

*CHIN PROMPT PLUS RE-PRESENTATION AS TREATMENT FOR
EXPULSION IN CHILDREN WITH FEEDING DISORDERS*

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Expulsion (spitting out food) is a problem behavior observed in many children with feeding disorders. In the current investigation, we identified 4 children diagnosed with a feeding disorder who exhibited high rates of expulsion. Treatment with re-presentation (placing expelled liquids or solids back into the child's mouth) was not effective in reducing expulsion. Therefore, we added a chin-prompt procedure (the feeder applied gentle upward pressure to the child's chin and lower lip) for the initial presentation and the re-presentation. Chin prompt plus re-presentation resulted in low rates of expulsion for all 4 children. The results are discussed in terms of the potential underlying mechanisms behind the effectiveness of the chin-prompt procedure.

Key words: chin prompt, escape extinction, expulsion, feeding disorder, negative reinforcement, pediatric feeding disorder, re-presentation

Expulsion of (spitting out) food or liquids is a problem that is common among children with feeding disorders (Coe et al., 1997; Girolami, Boscoe, & Roscoe, 2007; Patel, Piazza, Santana, & Volkert, 2002; Sevin, Gulotta, Sierp, Rosica, & Miller, 2002). Expulsion is problematic because it may result in decreased caloric intake, longer mealtimes, and promotion of tongue thrust. Repeatedly engaging in tongue thrust during expulsion may inhibit the development of tongue lateralization, which is necessary for advancement to higher textures (Logemann, 1983).

Only a few studies have addressed treatment of expulsion directly. Sevin et al. (2002) increased one child's acceptance with non-removal of the spoon (NRS); however, increases in acceptance were accompanied by increases in expulsion. These authors then used re-presentation in which the feeder scooped up expelled food and placed it back in the child's mouth to decrease expulsions. Sevin et al. proposed that

expulsion functioned as an escape behavior (i.e., expulsion allowed the child to escape eating), and re-presentation functioned as escape extinction. The data for the child in the Sevin et al. study were consistent with an extinction interpretation because rates of expulsion increased in the first two sessions of treatment with re-presentation and then decreased to near zero.

Girolami et al. (2007) replicated and extended the study by Sevin et al. (2002) by comparing rates of expulsion when the feeder re-presented expelled food with a spoon or a Nuk brush. The results of the comparison showed that expulsion was lower when the feeder re-presented expelled bites with the Nuk brush. Girolami et al. hypothesized that re-presentation with a spoon did not function as extinction, in that it was not effective in reducing expulsion for their participant. Girolami et al. suggested that the lower levels of expulsion with the brush may have (a) been a result of negative reinforcement for swallowing (the child could avoid re-presentation with the brush if he swallowed the bite and did not expel), (b) resulted from the increased effort associated with expulsion (the brush allowed the

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feeder to place the bite directly on the child's tongue, which may have made it more difficult for the child to expel), or (c) compensated for oral motor skill deficits (i.e., the child did not have to lateralize his tongue to form the bolus and move it onto his tongue; all he had to do was propel the bolus backward to swallow).

Patel *et al.* (2002) treated one child with a feeding problem whose expulsion did not decrease when the feeder re-presented expelled food with a Nuk brush. The authors then conducted an assessment of the effects of food type and texture (Munk & Repp, 1994) on expulsion. The results of the assessment showed that expulsion was higher with meats relative to other food types (i.e., vegetable, fruit, starch). Decreasing the texture of meats only was effective in reducing rates of expulsion to near zero. Patel *et al.* postulated that the texture may have affected the child's motivation to expel (i.e., motivation to expel increased with higher textures, which were more difficult to swallow, and decreased with lower textures, which were less difficult to swallow).

In summary, although the clinical interventions described above have been effective, the behavioral mechanism responsible for this efficacy has not been identified. Taken together, the results of these studies suggest that expulsion occurs for different reasons (e.g., motivational deficits, skill deficits). Therefore, a variety of procedures may be needed to address these different underlying reasons. Our clinical observation is that some children expel because they do not close their mouths around the cup or spoon during presentation or after acceptance of liquids or solids (which is different from the mechanisms hypothesized to be responsible for expulsion in previous studies). Absence of mouth closure may result in the bolus pooling out of the mouth passively or may allow the child to thrust the bolus out of his or her mouth more easily (Yokochi, 1996). Procedures such as re-presentation or texture manipulation may not be effective for children

who demonstrate poor mouth closure because swallowing is difficult in the absence of a closed mouth (Arvedson & Brodsky, 2002), and neither procedure facilitates lip or mouth closure.

One potential method of reducing expulsion in children who do not close their mouths is a chin prompt. Speech therapists use chin prompts to provide support to the jaw during feeding (Arvedson & Brodsky, 2002). We hypothesized that the chin prompt might be effective for reducing expulsion because the procedure involves the feeder applying gentle upward pressure on the child's lower lip and chin, which should facilitate mouth closure. We found two published studies on this procedure with preterm infants in which feeders combined chin and cheek support to facilitate bottle feeding (Borion, Da Nobrega, Roux, Henrot, & Saliba, 2007; Einarsson-Backes, Deitz, Price, Glass, & Hays, 1994). This procedure is different from a jaw prompt (Ahearn, Kerwin, Eicher, Shantz, & Swearingin, 1996), which is used to open a child's mouth by placing inward pressure on the mandibular joint. No published studies to date have evaluated the effects of the chin prompt as treatment for expulsion in children with feeding problems.

In the current investigation, we treated the expulsion exhibited by four children who did not close their mouths during presentation or after acceptance of liquids or solids. Re-presentation alone was not effective for reducing expulsion. Therefore, we evaluated the effectiveness of a chin prompt in conjunction with re-presentation. We used the chin prompt to facilitate closure of the child's mouth.

METHOD

Participants and Setting

Four children who had been admitted to an intensive pediatric feeding disorders day-treatment program participated. Prior to admission, all children underwent a comprehensive interdisciplinary evaluation to rule out medical etiologies

of their current feeding difficulties and to confirm the safety of oral feeding (i.e., no evidence of aspiration or the inability to swallow).

Ashley was a 4-year-old girl whose medical history included short gut syndrome secondary to necrotizing enterocolitis, cerebral palsy, and liver transplant. She was taking sodium bicarbonate. She was admitted for food selectivity, low oral intake, and gastrostomy (G-) tube dependence. She received the majority (90% to 99%) of her calories via G-tube feedings of Neocate Infant formula via pump at 135 ml/hr from 8:00 p.m. to 7:00 a.m.

Billy was an 11-year-old boy who had been diagnosed with developmental delays whose medical history included bronchopulmonary dysplasia, extreme prematurity, and tracheostomy. He was taking Zantac, Extendryl, Polyvisol, Celexa, and Miralax. He was admitted for low oral intake and G-tube dependence. He received all of his calories via G-tube feedings of PediaSure with fiber mixed with pureed fruits and vegetables (300 ml at 7:00 a.m., 347 ml at 5:30 p.m., 280 ml at 7:00 p.m., 347 ml at 9:00 p.m.).

Christine was a 2-year-old girl whose medical history included prematurity, bronchopulmonary dysplasia, fundoplication, and tracheostomy. She was taking Pulmicort and Singulair. She was admitted for G-tube dependence and food refusal. She received 99% of her calories via G-tube feedings of PediaSure with fiber (120 ml at 11:00 a.m., 120 ml at 2:00 p.m., 770 ml overnight from approximately 8:00 p.m. to 6:00 a.m.).

Donald was a 22-month-old boy who had been diagnosed with Cornelia de Lange syndrome whose medical history included gastroesophageal reflux disease and failure to thrive. He was taking Prevacid. Donald was admitted for G-tube dependence and low oral intake. He received 90% of his calories through G-tube feedings of PediaSure (140 ml from 12:45 p.m. to 1:45 p.m., 140 ml from 6:00 p.m. to 7:00 p.m., 580 ml from 9:00 p.m. to 4:00 a.m.).

The timing and volume of tube feedings described above remained constant throughout the study. Each participant used age-appropriate seating (e.g., toddler high chair, regular chair) and drinking or eating utensils and wore a bib with a crumb catcher (i.e., the bottom of the bib folded up to form a receptacle that would hold expelled liquids or solids). Therapists conducted sessions in a treatment room (4 m by 4 m) equipped with one-way observation and sound monitoring.

Dependent Variables and Data Collection

Observers sat approximately 1.5 m from the child and collected data using laptop computers. The primary dependent variable was expulsion, which observers measured as a frequency. Expulsion for liquids was defined as each time any liquid pea size or larger, that had not yet been swallowed, was visible outside the lips after any amount of liquid had passed the plane of the lips. Expulsion for solids was defined as each time any food pea size or larger, that had not yet been swallowed, was visible outside the lips after the entire bolus of food had passed the plane of the lips. The definition for liquids and solids was different because it was difficult for observers to determine when all of the bolus of liquid had passed the plane of the lips because the cup was not opaque. The frequency of expulsion was converted to expulsions per bite by dividing the number of expulsions by the total number of bites presented (when the feeder presented the cup or spoon within 4 cm of the child's lips, not including placement of the cup or spoon at the child's lips following re-presentation) in each session.

A secondary dependent variable was grams consumed. To calculate grams consumed, the feeder placed the cup of liquid or each bowl of food (each food was in a separate bowl) on a Tanita KD160 kitchen scale before each session and recorded the pre-session weight. The feeder then placed the cup of liquid or each bowl of

food on the scale after the session and recorded the postsession weight. The feeder used hospital-grade paper towels (which weighed 2 g each without spill) to wipe up any spill. The feeder calculated pre-session weight minus postsession weight minus (weight of paper towels with spill minus [2 g times the number of paper towels]) to determine the grams consumed for the liquid and for each food for the session. The data presented for solid grams consumed for each session represent the total gram weight for all four foods presented in the session.

Exact agreement coefficients for expulsion were calculated by dividing the number of 10-s intervals in which observers scored the same frequency of expulsion by the total number of 10-s intervals in the session and converting this ratio to a percentage. Exact agreement is a particularly conservative measure of agreement for high-rate behavior because both observers have to score the same frequency of behavior in the interval to produce an agreement, and small temporal deviations in scoring cause disruption to the coefficient. A second observer independently scored 67% of sessions for Ashley, 46% for Billy, 42% for Christine, and 19% for Donald. Mean agreement for expulsion was 94% (range, 63% to 100%) for Ashley, 94% (range, 72% to 100%) for Billy, 88% (range, 42% to 100%) for Christine, and 92% (range 67% to 100%) for Donald. We did not assess interobserver agreement for grams consumed.

Design and Procedure

Design. We used an ABAB design. Baseline (A) was re-presentation, and B was re-presentation plus chin prompt.

General procedure. Children participated in blocks of feeding sessions, which we will refer to as meals, five times a day (e.g., 9:00 a.m., 10:30 a.m., 12:30 p.m., 2:30 p.m., 4:15 p.m.). However, we conducted sessions for the analyses presented in the current study in only some of these meals; other meals targeted different feeding behaviors. We timed the meals so that

at least 1 hr elapsed between each meal. The feeder conducted meals for the current analysis at 9:00 a.m., 11:15 a.m., and 2:45 p.m. with approximately 3 to 10 sessions within each meal for Ashley; 10:45 a.m. and 2:30 p.m. with approximately four to five sessions within each meal for Billy; 9:00 a.m., 10:15 a.m., and 3:00 p.m. with approximately four to eight sessions within each meal for Christine; and 9:00 a.m., 10:30 a.m., and 3:00 p.m. with approximately two to six sessions within each meal for Donald. The first (breakfast), third (lunch), and fifth (dinner) meals of the day were 45 min in length. The second (morning snack) and fourth (evening snack) meals of the day were 30 min in length. We used this schedule to approximate a young child's typical meal schedule (three meals and two snacks) within the confines of an 8:30 a.m. to 5:00 p.m. day-treatment program. The number of sessions per meal depended on the meal length (30 or 45 min) and the length of any one session within the meal (i.e., the length of the session varied depending on the child's behavior).

Prior to the treatment of expulsion with the chin prompt, we developed treatments to increase acceptance. During treatment, Ashley, Christine, and Donald displayed high levels of expulsion with liquids, and Billy displayed high levels of expulsion with pureed solids. Therefore, the focus of this study was with liquids for Ashley, Christine, and Donald and pureed solids for Billy.

The initial treatment for all children consisted of NRS with re-presentation and planned ignoring for inappropriate behavior. In addition, the feeder delivered noncontingent reinforcement (NCR) in the form of adult attention continuously throughout the session to Ashley and Christine per caregiver request. Each session consisted of five presentations. The feeder presented 4 cc of Oral Restitution Solution in a pink cutout (nosey) cup one after the other to Ashley, approximately 1 cc of pureed solids on a coated baby spoon approx-

imately once every 30 s to Billy, 4 cc of PediaSure with fiber in a pink cutout cup approximately once every 15 s to Christine, and 2 cc of Nutramigen Lipil in a pink cutout cup approximately once every 30 s to Donald. Billy's mother selected the foods targeted for treatment, which included yogurt, chicken, peanut butter and jelly sandwiches, hot dogs, bread, pancakes, potatoes, waffles, fruit cocktail, applesauce, peaches, pears, carrots, green beans, broccoli and cheese, and peas. The feeder randomly selected four foods to present to Billy in each session and presented the foods in a random order during the session.

Re-presentation. During NRS with re-presentation and planned ignoring, the feeder presented the cup or spoon to the child's lips. If the child accepted the liquid or solid within 5 s of presentation, the feeder provided brief praise. If the child engaged in inappropriate behavior (head turning, batting at the cup or spoon) or failed to accept the liquid or solid, the feeder kept the cup or spoon at the child's lips until the child allowed the feeder to deposit the liquid or solid. The feeder re-presented expelled drinks or bites by scooping up the expelled liquid into the cup or the expelled solid with the spoon and placing the bolus back into the child's mouth using NRS. Feeders began re-presentation as soon as the liquid or solid passed the plane of the child's lips. Therefore, a typical re-presentation involved the feeder scooping up the expelled liquid or solid from the child's face or bib. If the feeder was not able to recapture the actual expelled liquid or solid, he or she estimated the amount of expelled liquid or solid, used a syringe (liquids) or spoon (solids) to replace the estimated amount in the cup or on the spoon, and re-presented it to the child. The levels of grams consumed were consistent throughout the study, which suggests that there was little or no variability in re-presented bolus sizes. The feeder said, "show me," to check if the child had swallowed the liquid or solid immediately (Ashley), 15 s (Christine), or 30 s

(Donald and Billy) after the feeder deposited the liquid or solid into the mouth. If no liquid or solid pea size or larger was in the mouth, the feeder delivered brief praise. If liquid or solid larger than the size of a pea was in the mouth, the feeder prompted the child to "swallow your drink [bite]." The feeder then presented the next drink or bite. If the child had liquid or solid pea size or larger in his or her mouth at the check following the presentation of the fifth (last) drink or bite, the feeder prompted the child to "swallow your drink [bite]" every 30 s until either no liquid or solid (pea size or larger) was in the child's mouth or 15 min (Ashley and Billy) or 10 min (Christine and Donald), whichever came first. We reduced the time cap for Christine and Donald because the data for Ashley and Billy showed that if the child had not swallowed within 10 min, the probability of swallowing did not increase with the additional 5 min (i.e., it was just an additional 5 min of unproductive session time). The feeder provided no other differential consequences for inappropriate behavior, vomiting, gagging, and coughing.

Chin-prompt assessment. Figure 1 is a photograph of a demonstration of the chin prompt. The feeder placed his or her forefinger under the child's chin during presentation, and the feeder's forefinger remained under the child's chin as described below. After the liquid or solid entered the child's mouth, the feeder placed his or her thumb under the child's lower lip and applied gentle upward pressure on the child's chin (with the forefinger) and lower lip (with the thumb) for 5 s while counting audibly ("one, two, three, four, five"). The feeder then removed his or her fingers from the child's chin and lower lip. The reason the feeder counted aloud was to give the child a prompt that signaled the termination of the chin prompt. We used this strategy to avoid adventitious increases in inappropriate behavior as a result of the possible pairing of inappropriate behavior and the termination of the chin prompt. The



Figure 1. Demonstration of the chin-prompt procedure.

feeder also used the chin prompt during re-presentation. All other procedures were identical to baseline.

For Donald, the speech therapist decided to repeat his swallow study with thin liquids in the middle of the second implementation of the chin prompt. He instructed us to present thickened liquids until the swallow study was completed. Therefore, we gave him thickened liquids (with the chin prompt) after Session 84 for 5 days while awaiting the completion of the swallow study. The results of the swallow study confirmed that Donald was not at risk for aspiration with thin liquids, and we resumed treatment as described above with thin liquids.

RESULTS

Figure 2 displays the results of the chin-prompt assessment. Although slightly variable, implementation of re-presentation plus chin prompt produced a decrease in expulsions per bite ($M = 0.2$) relative to both phases of re-presentation ($M = 0.74$) for Ashley. Adding the chin prompt to re-presentation produced decreases in expulsions per bite ($M = 0.52$)

relative to both phases of re-presentation ($M = 1.28$) for Billy. For Christine, adding the chin prompt to re-presentation produced decreases in expulsions per bite ($M = 0.79$) relative to both phases of re-presentation ($M = 3.3$). Finally, chin prompt plus re-presentation produced decreases in expulsions per bite ($M = 1.98$) relative to both phases of re-presentation ($M = 10.68$) for Donald. Presentation of thickened liquids with the chin prompt plus re-presentation resulted in higher levels of expulsions per bite ($M = 3.1$, data not shown) relative to chin prompt plus re-presentation with thin liquids, which suggests that Donald's expulsion did not improve as a result of thickening the liquids. Levels of negative vocalizations remained low throughout both conditions for all participants except Christine. For Christine, negative vocalizations did not occur during the first phase of re-presentation, increased to 23% during the first phase of the chin prompt plus re-presentation, decreased to low levels in the return to re-presentation ($M = 9.7\%$), and declined further during the second implementation of the chin prompt plus re-presentation ($M = 1.8\%$).

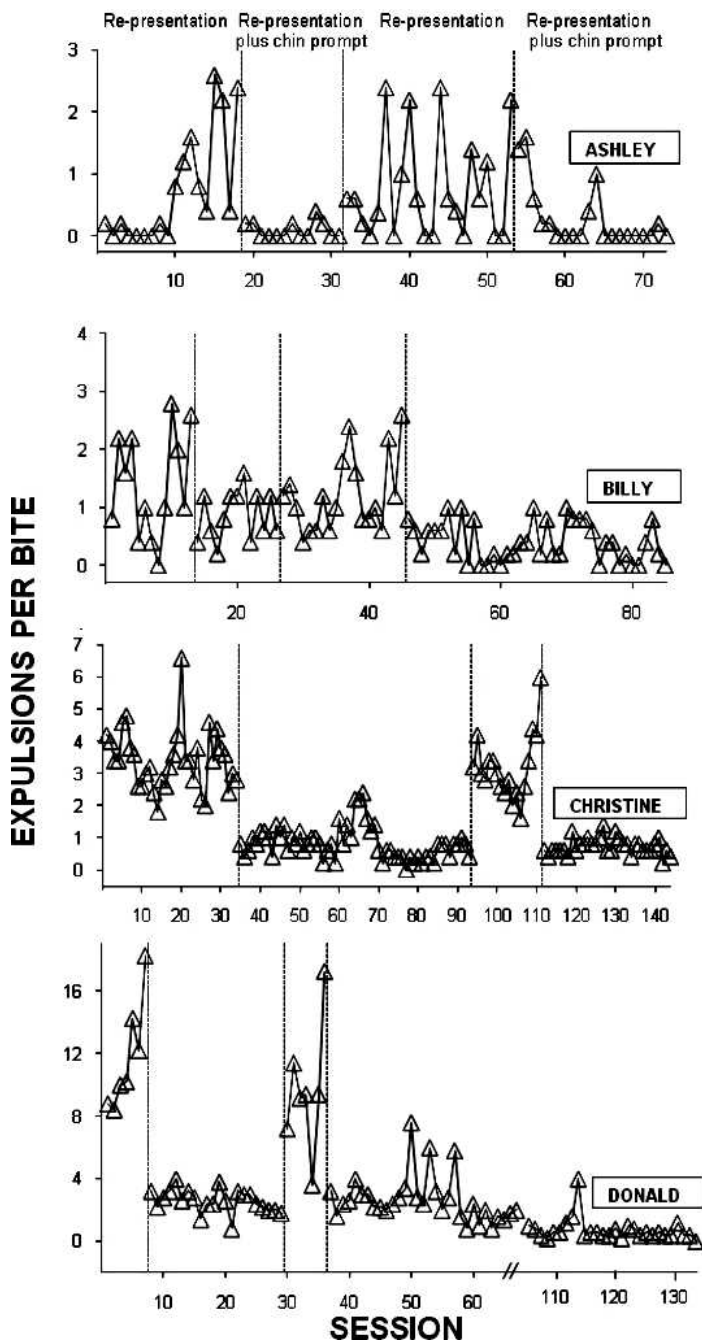


Figure 2. Expulsions per bite for Ashley (top), Billy (second), Christine (third), and Donald (bottom). The double break lines on the x axis represent the point at which we presented thickened liquids to Donald.

Mean grams consumed were 19.4 for re-representation and the first implementation of chin prompt plus re-representation (grams consumed data were lost for the second implemen-

tation of chin prompt plus re-representation) for Ashley, 3.5 for re-representation and 4 for chin prompt plus re-representation for Billy, 10.1 for re-representation and 10.7 for chin prompt plus

re-presentation for Christine, and 8.9 for re-presentation and 9.5 for chin prompt plus re-presentation for Donald. The negligible change in grams consumed would be expected, because the number of presented bites remained the same in re-presentation and chin prompt plus re-presentation conditions. The primary change in behavior was the reduction of expulsion, which resulted in the children consuming liquids and solids in a more timely and age-appropriate manner with the chin prompt plus re-presentation procedure.

DISCUSSION

In the current investigation, we identified four children whose expulsion did not decrease to clinically acceptable levels using re-presentation. Adding a chin prompt to re-presentation produced marked and consistent decreases in expulsion, indicating that this procedure was effective when re-presentation alone failed to decrease expulsion.

One question that arises from the current investigation is why expulsion occurs. Sevin *et al.* (2002) hypothesized that expulsion is a member of a response class hierarchy of escape-motivated behavior. In the Sevin *et al.* study, treatment of refusal resulted in increases in acceptance and increases in expulsion. Sevin *et al.* hypothesized that re-presentation functioned as escape extinction or possibly punishment for expulsion. That is, the child could no longer escape eating by expelling bites of food because the feeder re-presented the bites until the child swallowed (Girolami *et al.*, 2007).

In Sevin *et al.* (2002), the feeder used a spoon to re-present expelled bites. By contrast, Girolami *et al.* (2007) identified a participant whose expulsion did not decrease when the feeder re-presented expelled bites with a spoon. Girolami *et al.* compared re-presentation of expelled bites with a spoon or a Nuk brush and showed that expulsion was lower with the Nuk brush. Girolami *et al.* hypothesized that the child in their study had oral motor deficits that

caused him to have difficulty managing the bolus. Placement of the re-presented bite with the Nuk brush allowed the feeder to deposit the bolus directly on the child's tongue. Tongue placement may have reduced the response effort associated with swallowing because it was easier for the child to propel the bolus backward to swallow when the bolus was on his tongue (Girolami *et al.*, 2007).

Similarly, we hypothesized that the children in our study had oral motor deficits that affected the likelihood that they would close their mouths during feeding. Because normal swallowing involves elevation of the tongue, posterior movement of the tongue, and sequential contact of the tongue with the hard and soft palate to move the bolus into the pharynx (Arvedson & Brodsky, 2002), it is much easier to swallow liquids or solids with a closed relative to an open mouth. The chin prompt may have facilitated mouth closure, which may have reduced the effort associated with swallowing (similar to the effort reductions for swallowing hypothesized by Girolami *et al.*, 2007, that resulted from placement of the bolus on the tongue). Response effort for swallowing could be manipulated by facilitating (e.g., with a chin prompt) and preventing mouth closure in alternating conditions. Reductions in expulsion during the mouth closed condition would suggest that the effort associated with swallowing might be responsible for the differences. Simultaneous measurement of swallowing would provide data regarding whether the child was swallowing in conjunction with the chin prompt, which would provide further support that the chin prompt served to facilitate swallowing via mouth closure.

Conversely, the chin prompt in conjunction with re-presentation may have increased the response effort associated with expulsion. That is, it may have been more difficult to expel liquids or solids while the feeder was applying upward pressure to the child's chin and lower lip. It should be noted that the chin prompt did

not result in the feeder closing the child's mouth consistently. The child was able to hold her or his jaw firmly so that the mouth would not close; therefore, it was still possible for the child to expel during the chin prompt. The effects of response effort on expulsion could be assessed by manipulating the pressure (e.g., Chung, 1965) applied to the chin (e.g., a light touch or firm upward pressure). However, clinicians should exercise caution when implementing the chin prompt, because excessive pressure may cause bruising.

Alternatively, the chin prompt may have functioned as punishment for expulsion. Children with feeding problems often have aversions to being touched on the face (Piazza, Roane, & Kadey, 2009). If the chin prompt was aversive, it may have reduced the probability that the child would expel so that he or she could avoid future presentations of the chin prompt. Recall, however, that the child could not avoid the chin prompt altogether, because the feeder implemented it during presentation. One method of assessing the extent to which the chin prompt functioned as punishment would be to apply it after an alternative behavior (e.g., button pressing) to determine if that alternative behavior decreased following contingent application of the chin prompt (Mazaleski, Iwata, Rodgers, Vollmer, & Zarcone, 1994).

Finally, the chin prompt may have compensated for the oral motor skill deficits of the children in our study. We noted anecdotally that all of the children in our study exhibited open-mouth behavior in nonfeeding situations (i.e., their mouths "hung open" during everyday activities). By contrast, children without oral motor deficits typically exhibit close-mouth behavior during everyday activities. In addition, the children had very little experience eating by mouth prior to admission and demonstrated little or no mouth closure during presentation or following acceptance of liquids or solids. Children who have little experience as oral feeders may lack the prerequisite skills for orally

manipulating and swallowing liquids and solids (Logemann, 1983). The chin prompt may have functioned as a prompting strategy that taught the child what to do (i.e., to close his or her mouth) during presentation and swallowing the liquids or solids. One method of testing whether the chin prompt compensated for an oral motor skill deficit would be to teach mouth closure outside the feeding sessions. Training the skill of mouth closure should result in eventual reductions in expulsion in the absence of intervention during the feeding session.

One unanswered question is whether the chin prompt would have been effective in isolation. We implemented the chin prompt in conjunction with re-presentation; therefore, it is not clear whether the chin prompt alone or the chin prompt plus re-presentation was responsible for reduced expulsion. Clearly, re-presentation alone was not effective, but it was possible that we could have used the chin prompt in the absence of re-presentation. Future studies should evaluate the effects of the chin prompt alone. A second limitation of our study was that we implemented the chin prompt during presentation and re-presentation. Thus, it is possible that the chin prompt would have been effective if we had used it only for presentation or only for re-presentation. Future studies should evaluate the effects of the chin prompt for acceptance alone and for re-presentation alone. A third limitation is that the chin prompt is a somewhat invasive strategy and should be faded eventually to allow the child to become an age-appropriate eater. Fading the procedure was not attempted with any of the children in our study.

A final limitation is that we did not evaluate two of the procedures (re-presentation with a Nuk brush and texture manipulation) that have been published on expulsion. These procedures would have been appropriate only for Billy, because the two treatments are applicable only with solid foods, and Billy was the only child with whom the treatment was used with solid

food. We did not attempt to use the Nuk brush with Billy, because we thought that expulsion would have continued due to his open-mouth behavior during acceptance. In addition, Billy's food was a pureed texture, and we were reluctant to reduce it further (the lower texture in this case would have been baby food). Future studies should compare alternative treatments to the chin prompt for expulsion.

In conclusion, the addition of a chin prompt to a treatment package including re-presentation of expelled liquids or solids effectively decreased the expulsion of four children. This study is the first to demonstrate the effectiveness of this procedure as treatment for expulsion. The results of the current and previous studies suggest that there are a variety of potential procedures that are clinically effective as treatment for expulsion. A gap in the literature exists, however, in understanding the reason why expulsion occurs and the underlying mechanism responsible for the effectiveness of the various treatments, which future research should address.

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