

“No! Don’t! Stop!”: Mothers’ Words for Impending Danger

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SYNOPSIS

Objectives. In 2 studies, we aimed to describe the content of mothers’ verbal warnings to their young children and to investigate whether mothers modify their warnings based on the type of dangerous situation and children’s age. *Study 1.* Mothers of 12-, 18-, and 24-month-olds reported in a telephone interview the words and phrases they would use to prevent their children from falling, touching dangerous objects, ingesting poisonous substances, and running away. The words “no,” “don’t,” and “stop” were the most frequent warnings across ages. Mothers also used warnings to elicit their children’s attention, regulate children’s location, modify children’s actions, and to highlight the properties and consequences of specific dangers. The content, diversity and complexity of mothers’ warnings varied with children’s age and the type of dangerous situation. *Study 2.* We observed mothers in the laboratory as they warned their 12- and 18-month-old children not to walk down 50° slopes. As in Study 1, mothers primarily relied on the words “no,” “don’t,” and “stop,” but again used warnings to elicit attention, regulate location, modify actions, and describe the danger. Mothers used more complex and diverse warnings with older versus younger children. *Conclusions.* Although simple warnings, such as “no,” “don’t,” and “stop” hold privileged status at all ages, mothers express a rich array of warnings that are attuned to children’s age and the dangers of the situation.

INTRODUCTION

The development of independent mobility exposes children to a new world of potential dangers. Before the onset of locomotion, children stay safely in one place. With the advent of crawling and walking, children acquire new means for exploring the environment and new opportunities for blundering into potentially hazardous situations. Enticing but dangerous situations are only a short step away — touching a shiny glass shard or an electrical socket, ingesting a colorful cleaning fluid or a bowl of pet food, falling from the top of the stairs or the brink of the changing table, and

wandering the uncharted territories around the corner or across the street. Despite caregivers' best intentions, trouble is alive and accidents can happen.

Accidents are the leading cause of injury and death in American children under age 2, according to the interactive database of the Center for Disease Control and Prevention (CDC, 2003). Over 1,000,000 infants and toddlers incur accidental injuries each year in the United States. An additional 2,000 children under 2 years of age die as the result of accidental injury. Falling is the primary threat to children's safety, accounting for more than 500,000 — approximately half of all injuries to infants and toddlers. Swallowing poisonous substances, swallowing sharp objects, and suffocating from objects that block the airway result in more than 80,000 injuries. Unintentional cuts, burns, and electrocution from touching dangerous objects result in approximately 110,000 infant and toddler injuries. Independent mobility makes toddlers susceptible to pedestrian injuries. Nearly 3,000 injuries result from children running into the street, darting between parked cars, or crawling or walking into a driveway as a car backs up (CDC, 2003; National SAFE KIDS Campaign, 2002).

Of course, caregivers are highly motivated to prevent accidental injuries to their young children. They structure children's physical environments (A. Gärling & Gärling, 1993; Glik, Greaves, Kronenfeld, & Jackson, 1993; Glik, Kronenfeld, & Jackson, 1993; Gofin & Palti, 1991; Power, Olvera, & Hays, 2002; Tertinger, Greene, & Lutzker, 1984); track children's whereabouts (Gralinski & Kopp, 1993); remove children from hazards, for example, by grabbing their new crawlers at the brink of the stairs (Gofin & Palti, 1991; Morrongiello & Dawber, 1998; Power, Olvera, & Hays, 2002); remove hazardous objects from children, such as pushing the knife out of children's reach or taking a toy with small parts out of children's hands (A. Gärling & Gärling, 1995); and guide their young children's actions by helping their children steer a grown-up fork with metal tines into their mouths (e.g., Morrongiello & Dawber, 2000)

Child-proofing safety strategies and hands-on interventions, however, are only one means of avoiding accidents. As children become independently mobile, parents increase their reliance on distal, verbal communications to prevent injury (Campos, Kermoian, & Zumbahlen, 1992; T. Gärling & Gärling, 1988). The voice is effective across distances and does not require babies to be visually oriented toward the parent (Campos et al., 1992). A warning shout or preemptive "Lily" in a stern tone of voice can stop children in their tracks when parents cannot move quickly enough to remove their children from danger. Language can be used to explain the consequences of a potential hazard ("You'll poke your eye!"), so as to provide children with the knowledge to regulate their own actions in the fu-

ture (T. Gärling & Gärling, 1988; Morrongiello & Dawber, 2001; Power et al., 2002). Indeed, the social referencing literature reveals that parents' warnings function to regulate their children's responses to ambiguous objects and events; children avoid novel toys, objects, people, and visual cliffs when their mother's discourage, and approach the same objects when their mother's encourage (Campos et al., 1992; Mumme, Fernald, & Herrera, 1996; Sorce, Emde, Campos, & Klinnert, 1985; Tamis-LeMonda & Adolph, 2005).

With older children, mothers use a variety of verbal strategies — suggestions, commands, explanations, threats, bribes, rewards, and punishments (Peterson, Ewigman, & Kivlahan, 1993). For example, mothers of 6- to 8-year-olds reported that they would command their children to stop, caution them, and explain the dangers and consequences of their actions if their children ventured into playground situations that mothers considered dangerous (Morrongiello & Dawber, 2000). Mothers of 2- to 4-year-olds used verbal communications before hands-on interventions in a laboratory setting filled with potentially hazardous objects such as a hot coffee pot, a knife, Windex, and a stepladder (Morrongiello & Dawber, 1998).

From a developmental perspective, studies of parents' verbal warnings are especially interesting because children in the 1- to 2-year age range are newly mobile and just beginning to acquire language. To date, such research is limited to a small number of provocative findings. For example, mothers were less likely to communicate safety rules to 13-month-olds than to older 18-, 24-, and 30-month-olds, although mothers in all age groups deemed it important to prohibit children from touching dangerous objects, venturing too far, and eating or playing with unsanitary things (Gralinski & Kopp, 1993). Mothers of 1-year-olds were more likely to increase their vigilance, remove their babies from hazards, and remove hazards from children than to use verbal communications (e.g., explaining why toddlers shouldn't touch a hot stove). In contrast, mothers of 2-year-olds were equally likely to use verbal communications and hands-on interventions and mothers of 3-year-olds were more likely to rely on language than on physical interventions (Gralinski & Kopp, 1993).

In addition to the paucity of research on mothers' warnings to infants and toddlers, little is known about the specificity of mothers' warnings in different situations. Studies of human caregivers are limited to a single situation (e.g., playground risks; Morrongiello, & Dawber, 2000) or results are collapsed across situations (e.g., Morrongiello & Dawber, 1998). Dangerous situations vary in the nature and severity of their consequences and mothers' warnings might reflect those differences. Nonhuman primates and other animals use highly specific vocal signals to signal particular types of dangerous predators and elicit particular responses (Seyfarth,

Cheney, & Marler, 1980). Human caregivers may also use different verbal warnings to elicit different responses in their children under various conditions of danger.

Our studies were designed to redress gaps in the literature on parents' verbal strategies to protect their children from potential danger. Through two interviews with mothers (Study 1) and observations of mothers' verbal warnings in a risky laboratory task (Study 2), we examined whether mothers' warnings were tailored to specific situations and whether warnings varied with children's age.

STUDY 1

Study 1 was designed to obtain information on the content, diversity, and complexity of mothers' verbal warnings to their 12-, 18- and 24-month-olds across dangerous situations. In a structured telephone interview, mothers were probed about what they would say if their children were in each of four situations: falling, touching dangerous objects, ingesting dangerous substances, and running away. These situations represent the four leading causes of death and injury to young children in the United States.

Method

Participants. Seventy-two mothers of 12-, 18-, and 24-month-olds (± 1 week) participated. There were 24 children (12 girls, 12 boys) in each age group. Families were primarily European American, middle-class, and living in the New York City metropolitan area, and all mothers spoke English as their primary language. Ninety percent of mothers had college or graduate degrees. Most were first-time mothers (81.9%) and considered themselves to be their children's primary caregivers (93.1%). The majority of mothers cared for their children most of the day; only 15% of children were away from their mother for more than 20 hours a week.

Telephone interview. In a structured 10- to 20-min telephone interview, an interviewer probed mothers about the words they would use to warn their children of imminent danger. The interviewer asked the mothers to imagine their children in each of four potentially dangerous situations (falling, touching dangerous object, ingesting dangerous substances, and running away) using the following scripts:

- (1) "Imagine that [child's name] was in a situation where [he/she] might potentially fall, such as falling down stairs or falling from a piece of playground equipment."
- (2) "Imagine that [child's name] was about to touch something dangerous. For example, [he/she] might want to touch something hot, like the stove or an iron, something sharp like a knife, or something electrical like an electrical socket or an electrical cord."
- (3) "Imagine that [child's name] was about to place something poisonous or unsanitary in [his/her] mouth. By poisonous I mean a substance like a cleaning product and by unsanitary I mean something like trash, water from the toilet bowl, or droppings in a litter box."
- (4) "Imagine that [child's name] was [crawling/running away] from you or could potentially [crawl/run] away from you, like [crawling/running] into the street or [crawling/running] away in a store."

After each scenario, the experimenter asked, "What five words or phrases would you be most likely to say to prevent this from occurring?"

Mothers' warnings were transcribed verbatim during the interview. Clauses joined by connectives were broken into two separate warnings. For example, the warning "Don't touch because it's hot" was coded as two separate warnings (i.e., "Don't touch" and "It's hot"). Most mothers, however, separated warnings spontaneously (e.g., "First I would say 'No' then I would say 'That's dangerous'"). If mothers offered fewer than five warnings the interviewer asked, "Can you think of any other words or phrases that you might use in this situation?" to ensure that mother had nothing else to report. The interviewer then turned to the next dangerous scenario. Situation order was counterbalanced across children's age and gender.

At the end of the interview, the experimenter asked mothers what day their children were able to crawl and walk 10 feet continuously. Although all of the mothers could report confidently whether their children crawled and walked, only 19 mothers of 12-month-olds, 20 mothers of 18-month-olds, and 14 mothers of 24-month-olds could remember the dates or ages when their children achieved these locomotor milestones. Of the 12-month-olds, 63.2% were still crawlers and 36.8% had begun walking. Their average crawling experience was 3.56 months ($SD = 1.69$), walking experience was .33 months ($SD = .65$), and total locomotor experience was 3.7 months ($SD = 1.73$). All of the 18- and 24-month-olds had begun walking. Their average total locomotor experience was 9.2 months ($SD = 2.35$) and 15.03 months ($SD = 1.99$), respectively. Given that all of the children were mobile (either walkers or crawlers) at the time of the interview, it was reasonable to assume that children would have had opportunities to encoun-

ter our potentially dangerous situations and that mothers would have had opportunities to intervene.

Coding of mothers' responses. To examine the nature of mothers' warnings, we developed various categories of responses. As in previous work (Morrongiello & Dawber, 2000), the warning categories were based on a content analysis of the transcribed data. A primary coder scored mothers' responses blind to the dangerous situation. Thus, in principle, any warning category could be used in any situation; in fact, all warning categories were produced in response to all four scenarios of impending danger. A second coder scored 25% of each mothers' responses for interrater reliability. Cohen's kappas (κ) across the five warning categories ranged from .95 to .97.

Ninety-two percent of warnings that mothers provided could be classified into one of five categories. *Attention grabbers* quickly draw children's attention to their mother or to the potential hazard (e.g., child's name, "Watch out," "Look," "Uh-oh," "Eek."). Attention grabbers do not provide specific information about the situation or specify an appropriate behavioral response. (Note that because mothers occasionally used children's names with other phrases, e.g., "Lily, no," coders only scored names as attention grabbers if mothers volunteered the name by itself as in "I'd say her name, Lily.") *Basic prohibitions* express disapproval of children's ongoing action, negating the entire action to bring it to an immediate standstill (e.g., "No," "Don't," "Stop."). Like attention grabbers, basic prohibitions do not provide children with specific information about how to interpret the situation or about how to respond.

In contrast to the generic quality of attention grabbers and basic prohibitions, *what/why warnings* give children specific information about the nature of the hazard (e.g., "It's hot.") or the consequences of engaging in the dangerous activity (e.g., "You could get burnt."). Similarly, *action shapers* give children specific information about how to regulate or modify their ongoing actions (e.g., "Be careful," "Don't touch," "Slow down," "Put that down."). *Location regulators* are a special class of action shapers, designed to identify warnings specific to children who are independently mobile. Location regulators instruct children about where they should put their bodies in space (e.g., "Come here!" "Stay there."). The 8% of mothers' warnings that could not be classified into these categories were evenly distributed across the four dangerous situations.

Although mothers were probed for five warnings for each dangerous situation, they often responded with fewer than five, insisting that there was nothing else that they would say in the given scenario. Thus, we calculated the total number of warnings that each mother volunteered across

situations (maximum number = 20). In addition to classifying and tallying the warning categories, we calculated a diversity score to represent the total number of different warnings a mother reported across the four situations (maximum diversity score = 20). For example, "No," "Don't," and "Stop it" incremented the diversity score by 3, but "No" used in multiple dangerous situations only incremented the diversity score by 1. Similar word structures (e.g., "Stop." and "Stop it.") only counted once for the diversity score. We calculated a complexity score for each warning based on the number of words in the utterance. For example, "Stop" received a complexity score of 1, "Stop that" received a complexity score of 2, and "Stop doing that" received a complexity score of 3. Contractions counted as one word (e.g., "Don't" = 1).

Results and Discussion

In general, mothers were concerned about children's safety and mindful of everyday situations that could pose hazards. Although many mothers spontaneously volunteered that their first reaction to impending danger would be direct hands-on intervention ("I'd rush over to my baby."), all of the mothers endorsed verbal safety strategies as a natural response to dangerous situations. All but one mother could think of at least one warning that she would say for every dangerous situation.

Effects of age and dangerous situation on number and type of warning. Out of the possible 20 warnings per informant, mothers reported 15.07 warnings, on average, across the four dangerous situations. As a result, the data set consisted of 1,085 warnings and all further analyses were based on this reduced total. Because mothers' warnings did not differ by child gender, gender was collapsed in these analyses.

As illustrated in Figure 1, the total number of warnings per mother ranged from 4 to 20. Mothers of 12-month-olds reported fewer warnings overall ($M = 13.25$, $SD = 1.3$) than mothers of 18-month-olds ($M = 15.42$, $SD = 2.1$) and 24-month-olds ($M = 16.54$, $SD = 2.8$). The total number of warnings did not differ by dangerous situation: falling ($M = 3.63$, $SD = 1.04$), touching ($M = 3.92$, $SD = 1.03$), poisoning ($M = 3.79$, $SD = .94$), and running away ($M = 3.78$, $SD = .94$). A 3 (age) \times 4 (situation) mixed measures ANOVA on the number of reported warnings confirmed a main effect only for age; $F(2, 69) = 5.14$, $p < .01$. Post hoc tests revealed significant differences between the 12-month-olds and the two older age groups, $ps < .05$.

Given large individual differences in the numbers of warnings that mothers produced, we analyzed the effects of warning category based on normalized data rather than on raw frequencies. We reasoned that a

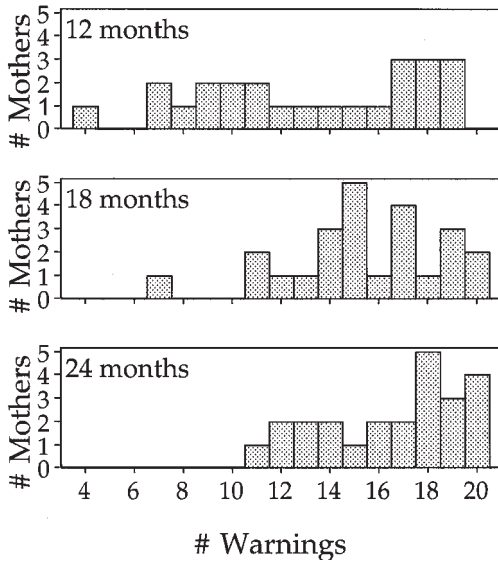


FIGURE 1

Frequency of total number of mothers' warnings for 12-, 18-, and 24-month-olds.

mother who produced only "No" to a given situation differed from a mother who produced "No" plus four other warning categories to the same situation. With raw frequencies, both mothers would be scored with one basic prohibition. With normalized data, we would count 100% of the first mother's warnings as basic prohibitions but only 20% of the second mother's warnings as basic prohibitions. Thus, we calculated the proportion of each warning category within each dangerous situation for each mother.

A 3 (age) \times 4 (dangerous situation) \times 5 (warning category) mixed measures ANOVA on the average proportion of warnings revealed a main effect for warning category, $F(4, 272) = 36.21, p < .001$, and interactions between warning category and age, $F(8, 272) = 2.82, p < .05$, and between warning category and situation, $F(12, 816) = 32.21, p < .05$. As illustrated in Figure 2, post-hoc analyses showed that the main effect of warning category resulted from a wide spread in mothers' preferences for the various verbal strategies. On average, mothers produced similar proportions of action shapers ($M = .16, SD = .13$) and location regulators ($M = .13, SD = .09$), *ns*, but the proportions of all other warning categories differed from each other ($M = .34, SD = .17$; $M = .21, SD = .12$; and $M = .08, SD = .11$) for basic prohibitions, what/why warnings, and attention grabbers, respectively, $ps < .05$.

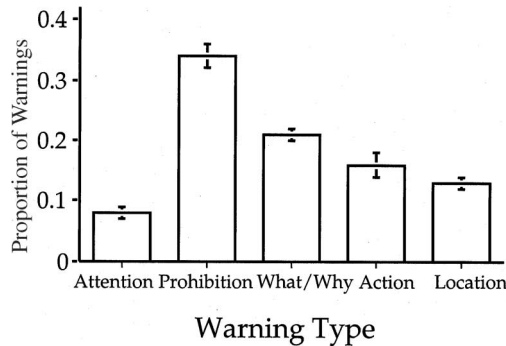


FIGURE 2

Average proportion of each warning type across ages and dangerous situations. Error bars denote standard errors.

Basic prohibitions — words that stop children in their tracks — were mothers' most prominent verbal strategy. Pooled across mothers and dangerous situations, the most commonly used warning in the dataset was "No" (18% of warnings). The remainder of the basic prohibitions contained "Don't," "Stop," and variants of the big three ("No, no," "Don't do that," "Stop it."). In contrast to the prevalence of basic prohibitions, attention grabbers — the other generic warning category — were the least common. Most attention grabbers were children's names used in isolation (4.8% of warnings) and mothers occasionally (7.5% of warnings) tagged other warning categories with children's names (e.g., "Lily, no.").

When mothers provided children with specific information with what/why warnings, they tended to describe the situation. Across mothers and dangerous situations 17.8% of warnings described the situation ("Hot," "Yucky.") but only 4.7% of warnings told children about the consequences of engaging in the potentially dangerous activity ("You'll get burnt," "You'll get sick."). Most action shapers gave children specific information about what to do by prohibiting certain actions as in "Don't climb" and "No touching" (7.8% of warnings) or by modifying actions as in "Go slowly" and "Touch gently" (5.9% of warnings). Most location regulators (9.0% of warnings) told children to keep their bodies next to mother ("Stay here," "Come to mommy.").

As shown in Figure 3, the Warning Category \times Age interaction resulted from mothers of 12-month-olds relying more on certain types of warnings than mothers of children in the two older age groups. In particular, the average proportion of attention grabbers decreased with age ($M = .14$, $SD = .21$, for 12-month-olds; $M = .05$, $SD = .10$, for 18-month-olds; and $M = .05$, $SD = .11$ for 24-month-olds). In contrast, use of action shapers increased be-

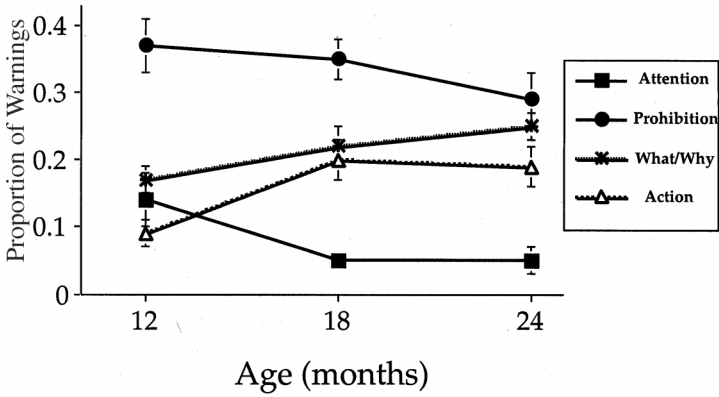


FIGURE 3

Average proportion of each warning type across dangerous situations for 12-, 18-, and 24-month-olds. Error bars denote standard errors.

tween 12 and 18 months ($M = .09, SD = .16$, for 12-month-olds; $M = .20, SD = .23$; and, $M = .19, SD = .23$, for 24-month-olds). Post hoc tests confirmed differences between 12-month-olds and the two older age groups for each of these two warning categories, $ps < .05$.

Figure 4 shows the Warning Category \times Situation interaction. Although mothers used every warning category differentially, their use of nonspecific warnings (i.e., attention grabbers and basic prohibitions) was less af-

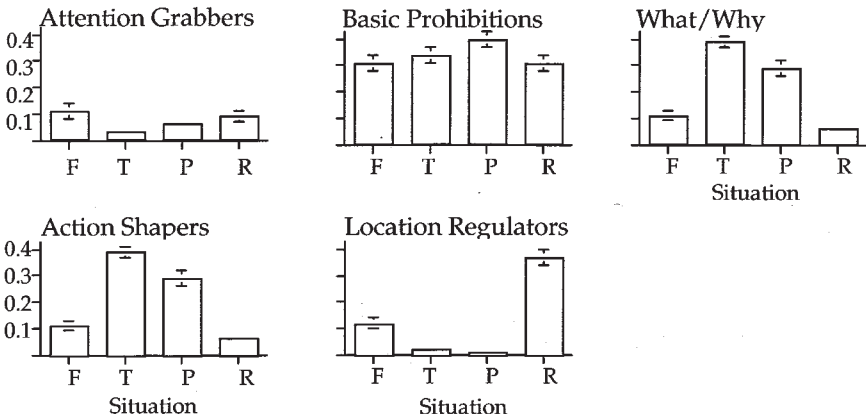


FIGURE 4

Average proportion of each warning type across ages for the four dangerous situations (F = falling; T = touching hot, sharp, or electrical objects; P = ingesting poisonous or unsanitary substances; R = running away from mother). Error bars denote standard errors.

ected by the situation than their use of specific warnings — what/why warnings that describe the potential hazard, action shapers that specify an appropriate response, and location regulators that tell children where to put their body in space. The average proportion of attention grabbers was consistently low across situations ($range = .03-.11$) and the average proportion of basic prohibitions was consistently high across situations ($range = .31-.40$). In contrast to this relative consistency, mothers' use of the other three warning categories varied widely across dangerous situations: The average proportion of what – why warnings varied from .07 to .39; the average proportion of action shapers varied from .06 to .27; and the average proportion of location regulators varied from .01 to .37. Post hoc comparisons summarized in Table 1 revealed differences between mothers' use of each warning category across situations.

In response to impending danger from falling, mothers were most likely to use basic prohibitions ($M = .31, SD = .27$) and action shapers ($M = .27, SD = .29$). In particular, the three phrases mothers most frequently produced were “No,” “Stop,” and “Be careful,” accounting for 37.2% of all fall-warnings. In response to impending danger from touching a hazardous object, mothers were most likely to use what/why warnings ($M = .39, SD = .19$) and basic prohibitions ($M = .34, SD = .23$) followed by action shapers ($M = .15, SD = .16$). The three phrases that they most frequently produced were “No,” “Hot,” and “Don't touch” accounting for 53.8% of the touch warnings. In response to ingesting poisonous or unsanitary substances, mothers most frequently used basic prohibitions ($M = .40, SD = .25$) and what/why warnings ($M = .28, SD = .22$). Their most frequently produced words were “No,” “Stop,” and “Dirty” accounting for 46.48% of poison-warnings. Finally, to warn their children from run-

TABLE 1
Post-Hoc Comparisons of Mean Scores of Each Warning Type
Across the Four Dangerous Situations

Warning Type	Situation							
	Fall		Touch		Poison		Run	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attention grabbers	0.11 _a	0.22	0.03 _b	0.09	0.06 _c	0.12	0.09 _a	0.14
Basic prohibitions	0.31 _a	0.27	0.34 _{a,b}	0.23	0.40 _b	0.25	0.31 _a	0.26
What/Why warnings	0.11 _a	0.18	0.39 _b	0.19	0.28 _c	0.22	0.06 _d	0.12
Action shapers	0.27 _a	0.29	0.15 _b	0.16	0.17 _b	0.19	0.06 _c	0.12
Location regulators	0.12 _a	0.19	0.02 _b	0.07	0.01 _b	0.04	0.36 _c	0.27

Note: Means in a row that do not share the same subscripts differ at $p < .05$ in the paired *t*-test significant difference comparison.

ning away, mothers most frequently used location regulators ($M = .36$, $SD = .27$) and basic prohibitions ($M = .31$, $SD = .26$). Their three most frequent words were "Come," "Come here," "Stop," and "No" accounting for 48.6% of the run-warnings.

Diversity and complexity of warnings. Diversity scores varied widely across mothers in each age group (*range* = 2–16 words and phrases for 12-month-olds, *range* = 3–18 for 18-month-olds, and *range* = 6–18 for 24-month-olds). In principle, diversity scores and the total number of reported warnings need not covary. That is, mothers could have reported 20 different words or phrases across the four dangerous situations for a total diversity score of 20; alternatively, they could have repeated the same 5 words and phrases in each situation for a total diversity score of 5. Nonetheless, diversity scores and the total number of reported warnings were highly correlated for each age group such that mothers who produced fewer warnings overall tended to repeat the same words and phrases across situations; $r(71) = .81$, $r(71) = .78$, and $r(71) = .76$ for 12-, 18-, and 24-month-olds, respectively, all $ps < .01$. Moreover, mothers who used more basic prohibitions received lower diversity scores, $r(71) = -.23$, $p < .05$, and mothers who used more what/why warnings, action shapers, and location regulators received higher diversity scores, $r(71) = .46$, $r(71) = .66$, and $r(71) = .38$, respectively, $ps < .01$.

Mothers of 12-month-olds showed a more constricted range in the diversity of their warnings ($M = 8.71$, $SD = 3.65$) compared with mothers of 18- and 24-month-olds ($M = 11.21$, $SD = 3.59$; and $M = 12.58$, $SD = 2.96$; respectively). An ANOVA and post hoc tests confirmed differences in diversity scores between 12-month-olds and the two older age groups, $F(2, 69) = 7.94$, $p < .01$. This general age effect remained even after normalizing the diversity scores by the total number of warnings, $F(2, 69) = 3.31$, $p < .05$. Post hoc tests on proportions of diverse warnings showed differences between mothers of the 12- and 24-month-olds, $p < .05$ ($M = .65$, $SD = .14$; and $M = .76$, $SD = .12$; respectively).

Mothers usually kept their warnings simple. Overall, 39.0% of warnings contained only 1 word (e.g., "Hot"), 27.0% contained 2 words (e.g., "It's hot"), 17.3% contained 3 words ("It's very hot"), 12.1% contained 4 to 5 words ("The stove is very hot"), and the remaining 4.6% of warnings contained 6 to 13 words. Mothers with higher diversity scores tended to receive higher complexity scores, $r(71) = .45$, and mothers who produced more basic prohibitions tended to receive lower complexity scores, $r(71) = -.49$, $ps < .01$.

Summary

The results of Study 1 demonstrate that mothers use warnings that are specific to the dangers of the situation and child age. The basic prohibitions “No,” “Don’t,” and “Stop” were prevalent across situations, yet were not the only strategy that mothers used. Mothers generated a high frequency of action shapers and location regulators when contemplating a dangerous fall and children running away, and a high frequency of what/why warnings when imagining their children touching a dangerous object or putting something poisonous or unsanitary in their mouths. Mothers of 12-month-olds resorted to simple and redundant warnings, whereas mothers of 18- and 24-month-olds used more complex and diverse warnings.

Nonetheless, the taxonomy we created of mothers’ warnings was based on mothers’ reports and might not represent the statements that mothers use when warning their children in real situations of danger. Mothers might use the full range of warnings that we identified, or alternatively might revert to a simpler subset of warnings such as “No,” “Don’t,” and “Stop” when their children confront real risk.

STUDY 2

In Study 2, we examined mothers’ on-line warnings as children faced a potentially dangerous situation in a laboratory setting. We investigated whether the content of maternal warnings in this real situation would parallel mothers’ reports in telephone interviews and whether mothers’ on-line warnings would vary with child age. Because we found age differences between 12- and 18-month-olds in Study 1, in Study 2 we tested mothers and their 12- and 18-month-olds. At 12 and 18 months, children differ in language and locomotor abilities and might be expected to elicit different types of warnings from their mothers. Mothers’ warnings were recorded as their children approached a 50° slope in a laboratory analog of the falling situation that had been presented in telephone interviews. We selected the falling situation for an on-line task because it is the most frequent danger encountered by children.

Data were drawn from a larger experimental study in which children descended slopes of various degrees while their mothers encouraged and discouraged descent. For the purposes of this study, analyses were based only on the trials in which mothers discouraged their children from crawling or walking down a 50° slope. At this angle, crawling and walking are impossible (Adolph, 1997; Adolph & Avolio, 2000).

Method

Participants. Twenty-four mothers ($M = 34.33$ years, $SD = 4.36$) with 12-month-old children (12 girls, 12 boys) and 24 mothers ($M = 36.82$ years, $SD = 4.05$) with 18-month-old children (13 girls, 11 boys) were recruited from the greater New York City metropolitan area. Children were within 1 week of their target age. Most families were European American, middle class, and highly educated. Mothers spoke English as their primary language.

All children were healthy and born at term. Mothers reported their children's locomotor experience in the context of a structured interview. In the 12-month-old group, 13 children were crawlers with an average duration of crawling experience of 3.26 months ($SD = 1.04$), and 11 children were walkers with an average duration of walking experience of .54 months ($SD = .85$). All 18-month-olds were walkers with an average walking experience of 5.72 months ($SD = 1.75$).

Mothers also reported their children's language skills so that we might directly test whether age variation in mothers' warnings (if present) might be explained by children's changing language competencies. We used the short forms of the MacArthur Communicative Development Inventories (Fenson et al., 1994) to obtain children's expressive and receptive language skills via maternal reports. Of the 48 participating mothers, we gathered reports from 39 mothers (18 reports from mothers of 12-month-olds and 21 reports from mothers of 18-month-olds).

Simulating a falling situation in a laboratory setting. Children were tested on a steeply sloping walkway to simulate the situation in Study 1 in which mothers were asked to imagine their children at the edge of a precipice (see Figure 5). Flat starting and landing platforms flanked a middle section sloping at 50° (each section 86 cm wide \times 91 cm long). The walkway was covered with carpet and netting stretched between wooden poles along the sides of the walkway. At all times, an experimenter followed alongside the children to ensure their safety. Mothers sat in a chair placed at the level of the landing platform on an adjacent raised platform facing their children.

The children's task was to crawl or walk down the slope (depending on their preferred method of locomotion). The mothers' task was to try to discourage their children from crawling or walking in any way that felt most natural to them. Trials began when the experimenter placed children on the starting platform and ended when children attempted descent (necessitating rescue by the experimenter) or at the end of 30 sec, whichever occurred first.

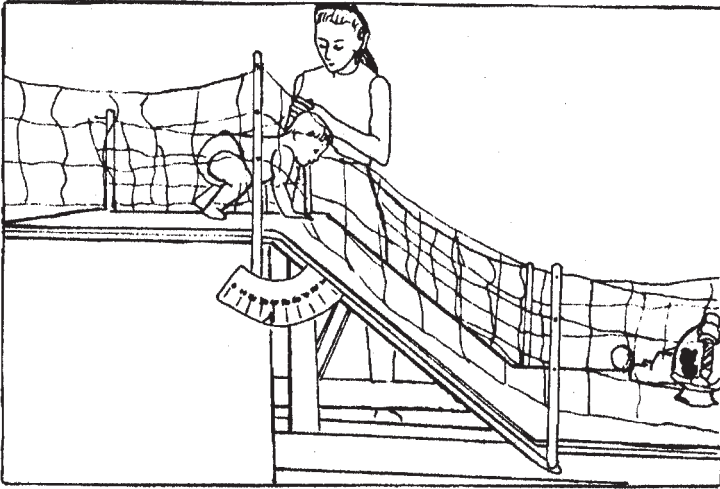


FIGURE 5
The task.

Coding. We transcribed verbatim each mother's responses over the entire duration of the trial. On average, trials for 12-month-olds lasted 16.71 sec ($SD = 12.21$) and trials for 18-month-olds lasted 13.56 sec ($SD = 12.24$), *ns*.

As in Study 1, phrases that were joined by connectives were coded as separate warnings. For example, the utterance "That's dangerous and you'll fall" was coded as two separate warnings (i.e., "that's dangerous" and "you'll fall"). A primary coder scored mothers' warnings. A second coder scored 25% of mothers' responses; Cohen's κ ranged from .96 to .98. Our primary goal was to capture mothers' real-time, unconstrained, verbal warnings. Therefore, we analyzed the total number of warnings (*tokens*) each mother produced, regardless of repetition (i.e., "no, no, no" would count as three tokens). As in Study 1, we assessed the diversity of maternal warnings based on the number of different warnings that each mother produced. For example, if a mother said "Slow down" and "Sit," she received a diversity score of 2, whereas "Sit" and "Sit down" received a diversity score of 1. Finally, we calculated the complexity of mothers' warnings in two ways — based on the number of different words in each warning (e.g., "Stay there" received a complexity score of 2, whereas "No" received a complexity score of 1) as well as by computing the type – token ratios (number of different warnings each mother used divided by the total number of warnings).

Results and Discussion

Content analysis of the transcripts revealed that 83% of mothers' responses could be classified into one of the five warning categories as identified in Study 1 (attention grabbers, basic prohibitions, action shapers, location regulators, and what/why warnings). From the remaining 17%, 9% of mothers' utterances were praise (e.g., "Good girl," "Yeah, that's right.") expressed in response to their child displaying safe choices or complying with their instructions. Mothers in the two age groups did not differ on their use of praise. The remaining 8% of maternal responses were warnings that could not be classified in the previously defined categories — occurring with equivalent frequency in the two age groups.

Across the two groups, mothers produced a total of 924 warnings. Again, mothers' warnings did not reveal gender effects. Mothers generated 26.15 warnings on average, although they varied enormously in the number of warnings expressed (*range* = 5–64). There was no difference between the mothers of the two age groups in the overall number of warnings. Mothers of 12-month-olds produced 511 warnings overall ($M = 21.29$, $SD = 12.86$) and mothers of 18-month-olds produced 413 warnings ($M = 17.20$, $SD = 10.14$).

A 2 (age) \times 5 (warning categories) mixed measures ANOVA on the number of warnings revealed a main effect for warning category, $F(4,184) = 18.70$, $p < .01$. Post hoc analyses demonstrated that mothers varied in the frequency with which they used the various warnings. Mothers favored basic prohibitions and location regulators ($M = 7.96$, $SD = 9.06$; and $M = 4.22$, $SD = 1.82$; respectively) and relied less on attention grabbers ($M = 1.50$, $SD = 1.70$), action shapers ($M = 1.63$, $SD = 2.88$), and what/why warnings ($M = 0.71$, $SD = 1.25$; see Figure 6). All of the warning categories differed from each other, $ps < .05$, with the exception of attention grabbers and

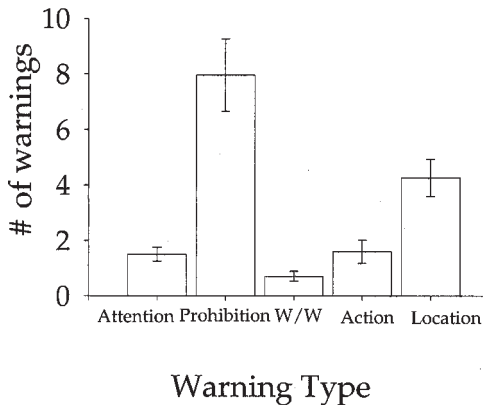


FIGURE 6 Average number of each warning type across both ages. Error bars denote standard errors.

action shapers, *ns*. Pooled across mothers of both age groups, the most prominent warning was “No” (32.8% of all warnings), followed by “Stay there” or “Stay” (22.2%). There were no main effects for age and no interaction between age and warning categories.

Diversity and complexity of warnings. We calculated the diversity of warnings in mothers of 12- and 18-month olds. As in Study 1, mothers’ diversity scores varied, ranging from 2 to 15 different words and phrases for 12-month-olds ($M = 6.96$, $SD = 3.26$) and 3 to 21 for 18-month-olds ($M = 8.21$, $SD = 4.55$). A *t* test revealed no differences in the diversity of mothers’ warnings based on children’s age. This finding accords with the finding in Study 1, where mothers of 12-month-olds differed in diversity from mothers of 24-month-olds but not from those of 18-month-olds. Similarly, a significant correlation reported in Study 1 between diversity scores and the total number of warnings was replicated in this observational study. Mothers who used fewer warnings tended to be more repetitive, $r(47) = .42$, $p < .05$. As in Study 1, mothers’ warnings were simple. Half (52.4%) of warnings contained only 1 word (e.g., “Stop!”), 21.6% contained 2 words (e.g., “Be careful.”), 13.5% contained 3 words (“Stop right there.”), 8.2% contained 4–5 words (“You will fall down.”), and the remaining 4.3% of warnings contained 6 to 9 words. However, mothers tailored the complexity of their warnings to their children’s developmental level. When complexity was assessed by counting the number of words per warning, mothers of 12-month-olds again used less complex warnings ($M = 1.78$, $SD = .54$) than mothers of 18-month-olds ($M = 2.37$, $SD = .81$), $t(46) = 2.90$, $p < .05$ (see Figure 7). When complexity was analyzed in terms of type – token ratios, mothers of 12-month-olds ($M = .38$, $SD = .16$) were more repetitive

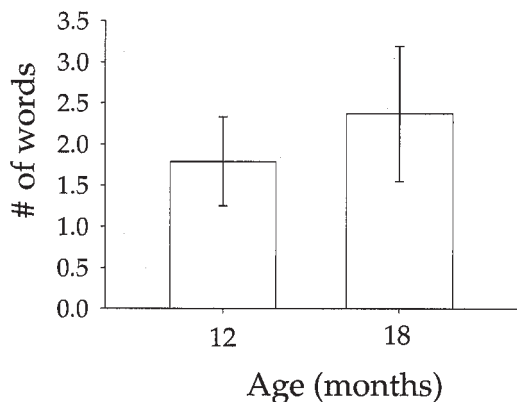


FIGURE 7 Complexity of warnings (number of words per warning) for 12- and 18-month-olds. Error bars denote standard errors.

than mothers of 18-month-olds ($M = .55$, $SD = .23$), as indicated by lower ratios, $t(46) = 2.82$, $p < .05$ (see Figure 8).

We therefore asked whether age-related changes in mothers' complexity of warnings might be attributable to children's growing language abilities. To address this question, raw scores for children's receptive and expressive language (based on the MacArthur Communicative Development Inventories) were examined in relation to the complexity and diversity of mothers' warnings. Mothers' type – token ratios positively correlated with children's receptive and expressive language scores, $r(47) = .41$ and $r(47) = .35$ respectively, $ps < .05$. The complexity of mothers' warnings as measured by the number of words per warning positively correlated with children's receptive language skills, $r(47) = .47$, $p < .05$. When these associations were examined separately by child age, strong associations were obtained at 12 months, $r(47) = .49$ and $r(47) = .48$, for receptive and expressive language respectively, $ps < .05$, but associations were not significant at 18 months, $r(47) = .03$ and $r(47) = -.20$. Similarly, the diversity of mothers' warnings was strongly associated with children's receptive language at 12 months, $r(47) = .48$, $p < .05$, but did not relate to either measure of language at 18 months.

Summary

Observations of mothers' on-line communications to their children revealed that mothers' warnings could be readily classified into the five overarching categories identified in Study 1, even though the focus was limited to a falling situation. Basic prohibitions were again the most frequently used warning. However, in contrast to Study 1, mothers' use of lo-

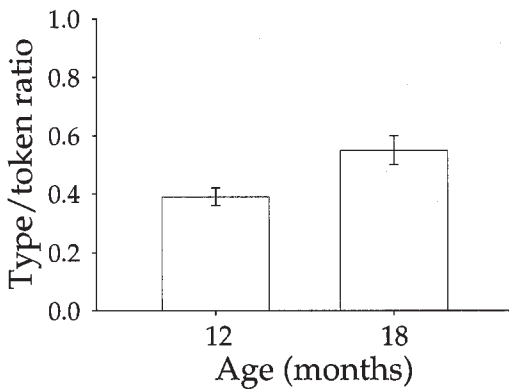


FIGURE 8 Complexity of warnings (type – token ratios) for 12- and 18-month-olds. Error bars denote standard errors.

cation regulators exceeded that of action shapers. When actually interacting with their children, mothers attempted to prevent falling by advising their children to remain where they were (i.e., on the starting platform of the steep slope). Mothers of 12-month-olds warned their children in simpler ways than mothers of 18-month-olds by using shorter, more repetitive phrases. Finally, the complexity of mothers' warnings is related to children's emerging receptive and expressive language skills, with associations achieving significance at 12 months only.

DISCUSSION

Safety is a primary concern for caregivers, and rightfully so: Accidents are a leading cause of injury and death in young children. When physical barriers and hands-on interventions fail to keep children out of potentially dangerous situations, verbal warnings — the human equivalent of an alarm call — are a reasonable way to bridge the distance between child and hazard. Despite the practical and theoretical importance of describing mothers' verbal warnings, researchers know little about what mothers say to protect their infants and toddlers from danger or whether and how warnings change with children's age. These studies were designed to redress these limitations.

In both studies, the most prevalent word in mothers' safety vocabulary was "No." More generally, basic prohibitions held a privileged status in mothers' verbal repertoire. Mothers consistently used a high frequency of basic prohibitions for children of every age group and in response to every dangerous situation. Basic prohibitions may have been mothers' warning of choice for several reasons. First, words like "no," "don't," and "stop" are lexically simple and may be quick to process and easy to understand. Basic prohibitions were usually built of one word composed of one syllable. In urgent situations, mothers may rely on simplicity to communicate effectively to young children with limited vocabularies. Similarly, reduced processing demands may make basic prohibitions the warning of choice for adult listeners, despite their rich receptive vocabularies. Second, in moments of high stress, lexically simple warnings may be easier for mothers to retrieve than more complex, situation-specific utterances. Consider, for example, an adult walking in front of an oncoming car. The speaker is likely to shout "No!" or "Stop!" rather than a longer warning like "You'll get hit!" or a more situation-specific warning like "Car!" because the simpler generic prohibitions spring to the speaker's mind more quickly than the more complex warnings. A final possibility for the prevalence of basic prohibitions in mothers' warning repertoires is their potential to operate

like a freeze-frame remote control. If mothers can get children to stop in their tracks, they can buy a little time to intervene with hands-on assistance or to utter a longer, more specific warning.

Attention grabbers share several features with basic prohibitions. Both warning categories are generic in that neither form specifies the precise nature of the hazard or appropriate behavioral response. Both warning categories involve linguistically simple constructions usually built of a single word (e.g., "Look!" in the case of attention grabbers). Moreover, the most prevalent attention grabber — children's names — are among the first words that children learn to understand (Snow, 1972) soon followed by the basic prohibitions of "No!" "Don't!" and "Stop!" Possibly, mothers of the youngest children relied on attention grabbers because, like basic prohibitions, they were relatively simple for children to understand and process and relatively easy for mothers to retrieve.

In contrast to basic prohibitions, however, attention grabbers were a relatively low frequency warning category across situations in both studies. Unlike basic prohibitions, attention grabbers do not always carry a negative meaning. In fact, mothers use children's names and words like "look" to direct children's attention in a variety of positive and playful contexts. Mothers' tone of voice likely functions to turn an attention grabber into a warning. If mother's stern tone is effective in drawing her infant's attention to her face there is the added potential of her frightened facial expression to communicate urgency and prohibition.

Action shapers were generally complex multiword constructions that provided children with specific information about how to respond to the impending danger. Mothers in Study 1 tended to report using action shapers in response to falling, with mothers of 18- and 24-month-olds relying on these warnings more often than mothers of 12-month-olds. Similar age differences were found in mothers' use of action shapers in Study 2, although differences were marginal. Akin to the "teaching" warnings that increase in mothers of 2- and 3-year-olds (A. Gärling & Gärling, 1995), action shapers require children to understand and execute commands about actions. Eighteen- to 24-month-old toddlers are in the process of rapidly acquiring verbs and adverbs in their lexicons and, thus, might be better able to understand the messages underlying action shapers than their younger counterparts (Dale & Fenson, 1996; Golinkoff, Jacquet, Hirsh-Pasek, & Nandakumar, 1996). Moreover, 18- to 24-month-olds are relatively experienced and proficient walkers and have progressed in their abilities to access potentially dangerous objects. Thus, older children might be better able to heed mothers' advice about how to modify actions.

Location regulators were highly prevalent in both studies. Mothers used these warnings to regulate the position of their children in space and

were primarily used in situations of falling (both studies) and running away (Study 1). The majority of mothers' location regulators instructed children to maintain a safe position. When children are engaged in locomotor tasks that warrant the risk of falling, location regulators are used to instruct the children to stay put and wait for more external help or further information. When faced with the threat of children running away, location regulators function to keep children in close proximity to their mothers.

What/why warnings provided children with information about the nature of the hazard and the consequences of engaging in the dangerous activity. In several ways, what/why warnings were the most complex. Not only do what/why warnings involve multiword constructions, but the message that they convey is indirect. *What* warnings require children to infer mothers' intended message about action based on the described dangers. "It's hot," for example, means "Do not touch." "That's dirty!" means "Don't put that in your mouth." *Why* warnings require even greater interpretive effort. They require children to infer mothers' intended message about an appropriate action by linking consequences to their causal antecedents ("You'll get burnt" means "If I touch the stove, I'll get burnt, and therefore I should not touch."). Despite the complex trains of thought required by what/why warnings, most mothers of children in all three age groups in Study 1 produced this type of warning especially in response to the touch and poison scenarios. One explanation is that in contrast to falling situations and running away — where rapid improvements in children's motor skills reduce the likelihood of accidental injury — touching and poisoning situations present high and unabated risk over the infant and preschool years. Mothers of school-age children rate the severity of injury from poisoning, burns, and cuts to be more serious than the dangers from falling (Morrongiello & Dawber, 1998). Touching a hot stove, a sharp knife blade, or an electrical socket is dangerous to young children of all ages, as is ingesting poison or pet droppings, and the dangers are not minimized with improved skill. One doesn't learn to ingest poison safely; one learns to avoid ingesting poison in the first place. What changes with age in this case is children's ability to learn rules for dealing with hazardous objects and substances (Dunbar, Lewis, & Hill, 1999; Kelley, Mayall, & Hood, 1997; Mori & Peterson, 1995). Thus, mothers may use what/why warnings in the touching and poisoning situations to teach their young children to recognize the dangers inherent in specific objects: that stoves are hot, outlets are dangerous, cleaning fluids are poisonous, and so on.

Findings from both Study 1 and Study 2 indicate that mothers' warnings take children's development and communicative abilities into account. Although the total number of warnings, diversity of warnings,

and complexity of warnings are independent in principle, all three were related in both studies. Overall, mothers who generated more warnings tended to produce a more diverse array of warnings and to use more words per warning, and all three factors related to children's age and growing language abilities. In Study 1, mothers of 12-month-olds generated fewer warnings per situation than mothers of the older children. Moreover, both when mothers reported their warnings (Study 1) and when mothers actually warned their children on-line (Study 2), they used more complex and diverse warnings with older versus younger children. In Study 2, the complexity of mothers' warnings related to children's language abilities, especially at 12 months. This suggests that mothers are rapidly changing in the ways that they communicate danger at the start of the second year as their children make the transition from prelinguistic to linguistic communication. However, by the time their children are 18 months, mothers' warnings might have reached a ceiling of complexity, and no longer vary in discernible ways with differences in children's language abilities.

The developmental shift toward more complex warnings extends findings on mothers' speech in play and mealtime settings. Mothers increase the complexity of their speech with children's age and in response to children's growing language competencies (Hoff-Ginsberg, 1985; Hoff-Ginsberg & Shatz, 1982; Tamis-LeMonda, Bornstein, Baumwell, & Damast, 1996; Snow, 1972; Snow & Goldfield, 1983; Yont, Snow, & Vernon-Feagans, 2003). Our findings reveal that increases in maternal language complexity with child age and language occur even under situations of danger, when mothers might be expected to revert to simpler verbal communications that quickly get the task done. Unlike play interactions, dangerous situations are highly stressful and allow little time for mothers to gauge their children's language abilities and to modify their speech accordingly. Thus, our findings suggest that changes to mothers' language with regard to child age transcend the demands of the situation.

Distal modes of communication enable parents to balance the dual roles of ensuring their young's safety and simultaneously encouraging children's developmental progress (Bruner, 1983). When children operate within tolerable limits, mothers are eager to support their children's autonomy and independent decisions. When children venture beyond the bounds of safety, mothers transition to their role as protector letting their children know: "We don't play with fire!" For mothers to successfully navigate the blurred boundary between lifeguard and cheerleader, they must effectively gauge when to scream "No!" when to suggest "Be careful.", and when to affirm "Come on, you can do it!"

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