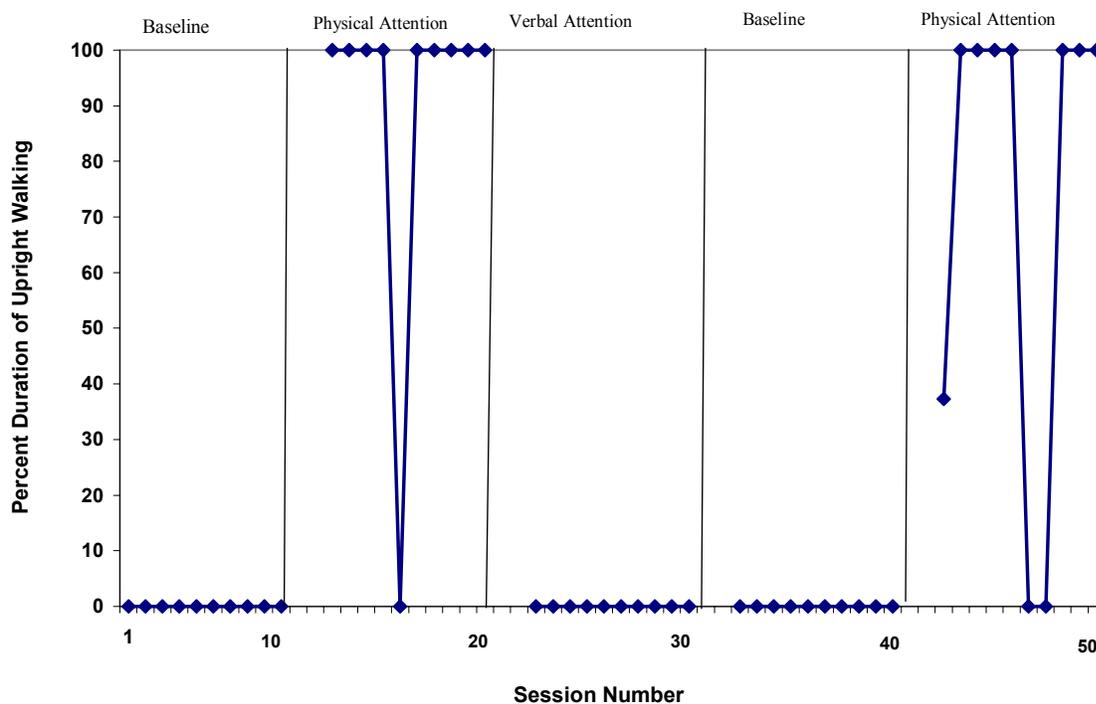
At the beginning of each session, an observer delivered a verbal cue “Becky, get up and walk” and presented the participant with physical assistance by offering one of their arms onto which she could hold. Verbal attention was not delivered during this treatment condition; however physical assistance was delivered continuously during sessions.

##### *Verbal Attention*

At the beginning of each session, an observer delivered a verbal cue “Becky, get up and walk” and stood an arm’s length away from the participant while delivering verbal praise and encouragement for her to walk. Physical assistance was not offered during this treatment condition; however, verbal attention was offered continuously during sessions.

#### *Results*

Figure 2 shows results obtained during baseline and during physical assist and verbal attention conditions.



**Figure 2.** Percent duration of upright walking across treatment conditions.

During the baseline condition, Becky did not exhibit upright walking. In addition, upright walking was not observed in the verbal attention condition. The physical assist condition was associated with a large and immediate increase in upright walking. An average of 81.86 percent duration of upright walking occurred across all physical assist conditions. The data showed a significant increase in upright walking when physical assistance was offered as treatment for socially stigmatizing ambulation in an open environment; however, Becky refused physical assistance during four sessions when it was available. The data collected for this study primarily recorded percent duration of upright walking; however each session also measured percent duration of socially stigmatizing ambulation because each transition was completed by either exhibiting upright walking or socially stigmatizing ambulation. Therefore, the data collected during treatment also represents percent duration of socially stigmatizing ambulation across conditions, which was unavailable in the functional analysis (see figure 3).

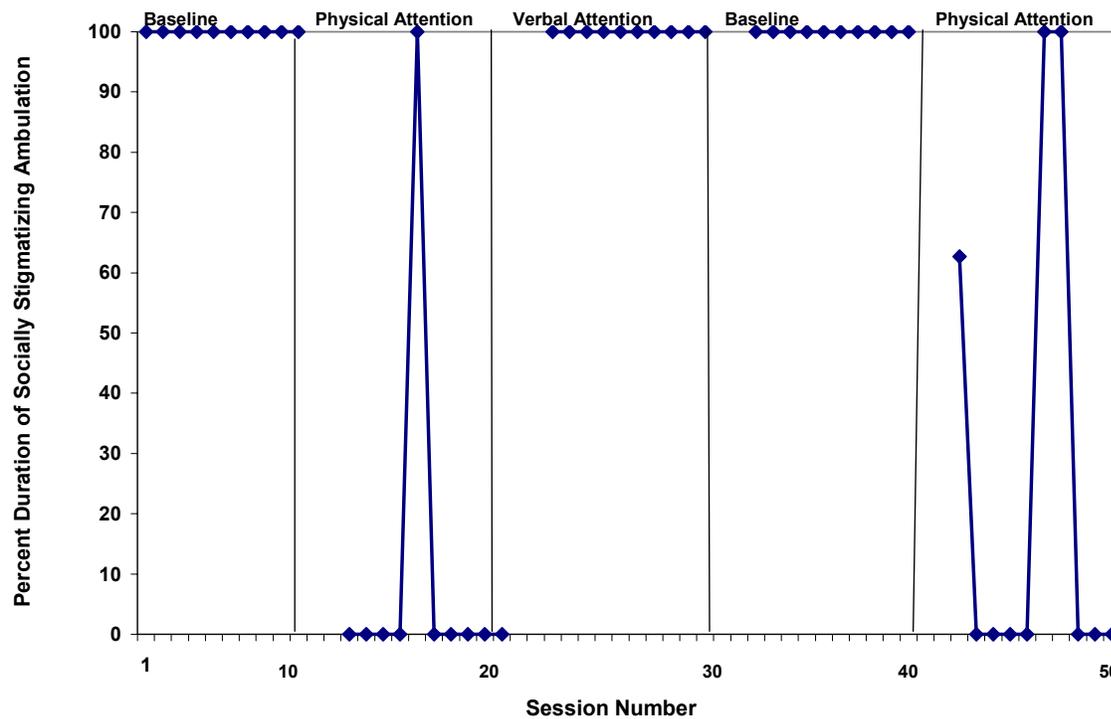


Figure 3. Percent duration of socially stigmatizing ambulation across treatment conditions.

Results of this study indicate that socially stigmatizing ambulation occurred at high rates in the absence of social contingencies. This finding indicates that socially stigmatizing ambulation is maintained by automatic reinforcement. Furthermore, this finding contradicts the original hypothesis that socially stigmatizing ambulation is maintained by positive reinforcement in the form of social attention. Regardless, treatment results support the original hypothesis that the incompatible responses are functionally equivalent because a decrease in socially stigmatizing ambulation is exhibited when upright walking is differentially reinforced.

#### *Treatment Implications*

Results of the study conclude that providing physical assistance to Becky during transitions increases duration of upright walking; however, this treatment is not practical or cost-effective in an applied setting with limited resources. Since Becky is supported in a 1:2 staffing ratio with another woman who requires contact guard during all transitions, it is currently impossible to extend the treatment for this study. There was a limited amount of transitions in which staff were able to provide physical assistance to Becky. The concept of an "open" environment was emphasized in this study due to the fact that Becky had been observed on numerous occasions walking upright in the hallway of her day habilitation program, while holding onto a hand rail. This evidence helps to support that socially stigmatizing ambulation is maintained by automatic reinforcement. Given all available treatment options in an ideal situation, Becky should continue to receive physical assistance during all transitions. Once upright walking is maintained, additional treatment components could be introduced, such as training with use of a walker. Reports

indicate that use of a walker had been attempted in the past, unsuccessfully; however, given the same staffing pattern it is unrealistic to expect Becky to utilize a walker independently without shaping the response first and then, fading the staff. Although providing constant physical assistance during every transition is a successful but temporary treatment option, it is not amenable to generalization. Since socially stigmatizing ambulation currently sets the occasion for both staff attention and physical assistance, another treatment option would be to teach a functional communication response that would request staff physical assistance prior to dropping to the floor and exhibiting socially stigmatizing ambulation. This chain of responding can be re-configured by immediately presenting Becky with physical assistance while she is seated in a chair and preventing the aberrant behavior from occurring altogether. The FCT response (“help me walk”) could be shaped, by reinforcing successive approximations prior to the delivery of physical assistance. Once this new chain of responding is established, use of a walker could be introduced and reinforced in the presence of staff. Once Becky shows success with the walker in the presence of staff, the staff could slowly fade out of the procedure. Unfortunately, these treatment options are not currently available; however, results of this study will be used to recommend additional staffing and environmental changes within Becky’s current routine in hopes of providing her with the necessary supports that will promote behavior change.

### *Discussion*

Initial descriptive assessment indicated that socially stigmatizing ambulation is maintained by positive reinforcement in the form of social attention. Based on the theory that incompatible responses are functionally equivalent, it was hypothesized that upright walking would also be maintained by social attention. After completion of the functional analysis, upright walking was greatest in the attention condition, concluding that the incompatible response is maintained by positive reinforcement. Since the functional analysis was conducted in an analogue setting, it did not set the occasion for socially stigmatizing ambulation and this response was not measured. The hypothesis that socially stigmatizing ambulation and upright walking are functionally equivalent could not be verified with any degree of certainty until treatment was implemented. Treatment conditions set the occasion for socially stigmatizing ambulation and functioned as an additional functional analysis. After completion of the treatment conditions, it was determined that upright walking is maintained by physical assistance, rather than staff attention. In addition, treatment conditions provided evidence that socially stigmatizing ambulation is maintained by automatic reinforcement. Based on the hypothesis that socially stigmatizing ambulation is functionally equivalent to upright walking, it was determined that differential reinforcement of an incompatible response delivered during treatment may have also functioned as matched stimuli and/or sensory extinction for socially stigmatizing ambulation. Treatment was effective in increasing duration of upright walking and conversely, decreasing socially stigmatizing ambulation in almost every session; however the specific treatment topography remains unclear.

Since the motivation for socially stigmatizing ambulation was determined as automatic reinforcement, the response itself directly produces reinforcement. It has been suggested that many “stereotypic behaviors are maintained by perceptual reinforcement, such as auditory, tactile, gustatory, vestibular, or other forms of sensory stimulation, and it is possible that distinct types of stimulation may maintain specific response topographies” (Roscoe et al., p. 635). Sensory extinction is one treatment for behavior maintained by automatic reinforcement. It involves the “elimination or attenuation of stimulation produced by a behavior, while still permitting responding to occur” (Roscoe et al., p. 636). It is suspected that differential reinforcement of upright walking (physical assistance) also served as sensory extinction because it eliminated any potential sensory stimulation (or avoidance of it). Other typical treatments involve non-contingent reinforcement, differential reinforcement of alternative behavior, differential reinforcement of other behavior and the use of matched stimuli that “provide sensory stimulation that is the same or similar to the stimulation produced by the aberrant behavior” (Piazza et al., p. 14). In

addition, it is suspected that the physical assistance delivered on a CRF schedule during the physical assist condition provided vestibular security that was similar to that which was produced by the socially stigmatizing ambulation (matched stimuli). Further analysis and preference assessments should be completed to test both of these hypotheses.

The results of this study helps to support previous research completed by Northup et al. (1991) because they demonstrated “direct evidence of the treatment utility of functional analysis as an assessment procedure” (p. 518). The variables identified through descriptive assessment that maintained socially stigmatizing ambulation were not proven to be the same variables maintaining the response after a thorough functional analysis of both incompatible responses. The reason for this discrepancy is unclear, although it is probable that the occurrence of socially stigmatizing ambulation sets the occasion for staff attention; staff attention is a consequence for the response but is not the maintaining variable. It would have been more beneficial and efficient to conduct the initial functional analysis in a naturalistic setting in order to set the occasion for ambulation and provide measurement of both incompatible responses. Due to the idiosyncratic nature of the behavior measured in this study and the lack of data for socially stigmatizing ambulation during the functional analysis, it was unclear if the maintaining variable (physical assist) functioned as positive reinforcement, sensory extinction or matched stimuli.

#### *Limitations*

Overall, the initial hypothesis was confirmed; however the maintaining variables were contradictory of the initial hypothesis. The original hypotheses could have been supported with greater validity if more sessions had been completed during the functional analysis. In addition, the 3-minute session duration was shorter than the previous research had recommended, although rapid differentiation was apparent. Wallace and Iwata (1999) recommended session duration of at least 10 minutes for optimal validity. Potential causes for such rapid differentiation may have been due to the timer serving as a discriminative stimulus at the beginning of each session. The timer rang to signal the end of each condition and was started again at the beginning of each session. It is not implausible that this may have signaled that a different type of reinforcement was available in each condition. The presence of discriminative stimulus has been proven effective in obtaining rapid discrimination between conditions in a study completed by Conners et al., (2000). “The inclusion of salient cues may increase either the efficiency of functional analyses or the likelihood of obtaining clear outcomes, which may be particularly helpful when conducting assessments comprised of either very few sessions (Northup et al., 1991) or brief session durations (Wallace & Iwata, 1999)” (Conners et al., p.306). Another potential cause for such rapid differentiation may be due to the dense schedule of attention reinforcement delivered for upright walking in the attention condition.

Additional limitations of the study include the number of participants, location and type of response measured. Since the response was unique to the individual, it was not possible to include additional participants in this functional analysis, which poses some concerns for the replication and reliability of the study. In addition, analogue conditions may not have been the best setting to assess ambulation, since they did not set the occasion for socially stigmatizing ambulation. This resulted in treatment selection based on a positive reinforcement hypothesis that was later disproved once treatment had been completed. Based on the treatment results, completion of the teaching session prior to the analogue conditions did not control for this confounding variable. In addition, the Cola placed at the end of the tapeline during each condition did not prove to be enough motivation for ambulation during the functional analysis; treatment was conducted in a naturalistic setting due to this confound.

### Conclusions

In spite of these limitations, the present results demonstrate that functional analysis can be completed for incompatible behavior, in which the measured response is intended to increase as the result of treatment. It is important to note that the functional analysis should set the occasion for the occurrence and measurement of both responses in order to clearly identify the maintaining variable. In addition, incompatible responses to dangerous behaviors deemed impossible to measure in an analogue condition due to ethical and safety reasons could be identified and then subjected to a functional analysis utilizing these similar procedures. This unique functional analysis could provide “a convincing demonstration of the effects of the changed contingencies and a practical, cost-efficient application of functional analysis procedures to an outpatient setting” (Northup et al., 1991, 522). Furthermore, the present results demonstrated that differential reinforcement of incompatible behavior is an effective treatment for two functionally equivalent responses with different topographies. In closing, this study serves to extend the literature on functional analysis and incompatible behavior because the results present an alternative and practical method of assessment that may expand the types of behavior possible for measurement through functional analysis in the field of Applied Behavior Analysis.

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