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USE OF THE HIGH-PROBABILITY INSTRUCTIONAL SEQUENCE AND ESCAPE EXTINCTION IN A CHILD WITH FOOD REFUSAL

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We used the high-probability (high-*p*) instructional sequence with and without escape extinction in the treatment of food refusal. Acceptance increased and refusal decreased only with the introduction of escape extinction. These results raise important questions about the high-*p* sequence in the treatment of food refusal.

DESCRIPTORS: escape behavior, high-probability sequence, negative reinforcement, pediatric feeding disorders, food refusal

Food refusal may be conceptualized as a form of noncompliance in which the child refuses to eat a sufficient volume or variety of food. One procedure used to treat noncompliance is the high-probability (high-*p*) instructional sequence (Mace et al., 1988), which involves issuing a series of instructions for which compliance is very likely followed by a request for which compliance is unlikely (i.e., a low-probability [low-*p*] instruction).

The high-*p* sequence has not been applied extensively to the treatment of feeding problems. An exception is a study by McComas et al. (2000), who used a multicomponent treatment that included escape extinction with and without the high-*p* sequence for 1 child with a feeding disorder. Acceptance of food (low-*p* response) increased more rapidly with the high-*p* procedure; however, acceptance also increased in the absence of the high-*p* procedure after only five sessions. The study is limited because the independent contribution of the high-*p* sequence was not evaluated. In the current investigation we evaluated the effects of the high-*p*

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sequence alone and, subsequently, the high-*p* sequence with escape extinction relative to escape extinction alone.

METHOD

Participant and Response Definitions

Mary, a 3-year-old girl, had been admitted to a day treatment program for the assessment and treatment of total food refusal. Her medical history included prematurity, gastroesophageal reflux, delayed gastric emptying, developmental delays, and gastrostomy (G) tube dependence.

Frequency of acceptance or compliance with low-*p* instructions (i.e., taking the entire bite within 5 s of presentation), compliance with high-*p* instructions (i.e., completion of the instruction within 5 s of presentation), and refusal behaviors (i.e., head turning, contact of the child's hands with the spoon or the therapist's hand or arm, and covering any part of the face with hands or bib) were recorded on laptop computers. Acceptance and compliance were converted to percentages by dividing the frequency of acceptance or compliance by the number of bites or demands presented and multiplying by 100%. A second observer independently coded 100% and 54% of compliance assessment and high-*p* evaluation sessions, respectively. Mean exact agreement for compliance during the compliance assessment was 100%. Mean exact agreement during the high-*p* evaluation was 94% for acceptance, 88% for compliance, and 96% for refusal behaviors. Interobserver agreement was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100%.

Prior to the evaluation, Mary's mother generated a list of 20 one-step instructions for a compliance assessment (e.g., "touch red," "give me five"), which resulted in identifying 13 high-*p* instructions (instructions for which compliance was 80% or greater).

Design and Procedure

A combination multielement and reversal design was used. The effects of the high-*p* instructions were evaluated within phases using the multielement component (no high-*p* vs. high-*p*), and the effects of extinction were evaluated across phases using the reversal component (escape vs. escape extinction [EE]), resulting in four conditions: escape plus no high-*p*; escape plus high-*p*; EE plus no high-*p*; and EE plus high-*p*. Six 12-bite sessions were conducted daily, 5 days per week, in a room containing a highchair, table, and two chairs. Mary was presented with four different foods in a random order during each session.

During escape plus no high-*p*, the therapist presented a bite of food and the low-*p* instruction "take a bite" approximately every 30 s. If Mary failed to accept the bite after 5 s, the spoon was removed and the next bite was presented at the 30-s interval. The therapist provided enthusiastic verbal praise for acceptance and mouth clean (no food visible in mouth 25 s after acceptance). If Mary engaged in any refusal behaviors, the spoon was removed for 30 s. The next bite was presented immediately after this escape period. Expulsion, packing, and vomiting were ignored. Escape plus high-*p* was identical to escape plus no high-*p* except that three high-*p* instructions were presented in random order approximately every 5 s prior to the delivery of the bite of food. If Mary did not comply with a high-*p* instruction, the next high-*p* instruction was presented.

EE plus no high-*p* was identical to escape plus no high-*p* except that escape was not provided following refusal behaviors. The spoon was held to Mary's mouth until she took the bite. If she expelled the bite, it was re-presented until the bite was swallowed.

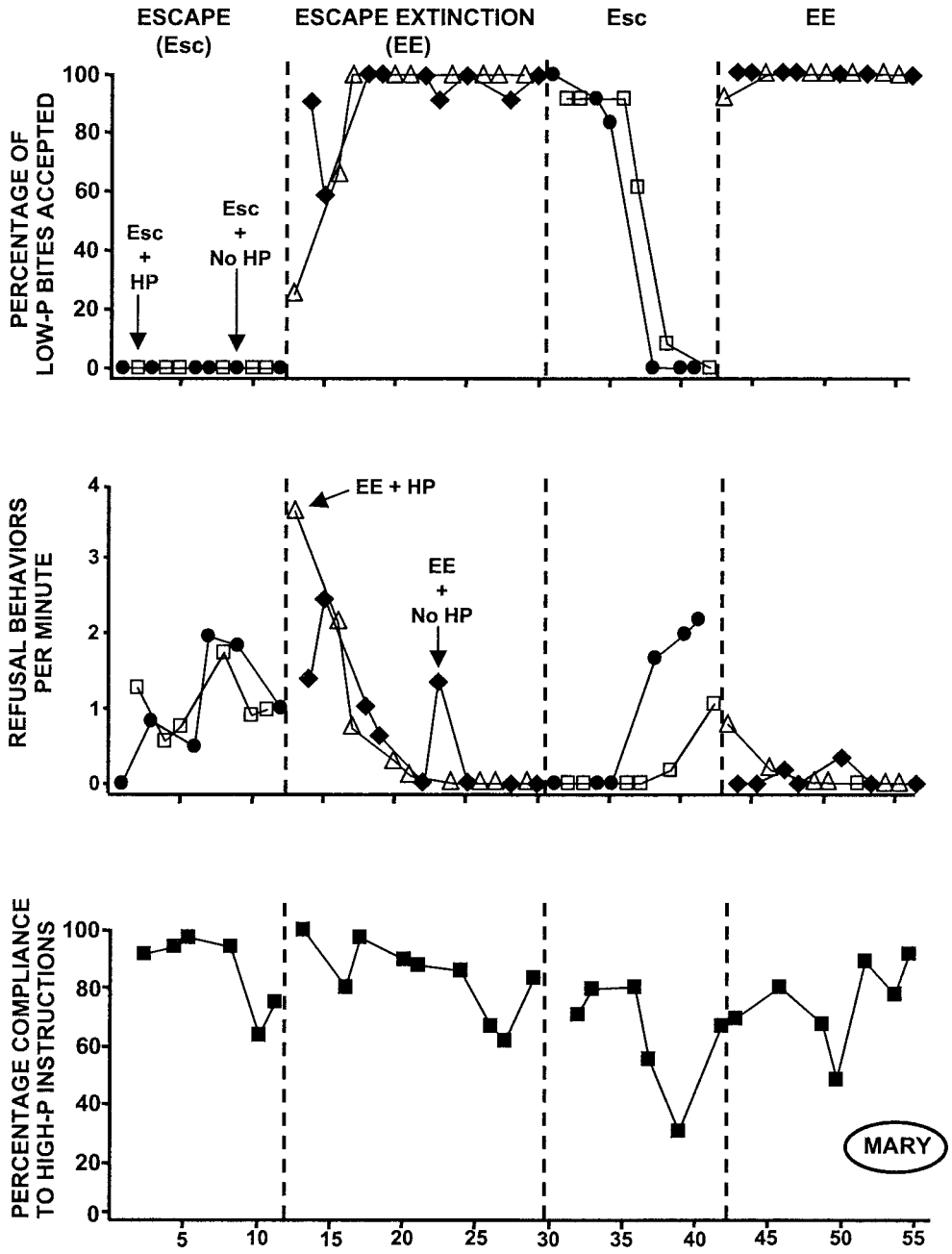

Figure 1. Percentage of bite presentations with acceptance (top panel), refusal behaviors per minute (middle panel), and percentage of compliance to high-probability instructions (bottom panel) during escape plus no high-*p*, escape plus high-*p*, EE plus no high-*p*, and EE plus high-*p*.

EE plus high-*p* was identical to EE plus no high-*p* except that three high-*p* instructions were presented in random order approximately every 5 s prior to the delivery of the bite of food. If she did not comply with the high-*p* instruction, three-step guided compliance was implemented. Sessions continued until she consumed 12 bites.

RESULTS AND DISCUSSION

The top panel of Figure 1 shows that acceptance was zero in escape plus no high-*p* and escape plus high-*p* in the first phase, indicating that the high-*p* intervention was ineffective when escape was delivered contingent on refusal behaviors. When escape extinction was implemented in the second phase, acceptance increased to 100% regardless of whether the high-*p* instructions were issued (EE plus high-*p*) or not (EE plus no high-*p*). The mean number of refusal behaviors per minute (middle panel) was 1.02 in escape plus no high-*p* and escape plus high-*p* in the first phase, and decreased to zero during EE plus no high-*p* and EE plus high-*p* in the second phase. The reversals conducted in Phases 3 and 4 essentially replicated the results of the first two phases, indicating that (a) EE was an effective intervention for food refusal, (b) high-*p* instructions were not effective when implemented alone (in escape plus high-*p*), and (c) high-*p* instructions did not add to the effectiveness of EE (in EE plus high-*p*).

The current results replicate and extend those of Zarcone, Iwata, Mazaleski, and Smith (1994), who hypothesized that the high-*p* sequence may not be effective when implemented in the absence of escape extinction because the positive reinforcement available for compliance may not compete with the negative reinforcement provided for escape behavior. Also, it is possible that high-*p* instructions failed to produce an effect because of their repeated pairing with a low-*p* instruction (presentation of food). Thus, high-*p* instructions may have become discriminative for the presentation of the low-*p* instruction, resulting in decreased compliance to high-*p* instructions over time. A third explanation of these findings is that responding to the low-*p* instruction failed to increase because of the dissimilarity between the two types of instructions. Nevin (1974) suggested that responding decreases as the test stimulus departs from the training stimulus. In the current investigation, the high-*p* instruction was a simple fine motor response not related to eating (e.g., touch ear), and the low-*p* instruction was a more complex behavior that involved multiple steps (e.g., opening the mouth, manipulating the food, and swallowing).

Future studies should investigate the extent to which (a) competition between positive and negative reinforcement alters the effects of the high-*p* sequence, (b) the low-*p* instruction affects compliance with high-*p* instructions, (c) similarities between the high- and low-*p* instructions alter compliance, (d) the use of escape extinction with the high-*p* sequence affects compliance, and (e) results may differ with various types of food refusal (e.g., food selectivity vs. total food refusal).

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