Don’t Touch the Gadget Because It’s Hot! Mothers’ and Children’s Behavior in the Presence of a Contrived Hazard at Home: Implications for Supervising Children

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Objective This study compared boys’ with girls’ hazard-directed behaviors at home when the mother was present and absent from the room. Methods Videos were coded for how children reacted to a contrived burn hazard (‘Gadget’), maternal verbalizations to children about the hazard, and children’s compliance with directives to avoid the hazard. Children’s behavioral attributes (risk-taking tendency, inhibitory control) and maternal permissive parenting style were also measured. Results Boys engaged in more hazard-directed behaviors when the mother was present than absent, whereas girls’ risk behaviors did not vary with caregiver presence and was comparable with how boys behaved when the parent was absent. Mothers emphasized reactive communications, and boys received significantly more of these than girls. Permissiveness was associated with fewer statements explaining about safety. Children high in inhibitory control showed fewer hazard-directed behaviors and greater compliance with parent communications, whereas those high in risk-taking propensity showed more hazard-directed behaviors and less compliance. Conclusions The hazard-directed behaviors of boys and girls vary with caregiver context, with boys reacting to parent presence with increased risk taking. Depending on child attributes, different supervision patterns are needed to keep young children safe in the presence of home hazards.

Key words children; hazards; home safety; injury prevention; parents; supervision.

Unintentional injury is the leading cause of death in childhood in many industrialized countries (Canadian Institute of Child Health, 2000; World Health Organization, 2008). For young children under 6 years of age, many injuries occur in the home (Baker, O’Neill, & Ginsburg, 1992; Shannon, Bradshaw, Lewis, & Feldman, 1992). Having a greater number of hazards in the home is associated with more hospital visits and injuries to children (Kendrick, Watson, Mulvaney, & Burton, 2005; LeBlanc et al., 2006). Hence, examination of how children behave in the presence of home hazards and the efforts parents extend to keep their children safe despite these hazards are important to understanding how young children’s risk of injury arises.

Child Injury-Risk Behaviors

Past studies in laboratory and naturalistic situations have shown that boys generally engage in more injury-risk behaviors than girls (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Morrongiello & Rennie, 1998; Rosen & Peterson, 1990; World Health Organization, 2008). For example, when exposed to ‘contrived’ hazards (i.e., objects that appear hazardous but have been modified to eliminate injury risk, cf. Cataldo et al., 1992) in a laboratory setting with their parent present, it was found that boys not only engaged in more hazard interactions than girls, but they did so significantly more quickly than girls (Morongiello & Dawber, 1998). In comparison with girls, boys also have been noted to engage in more exploratory and
Parents of young children use three prevention strategies to manage household injury risk: Modifying the home environment, supervising (i.e., watching and proximity), and expressing communications to their child about safety and injury hazards (Morrongiello et al., 2004a). Historically, research has examined parents’ use of safety devices and the changes to the environment they implement to prevent injuries to children in the home (Greaves, Glik, Kronenfeld, & Jackson, 1994; Paul, Sanson-Fisher, Redman, & Carter, 1994; Wortel, de Geus, & Kok, 1995). In the past decade, the focus has shifted to studying how parent supervision relates to children’s injuries (Morrongiello, 2005; Morrongiello et al., 2004b; Schwebel & Brezausek, 2007). However, there is relatively little known about parent communications to young children about injury hazards.

Past research shows that parents are aware of the importance of communicating to young children about avoiding risky situations in the home (Gralinski & Kopp, 1993), and that most parents assume it is their responsibility to teach their children about safety (Peterson, Farmer, & Kashani, 1990). By the time children reach 3 years of age, parents report that a common approach they use to try and prevent injuries is to educate children about safety and hazards (Garling & Garling, 1995; Gralinski & Kopp, 1993). In a study examining 3–3.5-year-old children’s behavior in a laboratory situation containing contrived hazards, for example, it was found that mothers typically responded to their child’s unfolding hazard-directed behavior by issuing verbalizations aimed at stopping the child (Morrongiello & Dawber, 1998). Extending these findings, the current study examined the nature of maternal communications when children are in the presence of a contrived injury hazard in the home, including comparison of proactive and reactive communications (i.e., alerting the child to the injury hazard before vs. after the child expresses an interest in it, respectively).

Current Study

To better understand young children’s interactions with hazards in the home, a novel contrived burn hazard (‘Gadget’) was incorporated into the home, and video recordings were taken of the mother and her 3-year-old’s behavior; the mother was aware of the videotaping but the child was not. During the course of an hour, the child was left alone in the room three times, each for 5 min, so hazard-directed behaviors in the presence and absence of the parent could be compared. Mothers’ safety-relevant communications throughout the hour were coded, along with children’s reactions to maternal efforts to prevent them from interacting with the hazard.

Two child behavioral attributes were measured, and one parenting measure was used, and these were related to the video-recorded behaviors. For children, risk-taking propensity has been shown to predict more frequent injury (Morrongiello, Corbett, Lasenby, Johnston, & McCourt, 2006) and inhibitory control (i.e., capacity to inhibit a behavior one wants to do, such as following safety rules that preclude risky but fun activities) has been shown to predict fewer injuries (Morrongiello, Corbett, McCourt, & Johnston, 2006; Schwebel & Plumert, 1999). The current study explored whether these attributes relate to children’s hazard-directed behaviors and/or compliance with parent communications about avoiding the hazard. In addition, research on supervision has shown that parents assume that listening in from a location other than the child’s location (i.e., beyond reach and not watching continuously) constitutes ‘supervising’ and can suffice to keep the child safe, although this pattern has actually been found to elevate young children’s risk of injury in the home (Morrongiello et al., 2004b). We reasoned that if children possess attributes that lead to poorer compliance with parent communications from a distance, then proximity is more critical to the child’s safety. Alternatively, if children possess attributes that foster compliance with directives by the parent to not interact with a hazard, then proximity is less critical to the child’s safety as long as the parent is watching sufficiently to issue such directives in time. Hence, the current study was expected to provide data relevant to the question of the necessity of proximity for moderating young children’s risk of injury when there are attention-getting hazards in their vicinity.

Permissive parenting was also measured to determine whether this relates to maternal safety communications.
Past research has found that parents high in permissiveness have children who experience more frequent medically attended injuries (Morrongiello, Corbett, McCourt, et al., 2006). The current study considered whether the communications about injury risk that permissive parents direct to their children might explain why they experience more frequent injuries. To the extent that permissive parents are more lenient about setting or explaining rules, or more encouraging of children to make their own behavioral decisions (Smetana, 1995), it was hypothesized that this attribute might lead to fewer communications aimed at constraining hazard-directed behaviors by the child.

**Method**

**Participants**

The sample consisted of 89 mothers with children ~3 years of age ($M = 36.46$ months, $SD = 2.05$ months), 42 were girls and 47 were boys. Participants were randomly selected from a database of over 13,000 families who had indicated interest in participating in research on child development. In terms of self-reported annual family income, 11% earned <$39,999, 30% earned between $40,000 and $59,999, 16% earned between $60,000 and $79,900, and 42% earned an income of ≥$80,000; the remaining 1% elected not to disclose family income. In terms of maternal education, 9% had received at least some high school education, 67% had some university or college training or had completed a degree, and the remaining 24% had received graduate training or a postuniversity education. Nearly all mothers were Caucasian. All procedures and methods were approved by the university Research Ethics Board, and all mothers granted written consent.

**Materials**

The contrived hazard was identified as a ‘Gadget’ to the child. This term was chosen because pilot research with mothers of toddlers had indicated that this was an unfamiliar term for young children; hence, children would not have preconceptions or prior knowledge based on what the hazard was called by the parent. The hazard was constructed for the purposes of this study. The rationale behind the creation of this item was that it would be appealing to children, none would have previous exposure to the object, and it would be convincing as an item that was supposedly ‘hot’.

The Gadget was the size of a basketball and was made of styrofoam. It was painted flat black and had colored sequins and small mirrors on it, along with multicolored three-fourth-inch size Christmas tree lights that were inserted into the surface of the ball in an uneven pattern, creating an attractive and attention-getting illumination effect when plugged in; the lights were lit the entire time it was in view of the child. Pilot testing of the Gadget with other young children confirmed that children found it attractive and would often spontaneously ask whether it was hot. The Gadget was placed on a child-size chair in whatever room the child typically played in at home. A very small hand-held battery-operated video camera with a built-in microphone was placed in the same room as the Gadget. The camera was placed out of reach and direct view of the child, and in an inconspicuous way, and it provided a wide-angle view of the Gadget and the surrounding area. From the time the child entered the room, the camera was running, and the Gadget was plugged in and lit; the children were not present when the camera and Gadget were installed or removed.

**Questionnaire Measures**

**Child Attributes.** The Injury Behavior Checklist (Speltz, Gonzales, Sulzbacher, & Quan, 1990) is a standardized measure of the child’s typical level of risk-taking behavior; scores have been found to correlate with the frequency of injuries (Potts, Martine, & Dedmon, 1993). Using a 5-point Likert scale (0 = not at all, 4 = very often/more than once a week), the mother indicates how often her child has engaged in each of 24 injury-risk behaviors (e.g., “jumps down the stairs”) within the past 6 months. Scores are summed and range from 0 to 96, with higher scores indicating greater risk taking. Internal consistency was good ($\alpha = .88$). Mothers also completed the inhibitory control subscale (12 items) from the Early Child Behavior Questionnaire (Putnam, Gartstein, & Rothbart, 2006). A 7-point Likert scale (1 = never, 7 = always) was used to indicate how often the child had exhibited each behavior in the past two weeks, with scores summed and higher scores indicating greater inhibitory control. Good internal consistency was obtained herein ($\alpha = .82$).

Mothers completed the permissiveness subscale of the Parental Authority Questionnaire-Revised (Reitman, Rhode, Hupp, & Altobello, 2002). For each of 10 items about permissiveness (e.g., In a well-run home children should have their way as often as parents do), mothers rated their extent of agreement using a 5-point Likert scale (1 = strongly agree, 5 = strongly disagree). A mean score was calculated, with lower scores indicating greater permissiveness. Internal consistency was acceptable ($\alpha = .71$).

**Procedure**

Data were collected in the home during a 2-hr visit. Mothers completed a random ordering of the questionnaires. Then, while the mother preoccupied the child
elsewhere in the home (e.g., washing hands in the bathroom), the research assistant set up the Gadget and camera in the room the mother identified as being a place the child commonly played; most often this was a playroom, den, or living room. The Gadget was placed on a child-size chair, so it would be at a height that children could touch if they desired to do so. It was plugged in and was set out of the way so that children would not accidentally knock or touch it, the chair, or the cord; thus, the child had to extend effort to approach and/or touch the hazard. The video camera was positioned in such a way that the child’s play area, the Gadget, and the mother’s sitting area were clearly visible.

The mother was asked to act as if the Gadget belonged to her (e.g., it is something new she had bought) and to manage her child’s risk of injury from the hazardous object in a manner consistent with how she would typically manage a hot hazard in the home. The mother was equipped with a silent stopwatch preset to vibrate at three 15-min intervals after she entered the room. The mother was instructed to leave the room for 5 min each time the watch vibrated, leaving the child alone with the Gadget during this time and exiting in her usual manner; we limited to leaving the child alone for 5-min periods because mothers reported they routinely did this and were comfortable with doing so (Morrongiello, Corbett, McCourt, et al., 2006). Mothers left the room under the guise of going to do something (e.g., I will be back in a few minutes, I am going to get an eraser and to sharpen my pencil.). The mother was given a clipboard with a reminder card outlining these instructions as well as some questionnaires about child development to complete during the video segment, thereby creating a naturalistic situation in which the mother was distracted with tasks while the child was at play. Finally, before commencement of the video session, the mother was asked “How likely do you think it is that when you leave the room your child will touch the Gadget?” and provided with a rating scale to indicate her response (1 = not likely at all; 5 = definitely s/he will touch it if I am not there). After the researcher set up the Gadget and video camera, she then left the home, returning after ~1.5 hr to pick up the equipment. Upon completion of the study, the mother was given a gift card for participating.

**Data Coding**

Content analysis of the videos resulted in development of a coding scheme to capture parent and child behaviors. Child behaviors included hazard-directed risk behaviors (i.e., intentionally touches the Gadget; tries to do so but misses, such as a swipe and miss; threatens or intends to do so, such as moving hand within inches of the Gadget) and reactions to parent efforts to prevent or stop the child from interacting with the Gadget (i.e., ignores parent, complies, defiant, negotiates). Parent behaviors were divided into proactive safety efforts (i.e., the mother communicates something to educate about safety or risk of injury related to the Gadget before the child expresses an interest in the Gadget) and reactive responses (i.e., reactions by the mother to the child performing risk behaviors directed toward the Gadget). For both proactive and reactive communications, maternal behaviors were coded into one of five types of communications: Warnings or threats (e.g., You are going to get punished if you go any closer!), prohibitions (e.g., Do not touch the Gadget!), redirections (e.g., Move away from there and come sit here by me), teaching about safety or injury risk (e.g., It’s hot so if you touch it you can burn your hand and it will hurt a lot), and testing the child’s knowledge of, or commitment to, safety (e.g., What can happen if you touch something hot—do you remember? You don’t want to get a boo boo on your hand do you?).

Reliability for coding was established by having a second coder independently code 25% of the videos (randomly selected), and exceeded 88% agreement across all child and parent coding categories. The data of the primary coder were analyzed.

**Results**

**Analytic Approach**

Analysis of variance (ANOVA) tests were conducted to compare the video data for male and female children when the parent was present versus absent, and to test for significant variation across the types of maternal communications and children’s reactions to the parent. Paired contrasts are based on t-tests, with a Bonferroni adjustment applied; the results reported are based on this adjustment. Finally, to identify attributes that related to maternal and child behavioral data, correlations were conducted relating the questionnaire-based attribute data to the video-based behavioral data.

Before running analyses, variable distributions were examined for violations of normality. Kurtosis was never violated but skewness was and, when this occurred, data were square-root transformed (Howell, 2007); examination of the distribution of the residuals confirmed that the transformed data then met the normality assumption for ANOVA (see Karazsia & vanDulmen, 2008 for alternative approaches to analyzing count data when violations of distribution assumptions persist). The statistical tests from analyses of the transformed data are reported throughout, with both transformed and nontransformed means and standard deviations given. Using Cook’s distance for
screening, there were no outlier scores identified for the original or the transformed data.

Children’s Hazard-Directed Risk Behaviors

The number of times the child touched or tried to touch the Gadget when the parent was present and absent from the room was tallied and converted to a rate of risk taking per minute to adjust for the fact that the mother was present for 45 min and absent for 15 min within the hour. These data are shown in Table I. An ANOVA was applied on the square-root transformed data, with child gender (2: boys, girls) as a between-participant factor and parent status (2: present, absent) as a within-participant factor.

Results revealed a significant gender by parent status interaction, F(1, 87) = 5.93, p < .05, partial $\eta^2 = 0.06$. Follow-up one-way ANOVAs were conducted to compare the rate of hazard-directed behavior of boys and girls as a function of parent status. As shown in Table I, when the mother was present, boys showed more hazard-directed behaviors than girls, F(1, 87) = 4.71, p < .05, partial $\eta^2 = 0.06$. When the parent was absent, boys and girls engaged in the same rate of risk taking. For girls, the same rate of hazard-directed behaviors occurred when the parent was present or absent. In contrast, for boys, significantly more hazard-directed behaviors occurred when the parent was present than absent, F(1, 46) = 49.10, p < .001, partial $\eta^2 = 0.52$. Thus, the presence of the parent evoked more hazard-directed behaviors among boys, but had no differential impact on the behavior of the girls.

Mothers were asked to select a rating (0 = definitely won’t touch it, 1 = a little likely, 2 = somewhat, 3 = very likely, 4 = definitely will touch Gadget) to indicate their expectation about how likely it was that their child would touch the Gadget when the parent was present. In contrast, for boys, significantly less likely to do so (M = 2.98 and 2.06, SD = 1.21 and 1.12, respectively), F(1, 87) = 6.23, p < .01, partial $\eta^2 = 0.07$. Hence, consistent with how children behaved in her presence, mothers expected sons to engage in more hazard-directed behaviors than daughters when she was absent.

Mothers’ Approach to Managing Children’s Risk of Interacting With the Hazard

The mothers were told to behave in whatever ways they typically would if a new ‘hot’ hazard was introduced into the home. Only 30 parents (34%) engaged in proactive safety-promotion behaviors that aimed to teach the child about the safety issue before any hazard-directed risk behaviors occurred (i.e., speaking with the child about the Gadget in advance of the child directing their attention and/or behavior to the Gadget). In contrast, most parents (N = 87 or 98%) showed reactive communications in response to the child doing something directed toward the hazard.

An ANOVA with parent safety-promotion behavior (2: proactive, reactive) and child gender (2: boys, girls) was applied to the frequency scores and confirmed that parents made significantly more reactive than proactive responses when the parent was present (M = 23.92 and 0.68 responses, SD = 13.83 and 2.28, respectively), F(1, 87) = 259.78, p < .001, partial $\eta^2 = 0.75$.

To examine these communications in greater detail, the five types of reactive communications aimed at redirecting the child away from the Gadget were examined. Means and standard deviation scores for each type of communication are presented in Table II. An ANOVA was conducted on the total frequency scores, with child gender (2: female, male) as a between-participant factor, and type of communication (5: redirecting the child, testing the child’s knowledge and commitment to behaving safely, teaching

Table I. Mean Rate per Minute (SD) at Which Children Engaged in a Hazard-Directed Behavior as a Function of Parent Status (Present, Absent) and Child Gender (Boy, Girl)

<table>
<thead>
<tr>
<th>Data type</th>
<th>Parent status</th>
<th>Boys*</th>
<th>Girls*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nontransformed</td>
<td>Present</td>
<td>0.31 (0.24)</td>
<td>0.21 (0.17)</td>
</tr>
<tr>
<td>Transformed</td>
<td>Absent</td>
<td>0.19 (0.27)</td>
<td>0.22 (0.38)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data type</th>
<th>Parent status</th>
<th>Boys*</th>
<th>Girls*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nontransformed</td>
<td>Present</td>
<td>0.51 (0.22)</td>
<td>0.40 (0.18)</td>
</tr>
<tr>
<td>Transformed</td>
<td>Absent</td>
<td>0.31 (0.30)</td>
<td>0.34 (0.37)</td>
</tr>
</tbody>
</table>

Note. Descriptive statistics for both nontransformed and square-root transformed scores are given.

*Significant difference for parent status, p < .05.
**Significant difference for gender, p < .05.

Table II. Mean (SD) Frequency of Each Type of Maternal Communication as a Function of Child Gender

<table>
<thead>
<tr>
<th>Maternal communication</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prohibitions*</td>
<td>9.57 (5.66)</td>
<td>7.19 (3.66)</td>
</tr>
<tr>
<td>Warning/threateningb</td>
<td>5.72 (4.96)</td>
<td>5.02 (4.46)</td>
</tr>
<tr>
<td>Teaching/explanationsb</td>
<td>5.13 (4.78)</td>
<td>5.09 (3.58)</td>
</tr>
<tr>
<td>Redirect childc</td>
<td>1.68 (1.31)</td>
<td>1.88 (1.53)</td>
</tr>
<tr>
<td>Test knowledge/safety commitment*</td>
<td>3.05 (3.00)</td>
<td>2.61 (2.18)</td>
</tr>
</tbody>
</table>

Note. Identical superscript letters designate conditions that did not significantly differ from one another for either boys or girls.

*Significant difference by gender, p < .05.
and explaining about safety or injury risk, warning or threatening the child, prohibition to the child) as a within-participant factor. Results revealed significant variation in the type of communication as a function of child gender, $F(4, 348) = 56.27$, $p < .001$, partial $\eta^2 = 0.39$. This interaction was examined further in two ways.

First, to determine which types of communications differed from one another, follow-up paired-comparison tests were conducted separately on the boys’ and girls’ data. Results revealed the same pattern of differences for boys and girls: Mothers stated prohibitions more than any other type of communication ($p < .05$) and issued warnings/threats about discipline consequences as often as they attempted to explain and teach the child about the Gadget, $p > .05$. Redirections occurred as often as those directed at testing the child’s knowledge and commitment to safety, $p > .05$, and significantly less frequently than other types of communications, $p < .05$.

Second, to determine whether the frequency of maternal communications differed for boys and girls for a given type of communication, one-way ANOVAs with gender as a between-participant factor were conducted for each type of communication separately. Results revealed that mothers issued significantly more prohibitions to boys than girls, $F(1, 87) = 5.42$, $p < .05$ partial $\eta^2 = 0.06$. No other gender differences emerged.

To explore whether permissive parenting was associated with particular types of reactions to the child in the presence of the hazard, correlations were conducted relating this score to scores for each of the five types of parent communications. Results revealed that greater permissiveness in parenting was associated with less teaching about the Gadget ($r = –.24$, $p < .01$) and fewer redirections, $r = –.32$, $p < .01$.

### Child Compliance With the Parent’s Efforts to Prevent Hazard Interaction

To examine child compliance, we focused on all instances in which the parent expressed a communication aimed at reducing the chances of the child interacting with the hazard. We then coded the child’s initial reaction, including compliance, ignoring (e.g., continued approach toward the Gadget), defiance (e.g., No, I won’t stop; No, I won’t move away), and attempts to negotiate a different outcome (e.g., Can I go close to see it if I don’t touch?). An ANOVA was applied to these frequency scores after a square-root transformation, with child gender (2: boys, girls) as a between-participant factor and child reaction (4: compliant, ignores, defiant, negotiate) as a within-participant factor. As can be seen in Table III, results revealed a significant effect of child reaction, $F(3, 85) = 37.28$, $p < .01$, partial $\eta^2 = 0.57$.

Follow-up paired comparison $t$-tests were conducted on the average of the boys’ and girls’ scores. Results revealed that boys most often attempted to negotiate and change the mother’s request for risk avoidance, and this exceeded all other child reactions, $p < .05$. Children were as likely to react with defiance as to ignore the mother’s efforts to direct the child away from the Gadget, $p > .05$.

To determine whether the frequency of child reactions to maternal efforts to direct them away from the Gadget differed for boys and girls, one-way ANOVAs with gender as a between-participant factor were conducted for each type of child reaction separately. Results revealed that boys reacted with defiance significantly more than girls, $F(1, 87) = 6.09$, $p < .001$, partial $\eta^2 = 0.07$. No other differences emerged.

### Child Characteristics That Related to Child and Parent Behaviors

Child characteristics related to children’s hazard-directed behaviors and parents’ expectations about this. Scoring high in tendency to take risks was associated with more frequent hazard-directed risk behaviors ($r = .37$, $p < .001$), whereas scoring high in inhibitory control was associated with fewer hazard-directed behaviors, $r = –.19$, $p < .05$. Similarly, parental ratings of children’s likelihood of touching the Gadget related to children scoring high in dispositional risk taking, $r = .41$, $p < .01$.

Not surprisingly, the more the child engaged in hazard-directed behaviors, the more reactive responses occurred by the parent, $r = .44$, $p < .001$. Additionally, children’s compliance with parent efforts to prevent

<table>
<thead>
<tr>
<th>Data type</th>
<th>Child reaction</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nontransformed</td>
<td>Negotiate</td>
<td>4.77 (4.82)</td>
<td>4.17 (2.92)</td>
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<tr>
<td>Defiant</td>
<td>2.00 (3.06)</td>
<td>0.81 (1.53)</td>
<td></td>
</tr>
<tr>
<td>Ignores</td>
<td>1.70 (1.13)</td>
<td>1.53 (1.92)</td>
<td></td>
</tr>
<tr>
<td>Compliant</td>
<td>0.85 (1.67)</td>
<td>0.95 (3.49)</td>
<td></td>
</tr>
<tr>
<td>Transformed</td>
<td>Negotiate</td>
<td>1.89b (1.10)</td>
<td>1.88* (0.96)</td>
</tr>
<tr>
<td>Defiant*</td>
<td>0.99b (1.02)</td>
<td>0.52b (0.74)</td>
<td></td>
</tr>
<tr>
<td>Ignores</td>
<td>0.89b (0.87)</td>
<td>0.78b (0.69)</td>
<td></td>
</tr>
<tr>
<td>Compliant</td>
<td>0.40b (0.90)</td>
<td>0.48b (0.80)</td>
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</tbody>
</table>

Note: Identical superscript letters designate conditions that did not significantly differ from one another. Descriptive statistics for both nontransformed and transformed scores are given.
*Significant difference by gender, $p < .05$.
Discussion

Although all parents must deal with the challenges of how to educate their young child about hazards in the home and moderate children’s interactions with these hazards, there is surprisingly little known about how parents achieve these aims. The present study used an innovative methodology in which a contrived hazard was placed in the home, and video records were taken of the child’s and mother’s behaviors in the context of this hazard; children were unaware they were being videotaped, and the parent purposefully left them alone with the hazard in the room some of the time. The findings reveal important gender differences in children’s hazard-directed behaviors in the familiar context of their home, and provide insights into parental efforts to manage children’s interest in hazards. The results also indicate how child and parent attributes influence these processes. Implications for supervising young children are considered.

Consistent with past laboratory and naturalistic observation studies of children with their parents, the pattern of children’s behavior in their homes revealed that boys engaged in more frequent injury-risk behaviors than girls when their parent was present (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Morrongiello & Dawber, 1998). This study extends past research, however, in that it reveals the surprising finding that boys’ frequency of hazard-directed behaviors was significantly lower when the parent was absent than when the parent was present. Boys’ level of hazard-directed behaviors when the parent was absent was comparable with the lower level shown by girls and which did not differ with parent presence or absence. The fact that girls engage in relatively low levels of risk taking whether the parent is present or absent suggests that they are generally cautious in the presence of hazards and/or self-motivated to behave in ways their parents would want. This interpretation is consistent with past evidence that girls are significantly more concerned than boys about the possibility of getting hurt (i.e., injury vulnerability), and they not only intentionally avoid risks when injury could occur (Hillier & Morrongiello, 1998; Morrongiello & Rennie, 1998) but also are more likely than boys to avoid specific risk behaviors they believe their parents would not condone (Morrongiello & Dawber, 2004). Thus, even at these young ages, girls seem to have internalized safety socialization messages that emphasize injury vulnerability (Morrongiello & Dawber, 1999) and parental disappointment about girls engaging in injury-risk behaviors of which the parent disapproves (Morrongiello & Hogg, 2004; Morrongiello, Zdzieborski, & Norman, 2010). Past research has found that a focus on fun and exploring things of interest are often key motivators of risk behaviors for boys (Morrongiello & Dawber, 2004) and can fuel their resistance to parental efforts to prohibit hazard-directed behaviors when they are together in the presence of hazards (Morrongiello & Dawber, 1998). Hence, boys have been found to persist in risk taking despite parents’ best efforts to prevent these activities (Peterson & Stern, 1997). What the current findings indicate, however, is that when parents are not present, boys do not necessarily persist with hazard-directed behaviors. Possibly, boys’ risk behaviors are sustained, at least in part, by the nature of parents’ reactions to these behaviors. Past research has shown that parents often experience anger and react with discipline-focused communications when boys engage in injury-risk behaviors in their presence at home (Morrongiello & Hogg, 2004). Such disciplinary-focused reactions are clearly aimed at controlling and curtailing boys’ interests in hazards, and the anger expressed by parents may make these interactions particularly salient for boys. The current results suggest that these parenting practices may have the unanticipated effect of actually maintaining boys’ focus on these hazards; in the absence of the parent, therefore, the child’s interest in the hazard may dissipate, resulting in fewer hazard-directed behaviors when the parent is absent. Although this explanation requires further study, suffice it to say, the present findings demonstrate that boys’ hazard-directed behaviors vary with caregiver context, are more frequent when the parent is present than absent, and may be influenced by the nature of caregivers’ reactions to boys’ hazard-directed behaviors.

The current findings have implications also for the patterns of supervision that are needed to moderate young children’s injury-risk behaviors. The fact that children successfully engaged in hazard-directed risk behavior even when the parent was present, suggests that the parent simply being in the same room is not sufficient to deter either boys’ or girls’ risk taking. Thus, in terms of the watching and proximity dimensions that have been proposed in defining supervision (Gitanjali et al., 2004), it would seem that proximity alone is not sufficient to deter young children’s hazard interactions if the caregiver is beyond reach. Importantly, the results suggest that watchfulness alone also may not be sufficient to curtail hazard interactions among young children. This conclusion
is based on the fact that boys showed less risk taking when the mother was absent (i.e., out of view) than present, and both boys and girls engaged in frequent hazard interactions when the parent was present and the child was within view. Because parents completed questionnaires when in the room, the typical supervision pattern when the parent was present comprised intermittent or discontinuity in watching coupled with beyond-reach level of proximity. It may be that both continuity in watchfulness and within-reach proximity are necessary to curtail hazard interactions at these young ages, especially in the context of a very attention-eliciting and novel hazard. The data on children’s compliance further clarify this interpretation.

One factor that influences the pattern of supervision caregivers need to moderate children’s injury risk is the extent to which young children comply with a verbal request by a supervisor aimed at preventing a hazard interaction. Results from this study indicate that child behavioral attributes affect compliance. Children who scored high in dispositional risk taking showed more active defiance and less compliance with communications aimed at preventing a hazard interaction. In contrast, children who scored high in inhibitory control showed greater compliance with parental efforts to prevent hazard interactions and, therefore, evoked fewer parent reactions. The pattern of these findings suggests that there is individual variation in supervision patterns needed to moderate children’s injury risk, and these patterns depend on children’s behavioral attributes (see also Morrongiello, Klemencic, & Corbett, 2008). If children are defiant and resist parents’ verbal directives to prevent a hazard interaction, then a physical response by the parent is necessary, and therefore, the caregiver being within-reach of the child would be essential. Alternatively, if children comply with caregiver’s verbal directives to avoid hazards, then within-reach proximity is not essential for supervision to effectively moderate injury risk. Thus, the extent to which within-reach proximity is essential to moderate hazard interactions will vary with individual child behavioral attributes.

Somewhat surprisingly, although mothers erroneously assumed boys would engage in more hazard-directed behaviors than girls when the mother was not present, this did not evoke more proactive responses by caregivers for boys. This result could arise because parents assume that the risk behaviors of boys are not easily modifiable (Morrongiello & Hogg, 2004; Morrongiello et al., 2010), and therefore, they do not extend the effort to try and do so until the child is nearing interaction with the hazard and the threat of injury is imminent. For boys and girls alike in the current study, hazard-directed behaviors by the child functioned to elicit a reaction by the parent, with the primary response being a prohibition of risk taking. To the extent that the pattern of child and parent behavior observed with respect to the Gadget mirrors what typically occurs in the home, there is surprisingly limited proactive effort extended to educate young children about safety hazards. This result is consistent with those from a recent study on home safety rules in which parents reported the primary motivation for implementing safety rules was that the child had experienced a minor injury or had almost done so (Morrongiello, McArthur, & Bell, 2014). Exactly why parents adopt a ’teach as needed’ approach to safety is not known but merits attention in future research, especially because it has been shown that understanding of a safety issue predicts better compliance with the safety rule by young children (Morrongiello et al., 2014). Thus, teaching about safety could presumably serve to reduce young children’s risk of hazard interactions in the home if it effectively enhances their understanding.

Finally, the current study adds to the limited research regarding how parenting style influences parents’ adoption of child-safety practices. Parents high in permissiveness have children who experience more frequent injuries (Morrongiello Corbett, McCourt, et al., 2006). The current study suggests that the way permissive parents react (i.e., less explaining, fewer attempts to redirect) when their young child is in the presence of a hazard, may elevate their child’s risk of injury. Although further research is needed, the consistency of the evidence to date suggests that permissive parenting may be a risk factor for child injury, at least for young preschool children.

**Limitations and Future Directions**

There are several limitations to the study that merit consideration in planning future research. First, the sample was relatively homogeneous. It included only mothers, and over half the participants were university educated, middle class, and Caucasian. This limits generalizability of the findings and obtaining a more diverse sample would be an asset in future research. Second, because of pragmatic considerations, the study focused on only one type of injury risk—burns. Although there is no evidence to date to suggest that parents use different teaching strategies based on type of injury threat, injury severity has been shown to influence parent safety practices (Morrongiello & Kiriakou, 2004; Peterson et al., 1990), so addressing this issue in future research by directly examining home teaching about different types of injury hazards would be an important next step in this research. Finally, video recording in the home provided a unique opportunity to examine young children’s risk-taking behavior in a fully naturalistic and familiar setting, which is a rare
occurrence in this research area. The parent, however, was fully aware of being video recorded, and therefore, it may be that the maternal behavior we observed was not as accurate a representation as what we obtained for the child. It is noteworthy that parents showed primarily reactive than proactive reactions, a mix of disciplinary-focused and teaching-focused reactions even though they knew of our interest in teaching about safety, and that the same types of reactions have been noted before when parents were observed with their child near contrived hazards and without awareness of being recorded (Morroniello & Dawber, 1998)—all of which suggests that they were not misrepresenting their parenting practices and/or how much they teach about safety. Nonetheless, we cannot say with certainty that this was the case. Incorporating an additional condition that allows one to unobtrusively record the parent’s behavior when the child is in the presence of a contrived hazard would be ideal in future research, to compare the parent’s safety-focused behaviors when they are aware versus unaware that they are being videotaped.

Conclusion

Using an innovative method, the current study provides unique insights into children’s risk behaviors when an unfamiliar ‘contrived’ safety hazard is introduced into the home, and the child is sometimes left in the company of the hazard without the parent present. Analysis of the square-root transformed scores revealed significant differences in boys’ and girls’ hazard-directed behaviors as a function of parent presence: Boys’ risk behaviors exceeded girls’ when the parent was present, but was at comparable lower levels to girls’ risk behaviors when the parent was absent. Examining parents’ reactions to children’s hazard-directed behaviors revealed a mix of disciplinary type responses (e.g., prohibitions, threats, warnings) and safety-education ones too (e.g., explanations, questions to assess knowledge), suggesting that parents aim to balance the prevention of a hazard interaction with teaching the child about safety; permissive parenting, however, was associated with fewer teaching-focused reactions. Children’s behavioral attributes affected both their hazard-directed behavior and compliance with parents’ communications to avoid the hazard, and this has implications for supervision (visual attention, proximity). Children high in inhibitory control showed fewer hazard-directed behaviors and greater compliance with parent verbalizations to avoid the hazard, suggesting that parent proximity is not as essential to the child’s safety as long as visual attention to the child is continuous. In contrast, children high in risk-taking propensity showed more hazard-directed behaviors and less compliance with parent verbalizations to avoid the hazard, suggesting that parent proximity may be critical for the child’s safety so that the parent can stop a noncompliant child who is attempting a hazard interaction. Thus, depending on child attributes, different supervision patterns may be needed to keep young children safe in the presence of home hazards.

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