Mother–Child Conversations About Safety: Implications for Socializing Safety Values in Children

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Objective   This study examined how mothers socialize their children about safety through conversations about potentially unsafe activities.   **Methods**   Mothers and their 8- and 10-year-old children discussed and rated the safety of 12 photographs depicting another same-gender child engaged in potentially dangerous activities.   **Results**   Conversations usually unfolded with children giving the first rating or rationale, followed by additional discussion between the mother and child. Mothers and children relied on 2 main types of rationales to justify their ratings: potential outcomes of the activity and specific features of the situation (dangerous and nondangerous). Mothers (but not children) used dangerous feature rationales more often than dangerous outcome rationales. When disagreements arose, mothers typically guided children to adopt their own rating rather than the child's rating. Additionally, children who used more nondangerous feature and outcome rationales had experienced more injuries requiring medical attention.   **Conclusions**   Mothers' focus on dangerous features appears to reflect their efforts to help children make causal connections between dangerous elements of the situation and adverse outcomes that might result.

Key words   injury prevention; mother–child communication; parental scaffolding; unintentional childhood injuries.

Introduction

Unintentional injury is the leading cause of death and disability in children in the United States. With the exception of fatal injuries related to motor vehicle occupancy, drowning is the most common cause of death in children aged 7–12 years, while falls are the most common cause of nonfatal injury in this same age group (National Center for Injury Prevention and Control, 2012). Despite the fact that parents are often the first line of defense when it comes to teaching children about safety, little is known about how parents socialize their children about safety (Morrongiello & Schwebel, 2008). One possible mechanism for socializing children about safety is parent–child conversations. These conversations may occur when parents are either preventing their child from engaging in a potentially harmful behavior or responding after the child has already engaged in a potentially dangerous behavior.

However, little empirical research has examined parent–child conversations about safety, beyond how parents teach explicit safety rules to their children (e.g., ''you should never play with matches,'' Garling & Garling, 1995). The goal of the present investigation was to better understand what strategies parents use to teach their children about safety by examining mother–child conversations about potentially dangerous physical activities.

Morrongiello and Lasenby-Lessard (2007) argue that the likelihood a child will engage in an unsafe behavior is determined by multiple factors, including child characteristics (e.g., age, sex, temperament), family influences (e.g., socialization practices, parental modeling, sibling effects), and social-situational milieu (e.g., peer pressure, media exposure, situational convenience). Their review of the literature shows that the determinants within each of these broad factors individually predict children's risk taking,

and that many determinants interact with sex to explain why boys are more likely to take risks than girls. For example, there are sex differences in locus of control relating to injury, with boys being more likely than girls to attribute injuries to bad luck than poor judgment (Morrongiello, 1997). At the same time, parents often explicitly encourage sons to take risks but caution daughters about vulnerability to injury (Morrongiello & Dawber, 2000). These differences in parental socialization may contribute to sex differences in locus of control, which in turn make it more likely that boys will engage in risky behaviors that lead to injury. At present, however, little is known about the processes whereby parental socialization practices influence risk taking.

Most of the past work on the role of parental factors in children's safety has focused on how well parents supervise their children (Morrongiello, Corbett, McCourt, & Johnston 2006; Saluja, Brenner, & Morrongiello, 2004). Supervision is a protective factor in reducing unintentional childhood injuries in a variety of domains, including pedestrian injury (Barton & Schwebel, 2007) and drowning (Brenner, 2003). Constant parental supervision is principally used with children aged <2 years (Garling & Garling, 1995). As children develop and become more independent, however, constant parental supervision becomes less prevalent (Morrongiello et al., 2006; Morrongiello, Kane, & Zdzieborski, 2011). For example, Morrongiello et al. (2006) trained parents of children aged 2–5 years to record their supervision habits when at home. As expected, they found that older children (aged 4 and 5 years) received less supervision than younger children (aged 2 and 3 years). Likewise, Garling and Garling (1995) suggest that sometime between the ages of 2 and 3 years parents slowly shift away from primarily supervising children and begin to incorporate teaching as a strategy for reducing injury risk. However, while Garling and Garling (1995) found that socializing and teaching increase with age, they did not elaborate on the nature of these conversations or the strategies caregivers use to teach their children about safety.

As children become more independent, they begin to navigate novel, potentially dangerous situations on their own. One question this raises is how children learn to behave safely in the absence of supervision. In particular, how do children learn about the potentially injurious consequences of their actions? Clearly, children can learn directly through experience with getting injured after engaging in dangerous activities. However, children can also learn indirectly through interactions with older more-experienced individuals. More specifically, parents can use conversation to help children internalize "safety

values" so that children are able to independently regulate their own behavior.

In situations where children are unlikely to engage in safe behavior or make safe decisions on their own, parents can scaffold their children through conversation to guide them to the appropriate behavior or solution. This kind of scaffolding works best when it occurs within the child's zone of proximal development (i.e., when the child can use assistance from others to succeed in learning a concept or using a skill that is just beyond his or her current capability; Vygotsky, 1978). To gear conversations about safety to the child's zone of proximal development, parents must be sensitive to the developmental level of the child. For example, a younger child may require more explanation than an older child about the causal relationship between particular behaviors and potential outcomes. Importantly, children also play an active role in these conversations through questioning the guidance they receive and offering their own solutions to solving problems (Rogoff, 1990). Children's active participation in the scaffolding process allows parents to better assess the child's current level of knowledge and tailor their instruction to the individual characteristics of the child. Over time, scaffolding can be modified or withdrawn as the child becomes increasingly competent at executing the skill. Developmental change results as responsibility for regulating behavior shifts from the adult to the child.

Drawing on literature from other areas such as the way parents socialize moral values in their children may provide insight into how parents socialize safety values in their children. As with physical safety, parents must teach children how to behave in accordance with good moral values in the absence of adult supervision. One classic study compared the moral development of a group of 7th graders in relation to their parents' style of discipline (Hoffman & Saltzstein, 1967). The children of parents who focused on the consequences of negative behaviors (i.e., hurting others' feelings or disappointing one's parents) ranked higher on many dimensions of moral development, including guilt and internalized moral judgments, in comparison with children of parents who used love withdrawal or power assertion. By using an inductive discipline style, parents were effectively teaching their children to realize that their actions can have negative consequences, an important consideration in safety as well.

Other work has also shown that parent–child conversations containing conflict (i.e., disagreement) can be beneficial for socialization of values (Dunn & Slomkowski, 1992). Laible and Thompson (2002) recorded the conversations of mothers and their 30-month-old children,

identifying cases of conflict for analysis. Children returned to the lab 6 months later and were tested on emotional and social understanding. They found that children had better subsequent socioemotional development when mothers not only had previously justified their positions and showed willingness to compromise, but the resolution of conflicts favored the mother as well. This finding indicates that mothers' strategic use of justifications and resolutions during conversations involving conflict may be beneficial for the socialization of safety values, especially in those cases where the mother is able to resolve the conflict in her favor.

The goal of the present investigation was to better understand how parents socialize children about safety by examining mother–child conversations regarding potentially unsafe activities. We developed a task to elicit conversations about safety by asking mothers and their 8- and 10-year-old children to rate and discuss photographs of a same-gender child engaged in potentially dangerous activities. Eight- and 10-year-old children were chosen based on previous research indicating that children in this age range are beginning to receive less supervision from parents and are exploring the world more independently (Morrongiello et al., 2011).

We were particularly interested in the rationales mothers and children used to justify their ratings, both when they agreed and disagreed about the safety of the activities. We focused on two broad categories of rationales: (1) referring to specific dangerous (or nondangerous) features of the situation (e.g., ''the stove burner is red''), and (2) referring to the potential dangerous (or nondangerous) consequences of the child's actions (e.g., ''his sleeve could catch on fire''). We expected mothers to reference potential future outcomes of the activities in the photographs most frequently, scaffolding children to think about the consequences of such actions. We also expected that mothers would increase their use of both feature and outcome rationales when there was disagreement over safety ratings to resolve the conflict in their favor. Finally, we explored whether mother–child conversations were related to real-world behavior by examining the relationship between rationales and injury history. We were particularly interested in whether children who used more nondangerous feature and outcome rationales (e.g., ''he doesn't have very far to fall'') also had experienced a greater number of injuries requiring medical attention, consistent with previous work showing that children with a high risk for unintentional injuries tend to discount the likelihood of injury (Morrongiello & Rennie, 1998; Peterson, Brazeal, Oliver, & Bull, 1997).

Method
Participants

Sixty-three mother–child dyads participated in the study. There were twenty-nine 8-year-olds (mean age: 8 years, 10 months; range: 8 years, 8 months to 8 years, 11 months; 15 female) and thirty-four 10-year-olds (mean age: 10 years, 9 months; range: 10 years, 6 months to 10 years, 11 months; 16 female). Two additional dyads (both 8-year-olds) were excluded because the child knew the actor in the photographs or the child's mother was a nonnative English speaker, and three additional dyads (one 8-year-old and two 10-year-olds) were excluded because they did not disagree about any of the safety ratings and therefore could not contribute observations to the main analyses. (Preliminary analyses indicated that the pattern of results was identical when these dyads were included in the sample.) Ninety-five percent of the children were Caucasian, 1% were Hispanic/Latino, and 4% were multiracial. Seventy-four percent of mothers had a 4-year-college education or beyond. Dyads were recruited for the study from an existing child research participant registry maintained by the Department of Psychology at the University of Iowa. This registry included 341 children aged 8–10 years. Parents of approximately half of eligible children from the registry received a letter describing the study, followed by a telephone call inviting them to participate. None of the dyads had participated in a similar study. Consent from mothers and assent from children was obtained immediately on arrival to the lab. The institutional review board at the University of Iowa approved the study. Children received a free movie pass as compensation for participating in the study.

Apparatus and Materials

An Apple iMAC and a 46-inch (116.8-cm) NEC MultiSynch P461LCD touch-screen monitor with integrated 3M Dispersive Signal Technology were used. Participants sat in front of the touch screen at a distance where they were able to comfortably make selections on the Likert scale below the pictures, which measured $20'' \times 25''$ on screen, using a 4-inch stylus. The experiment was programmed in Matlab (v. R2010a), using the Psychophysics Toolbox extensions. Two Sony Handycam DCR-HC96 camcorders were used to record the mother and child conversations from the back and from the side.

Using live actors, we took two sets of 12 photographs showing a similar-age child engaged in various activities, along with two sets of two photographs for familiarization trials. Each set contained the same 12 photographs with either a male or female Caucasian child, allowing us to

gender-match the photos to each participant. Test photographs presented a child: cutting an apple, attempting to split a log using an axe, standing on a stack of two paint cans to reach an object, climbing on the outside of a tube slide, walking down a slide, using a drill, climbing on the kitchen counter, standing on a ladder to reach an object, starting a lawnmower, climbing on top of a roof, riding a skateboard down a driveway, and reaching for a pot over a hot stove burner. Photographs were chosen to represent activities that children in this age range would likely engage in during everyday life. Additionally, as falls are the most common cause of unintentional injury in children (National Center for Injury Prevention and Control, 2012), several photographs depicted activities that would likely to result in a fall. A Likert scale was visible just below each photograph (Figure 1).

Design and Procedure

The session took place in two phases, for a total of ~45 min. In the first phase, children and mothers independently made ratings about the randomly ordered photographs. Children and mothers first received training on how to use the touch screen with two familiarization trials involving one photo depicting an obviously safe activity and one depicting an obviously dangerous activity (these photos were not included in the 12 test photos). For each photo, children and mothers rated the safety of the activity on a 4-point Likert scale that included the following choices: very safe, kind of safe, kind of unsafe, and very unsafe. Children (but not mothers) then indicated how scared they would be to perform the depicted activity on another 4-point Likert scale that included the following choices: not scared, a little scared, quite a bit scared, and very scared. In the second phase of the study, mothers and children were brought together to view the photos. Their task was to jointly arrive at a safety rating for each of the photos. They were instructed to discuss the activity depicted in each photograph and come to an agreement before choosing a rating on the touch screen. No one was in the room while the mothers and children discussed the photographs. On finishing the joint photo-rating task, mothers filled out the Accidental Injury Questionnaire (Plumert, 1995), which asked them to report their child's history of past injuries requiring medical attention.

Coding and Measures

Conversations were transcribed verbatim from the two synchronized video recordings for later coding. Twenty-one out of 792 (2.7%) trials were excluded from analysis because dyads either accidently tapped a rating before coming to a consensus on the safety of the photograph or noticed a frayed drill cord in one of the pictures. The drill cord was corrected using Photoshop early in the study.

We coded several elements of the conversations to examine how the conversation unfolded and how mothers and children justified their ratings. We coded whether the child gave the first rating or rationale, and whether mothers prompted their children to provide the first rating or rationale. We also coded whether the mother and child disagreed about the rating and if so, whether the mother prevailed in the resolution. Because we were interested in how disagreements between the mother and child were resolved, we coded for disagreements about the ratings using the conversation (e.g., the child says, "I think this is kind of safe," and the mother says, "well, I think it is very unsafe.") rather than coding for disagreements about the ratings using the individual ratings made previously. Scores for each of these variables represented the proportion of times each event occurred across all photos.
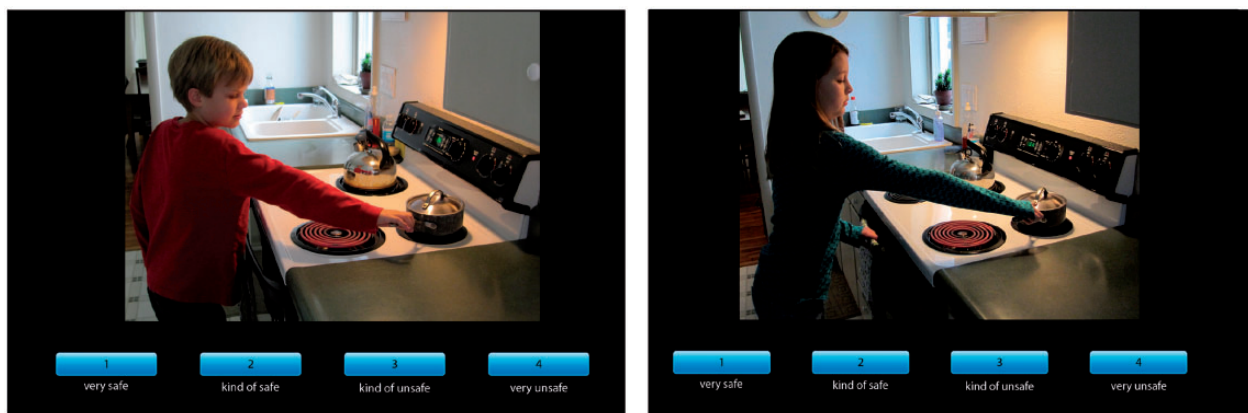

Figure 1. Examples of gender-matched photographs with the 4-point Likert scale. Please note that the front burner, which the child is reaching over, is on and red hot.

We also coded the rationales dyad members gave to justify their ratings (Table I). The two primary rationales were references to dangerous (or nondangerous) potential outcomes and specific features. Less frequent were rationales involving the child's age or capability, parental supervision, explicit rules, or the child's past experience with the activity. All rationales were coded separately for mothers and children. The total number of rationales per photo ranged between 0 and 13. The total number of feature and potential outcome rationales (both dangerous and nondangerous) averaged 1.64 for mothers and 1.29 for children per photo. Scores for the mother and child represented the mean number of rationales of each type per photo.

Interrater Reliability

Interrater reliabilities ($N = 12$) for the continuous variables of number of references to specific feature and potential outcome rationales (dangerous and nondangerous) for mothers and for children were calculated using intraclass correlations (ICC), and ranged between ICC $= .89$ and ICC $= .97$. Reliabilities for the categorical variables of prompting, initial rating, initial rationale, disagreement, and disagreement resolution were calculated using Cohen's kappa and ranged between $K = .67$ and .85.

Results

The results are organized into three sections, including (i) individual and joint safety ratings, (ii) mother and child safety rationales, and (iii) the relationship between safety rationales and injury history. Because preliminary analyses with gender as a factor yielded no significant results, this factor was not included in the analyses below. All post hoc analyses used Fisher's PLSD with an alpha of .05 unless otherwise reported.

Individual Safety Ratings

Before engaging in the joint conversation about the photographs, children and mothers rated the safety of photographs individually. In addition, children gave an assessment of how fearful they would be to perform the activity in each photograph. The mean safety rating was 3.19 (standard deviation, $SD = .35$) for children and 3.20 ($SD = .36$) for mothers, indicating that both viewed the activities as "kind of unsafe" on average. An Age (8 years, 10 years) × Dyad Member (mother, child) analysis of variance (ANOVA) revealed no significant effects.

Children gave the photographs a mean fearfulness rating of 2.47, just between the "not very scared" and "kind of scared" ratings. An ANOVA on fearfulness ratings with age (8 years, 10 years) as a factor revealed a significant main effect of age, $F (1, 61) = 9.84$, $p = .003$, $\eta_p^2 = .14$, with 8-year olds ($M = 2.71$, $SD = .53$) rating themselves as more scared to perform the activities than 10-year olds ($M = 2.26$, $SD = .59$).

Joint Safety Ratings

We examined several aspects of the joint safety ratings produced during the course of the mother–child conversation. These included whether the mother prompted the child to provide a rating and/or rationale, who gave the first rating, who gave the first rationale, whether the dyad disagreed about the rating, how disagreements were resolved, and what the final rating was. We also looked at the relationship between individual and joint ratings.

Did Mothers Prompt Children?

Mothers prompted their children for an initial rating or rationale on 24% of trials ($SD = 22$). We examined whether prompts varied by age group or trial half by entering prompts into an Age (8 years, 10 years) × Trial Half (first six, second six) mixed model ANOVA. There was a

Table I. *Definitions and Examples of Rationales for Safety Ratings*

Rationale	Definition	Example
Specific feature	Directly visible dangerous (or nondangerous) aspect of activity	"His sleeve is over that red hot burner."
Potential outcome	Potentially dangerous (or nondangerous) consequence of activity	"He could catch his sleeve on fire."
Age/capability	Risk of activity in relation to child's age or capability	"He looks old enough to be cooking on the stove."
Parent present	Risk of activity in relation to a parent being present	"His mom is probably there with him, so it's OK for him to use the stove."
Rule	Explicit rule or directive about activity	"You are not allowed to do that."
Previous experience	Previous experience with the activity	"You do that!"

main effect of trial half, F (1, 61) = 33.12, $p < .001$, $\eta_p^2 = .35$, with mothers prompting twice as much during the first six trials ($M = 33\%$, $SD = 26$) when compared with the last six trials ($M = 16\%$, $SD = 24$).

Who Gave the First Rating?
Children provided the first safety rating on 86% of all trials, a level significantly above chance (50%), t (1, 62) = 16.20, $p < .001$. The percentage of trials in which children gave the first rating did not vary with age, F (1, 61) = 1.24, ns.

Who Gave the First Rationale?
Children provided the initial rationale on 61% of trials ($SD = 52$), a level reliably above chance (50%), t (1, 62) = 2.65, $p < .01$. Further analyses revealed that 8-year olds ($M = 48\%$, $SD = 27$) provided the first rationale more frequently than did 10-year olds ($M = 34\%$, $SD = 25$), F (1, 61) = 4.05, $p = .05$, $\eta_p^2 = .06$.

Did Mothers and Children Disagree About the Rating?
Mothers and children disagreed about the safety rating on roughly a third of the trials ($M = 33\%$, $SD = 14$). When there was a disagreement about safety ratings, mothers gave more conservative ratings than their children on 56% ($SD = 35$) of trials, a level significantly above chance, t (1, 62) = 2.26, $p = .03$. Interestingly, the resolution of disagreements overwhelmingly favored the mother ($M = 82\%$ of trials, $SD = 23$), regardless of whether the mother was more or less conservative than the child. Resolution toward the mother was well above chance (50%), t (1, 62) = 10.96, $p < .001$. There were no effects of child age on whether mothers and children disagreed about the rating, F (1, 61) = 3.31, ns, whether mothers gave more conservative ratings, F (1, 61) = .99, ns, or whether disagreements were resolved toward the mother, F (1, 61) = .03, ns.

What was the Final Rating?
The final joint safety rating chosen by the mother and child fell near the "kind of unsafe" point of the scale ($M = 3.18$, $SD = .32$). This mirrors the individual ratings given by each dyad member where mothers and children rated the photos as being "kind of unsafe." However, mothers' individual safety ratings ($r = .70$, $p < .001$) were significantly more highly correlated with the joint safety ratings than were children's individual ratings ($r = .15$, $p = .02$), when there was disagreement, z (1, 62) = 5.89, $p < .001$. This indicates that when disagreement was present, mothers were guiding children to their own safety rating.

Rationales for Safety Ratings
Mothers and children provided several types of rationales for their ratings. The two most common rationales were references to potential outcomes of the activity (both dangerous and nondangerous) and reference to specific features of the situation (both dangerous and nondangerous). There were also a handful of other types of rationales that mothers and children used, but these were far fewer in comparison with references to potential outcome and specific feature rationales. Means for all rationale types can be found in Table II.

Dangerous Potential Outcome and Specific Feature Rationales
We entered the mean number of dangerous outcome and dangerous feature rationales provided by mothers and children during agreement and disagreement trials into an Age (8, 10 years) × Dyad Member (mother, child) × Rationale Type (outcomes, features) × Trial Type (agreement, disagreement) mixed model ANOVA with the last three factors as within-subjects factors. There were main effects of dyad member, F (1, 61) = 12.50, $p = .001$, $\eta_p^2 = .17$, rationale type, F (1, 61) = 15.12, $p < .001$, $\eta_p^2 = .20$, and trial type, F (1, 61) = 14.04, $p < .001$, $\eta_p^2 = .19$.

These effects were subsumed under a significant Dyad Member × Rationale Type interaction, F (1, 61) = 16.16, $p < .001$, $\eta_p^2 = .21$ (Figure 2), and a Dyad Member × Trial Type interaction, F (1, 61) = 12.67, $p < .001$, $\eta_p^2 = .17$. Simple effects tests of the Dyad Member × Rationale Type interaction revealed that mothers used significantly more features than outcome rationales, F (1, 62) = 34.02, $p < .001$, $\eta_p^2 = .35$, but that children did not differ in their use of the two rationale types, F (1, 62) = .07, ns. Simple effects tests of Dyad Member × Trial Type interaction revealed that mothers used significantly more rationales during trials where dyad members disagreed on safety ratings ($M = .84$, $SD = .65$) than on trials where they agreed about the safety ratings ($M = .49$, $SD = .35$), F (1, 62) = 21.40, $p < .001$, $\eta_p^2 = .26$. However, the number of rationales children used did not differ depending on whether the dyad members agreed ($M = .46$, $SD = .36$) or disagreed ($M = .50$, $SD = .47$) about the rating, F (1, 62) = .37, ns.

Nondangerous Potential Outcome and Feature Rationales
While mothers and children primarily pointed out the dangerous outcomes and features in the photos, they also sometimes referred to nondangerous features (e.g., "She is not very high up.") and potential outcomes (e.g., "He

won't get seriously hurt.''). We entered the mean number of mother and child references to nondangerous potential outcome and nondangerous feature rationales during agreement and disagreement trials into an Age (8, 10 years) × Dyad Member (mother, child) × Rationale Type (outcome, feature) × Trial Type (agreement, disagreement) mixed model ANOVA with the last three factors as within-subject factors. There were main effects of dyad member, F (1, 61) = 29.62, $p < .001$, $\eta_p^2 = .33$, rationale type, F (1, 61) = 33.96, $p < .001$, $\eta_p^2 = .36$, and trial type, F (1, 61) = 23.26, $p < .001$, $\eta_p^2 = .28$.

Table II. *Mean Number of Mother and Child References Per Photo to Each Rationale Type*

Rationale	Dyad member			
	Mother		Child	
	M	SD	M	SD
Dangerous				
Specific feature	.78	.45	.49	.42
Potential outcome	.41	.32	.48	.39
Nondangerous				
Specific feature	.36	.32	.21	.23
Potential outcome	.09	.13	.10	.16
Total	1.64	.65	1.28	.64
Other				
Age/capability	.22	.21	.10	.12
Parent present	.11	.14	.07	.12
Rule	.13	.16	.01	.04
Previous experience	.07	.09	.11	.19
Total	.53	.31	.29	.26

Note. M, mean; SD, standard deviation.

These main effects were subsumed under a significant Dyad Member × Rationale Type interaction, F (1, 61) = 33.96, $p < .001$, $\eta_p^2 = .36$, and a Dyad Member × Rationale Type × Trial Type interaction, F (1, 61) = 14.82, $p < .001$, $\eta_p^2 = .20$. Simple effects tests of the Dyad Member × Rationale Type interaction revealed that mothers used more nondangerous specific feature rationales than did children, F (1, 62) = 14.08, $p < .001$, $\eta_p^2 = .18$, but there was no difference between the dyad members' use of nondangerous future outcome rationales, F (1, 62) = .39, *ns* (Figure 3). Simple effects tests of the Dyad Member × Rationale Type × Trial Type interaction revealed a significant Dyad Member × Trial Type interaction for feature rationales, F (1, 62) = 21.55, $p < .001$, $\eta_p^2 = .26$, but not for outcome rationales, $F(1, 62) = .77$, *ns*. Additional simple effects tests revealed a significant effect of trial type for mothers, F (1, 62) = 30.83, $p < .001$, $\eta_p^2 = .33$, but not for children, F (1, 62) = 1.46, *ns*. Mothers used significantly more nondangerous feature rationales on disagreement ($M = .71, SD = .85$) than on agreement ($M = .21, SD = .25$) trials. However, children did not vary in this regard.

Finally, there was a significant Trial Type × Age interaction, F (1, 61) = 4.51, $p < .05$, $\eta_p^2 = .07$. Simple effects tests revealed a significant effect of age for disagreement trials, F (1, 62) = 8.08, $p < .01$, $\eta_p^2 = .12$, but not for agreement trials, F (1, 62) = 1.08, *ns*. In trials where there was disagreement, 10-year-olds ($M = .39, SD = .64$) provided more rationales than 8-year-olds ($M = .04, SD = .22$). This may reflect a greater willingness of older children to challenge their mother.
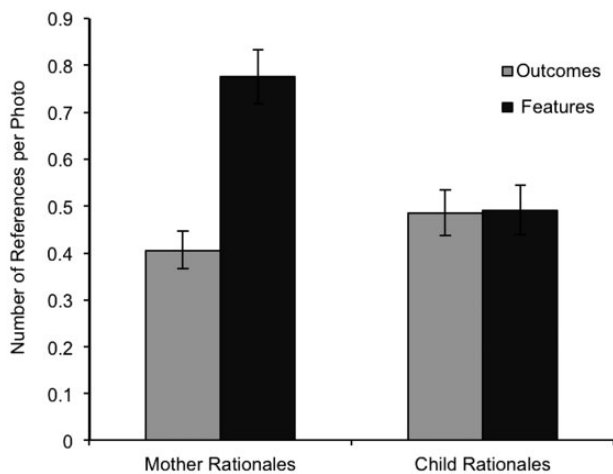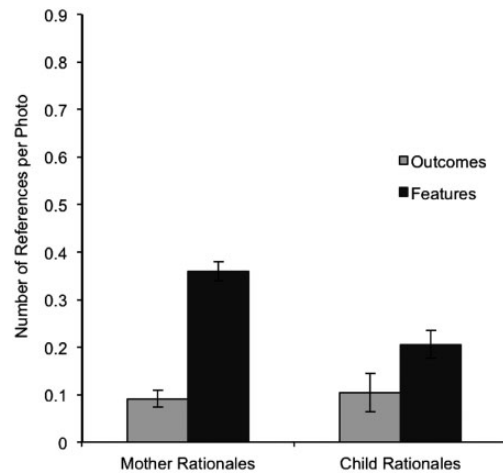

Figure 2. Mean number of mother and child references per photo to dangerous feature and potential outcome rationales.

Figure 3. Mean number of mother and child references per photo to nondangerous feature and potential outcome rationales.

Relations Between Unintentional Injury History and Safety Rating Rationales

We also addressed whether mother or child safety rationales were related to measures of injury history. A preliminary ANOVA with age (8, 10 years) as a factor on the number of past injuries requiring medical attention was not significant, $F(1, 61) = .99$, ns. There were no significant correlations between injury history and mother or child use of dangerous feature or outcome rationales. However, the number of past injuries requiring medical attention was significantly related to the number of child references to nondangerous feature rationales, $r = .27$, $p = .03$, and to nondangerous outcome rationales, $r = .28$, $p = .03$. Thus, children who referred more often to nondangerous features of the situation or to nondangerous potential outcomes of the activities had experienced more injuries requiring medical attention.

Discussion

To better understand how mothers and children talk about safety, we created a task in which mothers and children discussed a set of photographs showing another same-gender child engaging in physical activities that varied in safety. Their task was to arrive a joint safety rating of each activity. Conversations tended to follow a similar pattern with children often giving the first rating and rationale, followed by further mother–child discussion about the reasons why an activity was safe or unsafe. When disagreement arose between the dyad over their ratings, the final joint rating was often resolved in favor of mothers, most likely a result of mothers' increased references to specific features and potential outcomes. Contrary to our expectations, we found that mothers overwhelmingly pointed out dangerous features in the scene over potential dangerous outcomes of the activity to justify their ratings. Finally, we found that children with a history of more injuries requiring medical attention also made more references to nondangerous outcome and feature rationales. Together, these results have implications for effectively teaching children about safety.

Analysis of how conversations unfolded between mothers and children indicated that mothers both encouraged their child to actively participate in independently thinking about the safety of the activities and also guided their child to their own way of thinking about the safety of the activities in cases of disagreement. The following is an example from a dyad in our study.

> **Mother**: What about this one?
> **Child**: Very safe.

> **Mother**: (laughs) I said kind of unsafe (points to kind of unsafe) because what if she fell? (points away from girl towards the ground) I mean, she's not up too high yet (points from girl to top of slide), but she's headed there.
> **Child**: Yeah, and if she (points to top of slide)
> **Mother**: What if she couldn't reach up there? (points to top of slide)
> **Child**: Then she might fall.
> **Mother**: Yeah. Okay. What do you think we should say?
> **Child**: Kind of unsafe.
> **Mother**: Okay. I agree.

As this example illustrates, mothers often encouraged children to provide the first rating or rationale, though prompting decreased during the latter half of trials. Children responded by providing the first rating or rationale on the vast majority of trials (86%). Encouraging children to do so may have served the function of allowing mothers to gain a better understanding of their child's thinking. Mothers' greater understanding of their child's knowledge and reasoning may have helped them to tailor their message according to the child's developmental level, consistent with a scaffolding approach to promoting learning (Rogoff, 1990; Vygotsky, 1978). For example, knowing what outcomes the child anticipated could help mothers pick out the relevant features that might lead to that adverse outcome. In addition to mothers' encouragement of child participation, disagreements were typically resolved in favor of the mother, a strategy that has been linked to better internalization of values in the moral socialization literature (Laible & Thompson, 2002). The finding that mothers usually prevailed in disagreements is also born out by the fact that mothers' individual ratings were highly correlated with the joint ratings when there was disagreement. Likewise, disagreements about ratings may have also provided insight into how children assessed the safety of the activities.

Originally, we hypothesized that mothers would attempt to teach their children to anticipate the dangerous future outcomes that might result from engaging in the activities. However, we found that mothers emphasized noticing the dangerous features in the situations much more than anticipating the dangerous future outcomes that might result. Why might this be the case? Given that mothers rated the photographs on average as falling between "kind of unsafe" and "very unsafe," they may have been operating on an assumption of a likely adverse future outcome. Therefore, they focused on conveying why such an outcome might result from performing an activity. As the following example illustrates, mothers may have been helping children make the causal connections between the presence of many

dangerous features in the situation and the possible adverse outcomes that could result.

> **Mother:** He's got one (*points to bottom bucket*) on top of another (*points to top bucket*) and he is reaching up high (*gesture follows boy's reach*). I said kind of unsafe. This is not steady (*points to buckets*).
> **Child:** Yeah.
> **Mother:** He could easily fall.

These findings are consistent with work on parent–child conversations about prosocial behavior and parent–child conversations about scientific phenomena. In both of these domains, parents work to make causal connections between explicit features of the situation and the subsequent outcomes (Crowley, Callanan, Tenenbaum, & Allen, 2001; Hoffman & Saltzstein, 1967). When explaining scientific phenomena to children, for example, parents primarily rely on explanations that identify causal connections between actions and outcomes (e.g., ''When you turn that fast, it makes more electricity''). These kinds of explanations lead to in-depth learning in children, suggesting that parents focus on helping children understand the connection between features of the situation and outcomes that result. This work suggests that parents' references to causal connections could also be important when teaching children to consider the consequences of their actions in potentially dangerous situations.

Unfortunately, despite parents' best efforts, there can be a breakdown in this process. Some children are less likely to make the correct causal connections between explicit dangerous features and potentially adverse outcomes. Here, we found that children with a higher number of past injuries that required medical attention pointed out more nondangerous features and outcomes. This is consistent with findings that children at increased risk for injury often underestimate their own injury risk (Morrongiello, 1997; Morrongiello & Rennie, 1998; Peterson et al., 1997) Although these children often were pointing out the same features as other children, they perceived them to be less dangerous. The following is an example of two children's differing assessments of the same photo:

> **Nondangerous rationale:** Well, it's kinda safe because he's riding it properly (*points to skateboard*) and I bet he could turn around (*imitates turning around*) if he's going too fast. He could just stop.
> **Dangerous rationale:** He is not wearing a helmet, elbow pads, knee pads . . . what about, he is going down (*points to boy and gesture length of driveway*) into the street.

The fact that these children also pointed out more nondangerous outcomes may indicate that these children were not correctly identifying those features that could lead to a negative consequence as being dangerous. In turn, this could lead to impaired ability to make the causal connection between dangerous features and the adverse outcomes caused by those features.

There are several limitations of the study. First, it is not clear that the individual or joint ratings accurately reflected how mothers and children actually perceived the danger of the activities, as demand characteristics likely pushed participants toward providing more unsafe ratings. However, the ratings were secondary to our interest in how mothers talked to their children about safety and were intended to elicit conversation in the dyads. Second, our dyads included only mothers and children. At present, it is not known whether there are differences in how mothers and fathers talk to their children about safety. Third, it is not known whether our findings generalize to real-world settings. Observational studies would be beneficial for determining how these conversations happen in environments where children are at injury risk, such as playgrounds. And finally, our sample comprised mostly Caucasian mother–child dyads from highly educated, middle– to upper-middle–income families with typically developing children. As such, our sample likely provides a baseline for what might constitute optimal mother–child conversations about safety. However, it is not clear whether our findings generalize to the broader population, particularly to lower-income households and nontypically developing children [e.g., children with *attention deficit hyperactivity disorder* (ADHD)]. As children from lower-income families (Durkin, Davidson, Kuhn, O'Connor, & Barlow, 1994) are at greater risk for unintentional injury, it is important to better understand how mothers and children from these households talk about safety. Parents from low-income families tend to have a more authoritarian parenting style (Evans, 2004), which may contribute to increase injury risk due to more rule enforcement and less explanation (Baumrind, 1971; Shaffer, 2005). Children with ADHD are thought to be at greater risk of injury due to increased impulsivity and oppositionality (Farmer & Peterson, 1995). According to Schwebel and Gaines (2007), children who exhibit oppositionality may be particularly at risk for injury because they typically do not heed advice from adults when told to stop performing a potentially dangerous activity. This oppositionality may also extend to parent–child conversations about safety, resulting in poorer internalization of safety values. Further research is needed to determine if differences in parent–child communication about safety contribute to injury risk in other populations.

What implications do these results have for preventing injuries in children? Unintentional injuries primarily result from unsafe environments or risky behavior, or some combination of the two. Risky behavior (or the lack thereof) may be mediated by the internalization of safety values, much like prosocial behavior is mediated by the internalization of moral values. Understanding the processes whereby parents might contribute to the internalization of safety values is critical for promoting interventions that decrease the likelihood that children and adolescents will engage in risky behavior. The present investigation represents an initial step forward in understanding how parent–child conversations about safety might contribute to this process of internalization. Further research is needed to determine if the strategies used in parent–child conversations about safety are effective in decreasing risky behavior.

Acknowledgments

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