

Caregiver Verbal Encouragement Increases Food Acceptance among Vietnamese Toddlers^{1–3}

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Abstract

Responsive feeding, defined as the positive environment and caregiving behaviors that encourage children to eat, is critical to their physical, mental, and social development. However, research and programs designed to foster responsive feeding have been limited. This research tested the hypothesis that caregiver encouragement, caregiver and child behaviors, and other feeding characteristics were associated with acceptance of food. A total of 91 mother/child pairs in rural, northern Vietnam were videotaped during 2 2-h feeding episodes. Children were 12 and 17 mo of age at the time of study. Caregiver and child behaviors were coded at the level of the “intended bite” (7135 bites total). Feeding episodes were marked by few physical actions and minimal verbal encouragement by caregivers. Results from generalized linear mixed models suggest that when caregivers provided children with positive comments, children were 2.4 times as likely to accept bites compared with when no comments were given. Twelve-mo-olds who were in the caregiver’s arms [odds ratio (OR) = 0.5] or lap (OR = 0.5) were significantly less likely than those who stood to accept bites. The 17-mo-olds who played were less likely than those with no physical action to accept bites. Play appeared to distract boys more than girls. In Vietnam, programs should help caregivers provide positive verbal encouragement to eat. Program planners and implementers may want to encourage caregivers to avoid force feeding and other forms of physical pressure. Further, mealtime should be seen as an opportunity to develop long-term feeding skills and encourage a healthy appetite. *J. Nutr.* 139: 1387–1392, 2009.

Introduction

Child malnutrition is the principal underlying cause of child morbidity and mortality in developing countries (1). Many deaths in the first 5 y of life can be averted if caregivers practice optimal behaviors, including exclusive breastfeeding for the first 6 mo (2) and appropriate complementary feeding thereafter (3). Complementary feeding includes sustained breastfeeding, gradual transition to the family diet, the provision of the appropriate quality and quantity of food, and frequent, responsive feeding (4–6). As Moore et al. note (7), malnutrition may be due as much to difficulties in the interactions between caregivers and children as to a lack of high-quality foods.

The UNICEF conceptual framework (8) posits that appropriate care and feeding of infants is central to their growth and development (6). Scientific consensus on the importance of these issues culminated in the development of the Guiding Principles for Optimal Feeding of the Breastfed Child (9), including recommendations that children be fed responsively.

Responsive feeding refers to interactions between caregiver and child that lead to a positive feeding experience, adequate dietary intake, and enhanced developmental opportunities. Responsive feeding is defined as: 1) feeding infants directly, being sensitive to their hunger and satiety cues; 2) feeding slowly and patiently and encouraging children, but not forcing them, to eat; 3) when children reject food, experimenting with different food combinations, tastes, textures, and methods of encouragement; 4) minimizing distractions during meals; and 5) talking to children during feeding, with eye-to-eye contact (10).

Despite the perceived importance of responsive feeding as reflected by a series of policy documents (2,10–12), numerous authors note that there is scant research on the topic and that program efforts to encourage it have been limited (13–20).

This research was part of an effort to assess the relationship between responsive feeding, dietary intake, and nutritional status among infants and toddlers in Vietnam. The present study tests

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³ Supplemental Table 1 is available with the online posting of this paper at jn.nutrition.org.

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the hypothesis that children whose caregivers encourage them to eat are more likely to accept food, whether fed by caregivers or when self-feeding. Of specific interest is how each of the following affects child acceptance of food and drink offered by caregivers: caregiver behaviors, child behaviors, other feeding characteristics, and characteristics of the foods themselves.

Materials and Methods

Data collection. The methods used for this research have been described in detail elsewhere (21,22). In brief, this observational study took place in rural Vietnam. It was part of a prospective, randomized community intervention trial that sought to improve child diet and nutritional status. That study included 240 children 5–25 mo of age where Save the Children implemented positive deviance-informed programming. Baseline data were collected in December, 1999, and children were followed for 1 y, with data collection occurring during study mo 0 (baseline), 2, 4, 6, and 12. In addition to information on caregiving (described below), data were collected on dietary intake and nutritional status.

To assess caregiver-child interactions during feeding, children and their caregivers were videotaped over a 2-h period on 2 different d at least 7 d apart. We analyzed both videotapes if they were available and we accounted for potential correlation between videotapes in the analysis. Children were randomly selected to participate at either 12 or 17 mo of age. Of the 108 children selected, 6 were observed only once and 11 were not observed due to refusal or because of scheduling conflicts ($n = 91$). The study children were videotaped during a main meal: 48.4% during lunch, 20.9% at breakfast, and 30.8% at dinner. Before and during videotaping, fieldworkers discouraged changes in usual feeding and care. Once all videotaping was completed, videos were transferred to DVDs for coding and analysis.

Video observation and coding. Observers coded each feeding episode using a coding scheme adapted from studies in Peru (23) and Guatemala (24). Working with 1 of the authors (M.E.B.), a Vietnamese health professional reviewed DVDs for 9 children and modified the Peruvian coding scheme to fit the Vietnamese context. Six observers coded the videotapes, including the Vietnamese health professional in Hanoi and 5 university students in the United States. One student was Vietnamese and 2 were fluent in Vietnamese. They were paired with 2 non-Vietnamese speakers for verbal coding. The U.S. observers completed 1.5 d of training with 2 of the study's authors (M.E.B. and L.E.C.). Training included standardizing observations until 80% agreement was achieved for each item coded.

Each observer was randomly assigned to DVDs for coding. The entire feeding episode was coded, not simply the main meal. This was done to maximize the observation of caregiving behaviors.

Observers coded at 3 levels the individual bite, the feeding episode (all bites that were >20 min apart from subsequent bites), and the child. Because the main outcome of interest was acceptance of food, the bite was the central unit of analysis.

Observers examined "intended bites" (the caregiver or child brought food to within a few inches of the child's mouth with the intention of it entering the mouth for consumption, whether or not it was consumed.) Because coders could stop, reverse, and fast-forward DVDs, it was possible to code frame by frame. The major outcome was child interest in eating, determined by whether or not the child accepted the intended bite.

The Emory University Human Investigations Committee granted ethical approval for this study. Written informed consent was obtained from the household head during the first home visit.

Analytic methods. Descriptive statistics were calculated for response and explanatory variables. We included age with interactions in the model to test for differences in effects between the 2 age groups. We did the same for who fed the child, a variable strongly associated with child's interest in eating. Coding for each variable is given in Table 1.

Response variable. Children's interest in food was coded 1–5: 1 = child eagerly accepted food by leaning forward, opening mouth, reaching for

TABLE 1 Response and explanatory variables (including bites), stratified by age of child, in Vietnam

	12 mo old	17 mo old
<i>n</i>	40	51
Intended bites, <i>n</i>	2487	4648
Bites, <i>n</i> (%) <i>child variables</i>		
Interest ¹		
Accept (ref)	1876 (75.4)	3802 (81.8)
Reject	611 (24.6)	846 (18.2)
Verbalization of child		
None (ref)	1588 (63.9)	3071 (66.1)
Any	899 (36.1)	1577 (33.9)
Physical actions of child ¹		
None (ref)	1646 (66.2)	3082 (66.3)
Crawling	173 (7.0)	693 (14.9)
Playing with an object	543 (21.8)	662 (14.3)
Playing without object	66 (2.7)	66 (1.4)
Playing with a person	59 (2.4)	145 (3.1)
Position of child ¹		
Standing (ref)	582 (23.5)	2028 (43.6)
Sitting on lap	358 (14.4)	398 (8.6)
Sitting on floor	406 (16.3)	397 (8.5)
Sitting on chair, stool, bed	579 (23.2)	1216 (26.2)
In the arms of caregiver	508 (20.4)	373 (8.0)
Other	54 (2.2)	236 (5.1)
Caregiver variables		
Person feeding ¹		
Self	699 (28.1)	2486 (53.5)
Mother	1125 (45.2)	1498 (32.2)
Other (ref)	663 (26.7)	2162 (44.3)
Father	36 (1.5)	177 (3.8)
Grandmother	332 (13.3)	272 (5.9)
Grandfather	41 (1.7)	34 (0.7)
Sibling female	159 (6.4)	32 (0.7)
Sibling male	32 (1.3)	47 (1.0)
Unknown	63 (2.5)	102 (2.2)
Verbalization of caregiver ¹		
None (ref)	1501 (60.3)	2943 (63.3)
Positive	312 (12.6)	334 (7.2)
Mechanical/direct	662 (26.6)	1327 (28.5)
Ordered/threatened	12 (0.5)	44 (1.0)
Physical actions of caregiver ¹		
Normal facilitation (ref)	1706 (68.6)	2225 (47.9)
None	567 (22.8)	2221 (47.8)
Physical pressure	164 (6.6)	177 (3.8)
Force feeds	50 (2.0)	25 (0.5)
Food variables		
Consistency of food ¹		
Liquid (ref)	191 (7.7)	424 (9.1)
Semisolid	984 (39.6)	1244 (26.8)
Solid	1312 (52.8)	2980 (64.1)
Utensil ¹		
Feeder's hand (ref)	217 (8.7)	188 (4.0)
Child's hand	594 (23.9)	1679 (36.1)
Spoon	464 (58.9)	2327 (50.1)
Chopsticks	89 (3.6)	72 (1.6)
Cup	110 (4.4)	329 (7.1)
Other	13 (0.5)	53 (1.1)

¹ *P*-value ≤ 0.001 from chi-square test comparing age groups.

hand or spoon of feeder; 2 = child passively accepted the food (not eagerly); 3 = child accepted the food, then subsequently rejected it; 4 = child rejected, then accepted; and 5 = child completely rejected the food.

To simplify analyses and to ensure sufficiently large cell sizes, interest in food was recoded as a binary variable, with values 1, 2, and 4 combined into a new category (“accept”) and values 3 and 5 classified as “reject.”

Explanatory variables. Caregiver behaviors were assessed using 3 variables: person feeding, verbalization of caregiver, and physical actions of caregiver. The 8 categories for person feeding were later collapsed into 3 categories: self, mother, and other. Child behaviors were measured using 3 variables: verbalization of child, physical actions of child, and position of child. Food variables included consistency of food and utensil.

Statistical model. Because the response variable was binary, we used a logistic regression model to estimate the association between the odds of accepting the food or drink and the explanatory variables listed above. All analyses were adjusted for the effects of the child’s age and sex. Each child had multiple bites per feeding episode; consequently, it was possible that within-child bites were correlated with one another. This correlation was accounted for by using a logistic regression model for correlated data (PROC GLIMMIX in SAS) with a random intercept term.

Interactions. Interactions between child age and sex and all of the primary explanatory variables were considered and were retained in the model if significant ($P < 0.05$). Findings suggested interactions of age with consistency of the food, position of the child, and physical actions of the child. Interactions of sex with physical actions of the child, verbalization of the child, and who fed the child were also detected. There were no interactions between age or sex and either of the 2 variables describing caregiver behaviors. Potential confounders, including mother’s age, education, living standard, etc., were also entered into the model. None were significant ($P < 0.05$).

Because who fed the child (self, mother, other) was strongly associated with the odds of accepting the bite, interactions between self and all other explanatory variables were considered. None were significant. The focus here is on responsive complementary feeding; breastfeeding episodes were coded but not analyzed.

Results

Nearly one-half (47.8%) of mothers had completed intermediate school or higher and literacy was almost universal. About one-half (48.9%) reported that they went hungry on a daily basis or that they did not have enough food (Supplemental Table 1).

Explanatory variables. Table 1 provides descriptive information for each of the explanatory variables, stratified by age of child. Findings for 12-mo olds indicate that infants were generally interested in the food offered to them and ate most frequently when standing; sitting on a chair, stool, or bed; or in the arms of the caregiver. In one-third of bites, 12-mo olds verbalized and demonstrated physical actions. For 60.3% of all bites, caregivers of 12-mo olds gave no verbal encouragement for their child to eat. When caregivers spoke to infants, they did so “mechanically” or in a directive fashion (26.6% of all bites). Physical pressure and force feeding were infrequent.

Seventeen-month-old children were more likely than 12-mo olds to stand while eating and were less likely to be in the lap or arms of the caregiver. They were also more likely to feed themselves (53.5% of all bites for 17-mo olds vs. 28.1% for 12-mo olds). Caregivers of 17-mo olds were less likely than those of 12-mo olds to use any physical actions to encourage children to eat.

Data from 24-h recall indicate that breast milk constituted 18.9 and 2.2% of all liquids and foods consumed by 12- and 17-mo olds, respectively. Consumption of most other foods was virtually identical for 12- and 17-mo olds.

Few children self-fed entirely. Of the 40 12-mo olds, none were completely self-fed, 11 were completely fed by others, and

29 were fed both by self and others. Among the 51 17-mo olds, none were completely self-fed, 6 were completely fed by others, and 45 were fed by self and others (not presented). The child’s mother was the most frequent feeder (Table 1).

Self-feeding compared with being fed by others. As expected, children who fed themselves were more likely to accept bites (children accepted 95.2% of all bites they offered themselves but only 67.0% of bites given by others; not presented). Consequently, analyses were stratified by type of feeder. Findings suggest the following for self-feeders (not presented): one-third verbalized while self-feeding, most remained motionless, and caregivers generally remained silent (75.5% of all intended bites) and did little physically to influence their children’s acceptance of bites. Children fed by others were similar to self-feeders with respect to their own verbalization and position. However, for 1 in every 5 (18.9%) bites, children fed by others were in the arms of the caregiver, a position that might restrict children’s mobility or opportunities to reject food. Children fed by others were more likely than children who fed themselves to receive verbal feedback from the caregiver, often mechanical or directive in nature. Even so, ordering and threatening were rare.

Factors associated with the acceptance of bites. A single generalized mixed model was used to identify factors associated with the odds of accepting bites (Tables 2–4). Table 2 lists variables independently associated with acceptance of bites and Tables 3 and 4 list interactions by age and sex. As noted previously, who fed the child was strongly associated with the odds of accepting the bite. The model adjusts for whether the child self-fed or was fed by others.

Positive and mechanical/direct verbalization by the caregiver was significantly associated with the odds of a child accepting the offered bite, regardless of age or sex of the child (Table 2). If verbal comments were positive, children were 2.4 times as likely to accept the bite compared with when no verbal comments were given. When verbal comments were mechanical/directive, children were significantly less likely to accept the bite [odds ratio (OR) = 0.7]. Physical actions of the caregiver were correlated with accepting bites, although in an inverse fashion. Force feeding was also positively associated with acceptance (OR = 2.0). Children who fed themselves were more likely than children fed by individuals other than the mother to accept bites (OR = 10.6).

TABLE 2 Results from a generalized linear mixed model with the odds of accepting a bite as the outcome, in Vietnam¹

	OR	95% CI
Verbalization of caregiver (ref = none)		
Positive	2.4 [‡]	1.8–3.1
Mechanical/direct	0.7 [‡]	0.6–0.9
Ordered/threatened	0.6	0.3–1.2
Physical actions of caregiver (ref = normal)		
None	1.1	0.7–1.7
Physical pressure	1.5 [†]	1.1–2.0
Force feeds	2.0*	1.1–3.7
Person feeding (ref = other)		
Self	10.6 [‡]	6.7–16.7
Mother	1.2	0.9–1.5

¹ The null hypothesis is that OR = 1. Symbols indicate that the OR differs from the reference category. * P -value ≤ 0.05 ; [†] P -value ≤ 0.01 ; [‡] P -value ≤ 0.001 .

TABLE 3 Results from a generalized linear mixed model with the odds of accepting a bite as the outcome, in Vietnam¹

	12 mo old		17 mo old		P-value ²
	OR	95% CI	OR	95% CI	
Physical actions of child (ref = none)					
Crawling	2.8*	1.1–4.5	0.9	0.6–1.2	0.004
Play with an object	0.8	0.5–1.2	0.8	0.6–1.1	0.982
Play without an object	0.4*	0.1–1.0	0.4*	0.2–0.8	0.825
Play with a person	1.1	0.4–3.2	0.4*	0.2–0.8	0.080
Position of child (ref = standing)					
Sitting on lap	0.5 [‡]	0.3–0.8	0.9	0.6–1.3	0.045
Sitting on floor	0.7	0.4–1.1	1.4	0.9–2.2	0.028
Sitting on chair, stool, or bed	0.6*	0.3–0.9	1.1	0.8–1.4	0.032
In the arms of caregiver	0.5 [‡]	0.3–0.7	1.4	1.0–2.0	<0.001
Other	0.5	0.2–1.2	0.6 [†]	0.4–0.9	0.719
Consistency of food (ref = liquid)					
Semisolid	0.1 [‡]	0.1–0.2	0.5 [†]	0.3–0.8	<0.001
Solid	0.1 [‡]	0.1–0.3	0.3 [‡]	0.2–0.5	0.028

¹ The null hypothesis is that OR = 1. Symbols indicate that the OR differs from the reference category. *P-value ≤ 0.05; [†]P-value ≤ 0.01; [‡]P-value ≤ 0.001.

² P-values associated with the null hypothesis that the OR of the 12- and 17-mo-old children do not differ.

Twelve-mo olds who crawled during feeding were 2.8 times as likely to accept bites than 12-mo olds who had no physical action (Table 3). However, 12-mo olds who played without an object during the feeding episode were less likely to accept bites. Thus, among 12-mo olds, crawling appeared to encourage acceptance of bites, whereas playing without an object discouraged acceptance.

Among 17-mo olds, those who played during a feeding episode were less likely than children with no physical actions to accept bites (Table 4). The position of 17-mo olds had little influence on the acceptance of bites.

OR for 12- and 17-mo olds were compared to detect significant differences between groups. Findings indicate that 17-mo olds who sat on a lap; on the floor; on a chair, stool or bed; or who were in the arms of the caregiver were more likely than 12-mo olds in these same positions to accept bites (Table 3).

Males and females who verbalized during feeding were significantly less likely to accept bites (Table 4). In particular, females who demonstrated any verbalization were one-half as

TABLE 4 Results from a generalized linear mixed model with the odds of accepting a bite as the outcome, in Vietnam¹

	Females		Males		P-value ²
	OR	95% CI	OR	95% CI	
Verbalization of child (ref = none)					
Any	0.5 [‡]	0.4–0.7	0.8*	0.6–0.9	0.005
Physical actions of child (ref = none)					
Crawling	0.7	0.4–1.5	0.9	0.6–1.2	0.589
Play with an object	0.7	0.5–1.1	0.8	0.6–1.1	0.608
Play without an object	1.1	0.4–2.9	0.4*	0.2–0.8	0.085
Play with a person	1.4	0.5–4.0	0.5*	0.2–0.8	0.009

¹ The null hypothesis is that OR = 1. Symbols indicate that the OR differs from the reference category. *P-value ≤ 0.05; [†]P-value ≤ 0.01; [‡]P-value ≤ 0.001.

² P-values associated with the hypothesis that the OR of females and males do not differ.

likely (OR = 0.5) to take liquids and foods given to them, suggesting a verbal protest in response to food offered. Playing without an object appeared to distract boys but not girls from eating. Playing with a person appeared to divert boys' attention but not girls'.

Females who verbalized were considerably less likely than males who verbalized to accept bites (Table 4). Females who played with a person were significantly more likely than males to accept bites.

Discussion

This article adds to a growing literature that investigates the role of feeding styles on child dietary intake, focusing on caregiver behaviors that may be responsive or less optimal. We tested the hypothesis that caregiver encouragement, caregiver and child behaviors, other feeding characteristics, and the characteristics of foods themselves are associated with acceptance of food. Results indicate that Vietnamese children frequently accepted food that was offered to them. Generally, caregivers provided physical support to help children eat but gave little verbal encouragement. When they did so, it was often mechanical or direct. Physical pressure and force feeding were rare.

Our results differ from those presented elsewhere. Whereas these Vietnamese children accepted a majority of bites offered to them, studies from Bangladesh and Nicaragua report the opposite (19,25). In the Nicaragua study, 65% of all children refused at least part of the mid-day meal and in Bangladesh, children rejected more than one-quarter of all bites. However, observational and coding instruments varied among the 3 studies.

In this study, verbalization and physical actions of caregivers were the only factors associated with acceptance of bites, independent of the child's age and sex. Positive verbalization represents one element of responsive feeding. We defined it as a positive verbal tone or statement related to feeding between caregiver and child. However, interpreting the relationship between physical pressure, force feeding, and bite acceptance is not so clear. "Physical pressure" to eat was coded as providing "light, non-forceful" pressure when feeding.

Other studies report findings that differ from our own. Using a somewhat different definition of "active" feeding, Engle and Zeitlin (19) found that caregiver's active feeding (encouragement to eat, threatening, serving additional food, offering additional food, demonstrating how to eat more, and ordering child to eat more) and child's acceptance of food were inversely related. This may be due in part to the possibility that the more the child refuses the food, the more caregivers encourage the child to eat. Findings from Vietnam seem logical; when children are verbally encouraged to eat, they respond favorably; when children are physically forced to eat, they may have little opportunity to reject food.

With respect to child behaviors, among 12-mo olds, crawling appeared to encourage acceptance of bites; playing without an object or remaining in the arms of the caregiver did not. Among 17-mo olds, playing discouraged acceptance of bites. The position of 17-mo olds had minimal influence on acceptance of bites. Generally, 17-mo olds who sat or who were in the arms of the caregiver were more likely than 12-mo olds in these same positions to accept bites. In addition to age, the sex of the child mediated the relationship among child verbalization, child behaviors, and acceptance of bites. Males and females who verbalized during feeding were less likely to accept bites. Playing without an object and playing with a person distracted boys but not girls.

Limited mobility was associated with a significant reduction in the acceptance of foods and liquids for 12-mo olds but not for

17-mo olds. One possible explanation is that younger infants in caregivers' laps or arms may have felt overly constrained or controlled or were sick. Outright rejection of food is one approach children may use to protest or show displeasure. Ironically, whereas the mobility afforded by crawling increased the likelihood of infants accepting bites, playing while eating did not.

As others have noted, feeding behaviors often appear together in ways that represent an overall feeding style. Feeding styles are embedded in cultural ethnotheories of parenting and care (21,26–28). Birch and Fisher (29) delineate 3 caregiver styles: controlling, laissez-faire, and responsive. In a highly controlled setting, the caregiver directs when and how much the child eats. This style has been observed in the US and may be related to pediatric obesity risk (30–32). In contrast, caregivers may provide little encouragement to eat. This style of feeding may be based on cultural beliefs that a child knows when and how much to eat or that the child should develop independent feeding styles at an early age (20). Such a laissez-faire or passive approach to feeding is characterized by low levels of caregiver-child interaction. This approach may be particularly maladaptive when children have low appetites and reject food (25,33,34).

Findings from this study are generally consistent with results from previous research. In Northern Vietnam, caregivers often exhibited passive or laissez-faire feeding, demonstrating some physical actions (less for 17-mo olds), minimal verbal encouragement, and mechanical or directive orders when they verbalized. Similar findings have been reported for Nicaragua (19), Peru (24), and Mali (34).

Moore et al. (7) found that in Bangladesh, older children self-fed more, a finding similar to our own. However, one cannot tell from our data whether the motivation to self-feed comes from caregivers or whether, as is likely, children become more autonomous as they age. In general, lack of self-feeding may be due in part to caregivers' desire to take an active part in videotaping and feeding.

There are limitations to our study. First, the relationship between caregiving and acceptance of bites is not causal. In this bite-by-bite analysis, it is difficult to know whether a recalcitrant child who refuses to eat caused the feeder to force feed or, conversely, whether physical coercion caused the child to refuse the bite. Other researchers (7) have assessed how feeding styles and acceptance of food influence each other. These analyses are possible with recoding of videotapes. Second, we did not observe all children during the same meal. Children reject bites for a variety of reasons, including chronic anorexia, illness, undernutrition, the monotony of liquids and foods caregivers offer, how foods and liquids are presented, and caregiver feeding styles (35). This study focused on 4 determinants of child acceptance of food. It is possible that factors other than those identified here may have affected acceptance of bites.

Our results suggest actions program planners might emphasize to improve responsive feeding. Program planners may wish to consider building upon positive caregiver verbalization. Programs in Vietnam might also encourage greater mobility for younger infants, including time outside of the caregiver's lap or arms. Program planners should account for how age and sex of child influence acceptance of bites. Although we analyzed acceptance of food, programs should not focus exclusively on increasing the number of bites children consume, especially if caregivers use physical pressure or force feed. Rather, as noted by Moore et al. (7), mealtime is not merely an occasion to provide nutrition but an opportunity to develop long-term feeding skills and encourage a healthy appetite and food choices in children.

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