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ABSTRACT

Two studies investigated how mothers of young children anticipate and interfere in events which may result in injury to their child. The first naturalistic study examined 150 mothers of firstborn children between 1 and 3 years old in Sweden. Mothers were interviewed and instructed in reporting about events which they anticipated would cause injury to their child, as well as any injury or near-injury occurring without being anticipated. The second study examined 72 different mothers and their children in the same age group and location. Mothers were interviewed in their homes, and on separate occasions were presented with vignettes which described a potential injury to their child. All vignettes had the general form of a statement about a potential injury-causing agent being present in the environment and the child's interaction with it. Mothers rated how likely they perceived injury to their child. Results from both studies showed that in the home environment, mothers frequently anticipated injury to their child prior to the child's interaction with the injury-causing agent. In the second study, the frequency with which mothers identified a potential injury varied with the child's age. (MM)

# MOTHERS' PERCEPTIONS OF RISK OF UNINTENTIONAL INJURY TO YOUNG CHILDREN

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## *Abstract*

How mothers of young children anticipate and interfer in events which may result in injury to their child is being investigated. Acquired causal schemata or scripts are hypothesized to play an important role in this process. In one naturalistic study of 150 mothers of firstborn boys and girls at the ages of 1, 2, and 3 years old, the mothers were found to most frequently anticipate injury to their child in the home prior to the child interacted with the injury-causing agent. However, the child had to be close to the agent. In another, experimental study of another 72 mothers recruited from the same population, the mothers' responses to vignettes which also included less frequent, more serious injury types yielded a similar pattern of results. Yet, some of the injury types (being caught and electrical injury) were anticipated later, thus suggesting how important it may be that the mothers understand the agent's injury-causing properties.

Although parents in general are strongly motivated to protect their children from unintentional injury, they need knowledge and skill to do this. We hypothesize that acquired causal schemas or scripts are used by supervising parents (and other adult caregivers) to identify injury-causing events (Gärling, 1989; Gärling, Svensson-Gärling, & Valsiner, 1984). In our most recent research, both naturalistic studies and laboratory-based experiments have been conducted with the aim of assessing mothers' ability to anticipate and, on this basis, to interfer in sequences of events which may result in injury to their child. Thus, we attempt to contribute to a systems approach to injury prevention which emphasizes the role of the caretakers (Peterson, Farmer, & Mori, 1987) as well as changes in children's environments (Roberts & Brooks, 1987).

Despite their beliefs to the contrary (Gärling & Gärling, 1993; Gärling et al., 1989), mothers may not always manage to effectively supervise their children. Supervision is most successful if mothers anticipate injury-causing events so early that they have time to undertake preventive measures. Therefore, a question we raise is at which stage mothers anticipate an unfolding event as being potentially injury causing? On the basis of our previous research (e.g. Gärling, 1989) which demonstrates the role and nature of causal schemas in mothers' anticipation of injury to their children, it may be expected that the presence of an injury-causing agent (e.g. a hot teapot left on the stove) is seldom sufficient unless the child is also present (e.g. a sharp knife left on the kitchen table at which the child is sitting). However, under circumstances where mothers do not readily perceive the agent as potentially injury causing, they may never anticipate the injury, or perhaps they only do so at a late stage, when the child interacts with the agent (e.g. when the child tries to poke the knitting needle into the electrical outlet). It may then be too late to intervene.

The first study we conducted attempted to assess, in a naturalistic setting, how early mothers anticipate injury-causing events and how accurate they are in doing so. We used a methodology which has been employed in research on mother-child interaction, for instance in studies of the use of disciplinary techniques (Chapman & Zahn-Waxler, 1982; Trickett & Kuczynski, 1986). In our study we requested that

mothers reported every time they anticipated injury while being at home with their child.

The naturalistic study provided us with answers to the question raised. However, serious injuries may primarily be caused by very rare events which we never observed. An experimental study (Gärling & Gärling, 1991) was therefore conducted in which such rare events known to cause serious injury were included. It was expected that mothers may have less knowledge of the course of such events and thus be less skilled at identifying their injury-proneness.

## *Study 1*

### *Sample*

The sample consisted of 150 mothers who were randomly selected from families living in Umeå, Sweden. Of the initially sampled mothers, 29 (28,6%) were replaced either because they were inaccessible or because they refused to participate. All of the mothers' children were firstborns. Thirty two were 1-years-old boys and equally many 1-years-old girls, 24 were 2-years-old boys and girls, and 24 3-years-old boys and girls.

### *Procedure*

The mothers were first contacted through a letter which stated that the primary purpose of the study was to determine why unintentional injuries occur to children in different types of homes. The letter also informed the mothers why they had been selected and asked for their cooperation. They were promised the equivalent of US$20 in return for participation in an interview, the content and form of which were outlined. A telephone call a few days later solicited the mothers' informed consent. Appointments for the interviews were scheduled within 2 weeks after the children's birthdays.

Initial interviews were conducted in the mothers' homes by one of three trained, female students. No children were present during the interviews. After about 30 minutes of general questions on different related topics, the mothers received instructions about how to report events which they anticipated would cause injury to their child, as well as any injury or near-injury occurring without being

anticipated. Reports were made the following seven days during times when the mothers were at home with their child. Written instructions were read aloud by the interviewer, then left with the mothers for additional reading whenever needed. The mothers were also given one yellow sheet and a set of blue sheets which they were asked to keep, together with the instructions, in a place which was easy to access.

The mothers kept a record of which hours they were home, being with their awake child. They were asked to use the yellow sheet to register, as close in time as possible, the hour on coming home, on going out, when the child fell asleep, and when the child wake up.

The mothers were also asked to record each time they anticipated that their child may be injured. Three different examples, based on pilot data, were provided to convey what was meant. The examples involved the mothers' discovering a scissors on the kitchen table, teaching the child not to burn himself or herself on the stove, and discovering the child jumping on the bed. The mothers were requested to record each such event on a separate blue sheet as close in time as possible. An event was to be described by the mothers in their own words, including what they experienced, time and day of the event, where in the home it occurred, how they acted, and possible consequences.

The mothers were furthermore requested to report any injury or near-injury which they did not anticipate. Such events were defined as something causing the child injury, or which the mother, after the event had occurred, realized could have caused such injury. This time two examples were given. In one the child almost slipped on a carpet, and in the other the child was hurt when overturning his or her chair at the dinner table. The mothers recorded these events in the same way as those where they anticipated injury.

After having read the instructions, the interviewer asked the mothers to think of one exemplar of each of the two classes of events which had recently occurred. They were then asked to practice by describing these events. Furthermore, the interviewers called the mothers on the evening of the first day of recording, requesting that they read aloud what they had recorded. In cases where the descriptions were scanty, the mothers were encouraged to subsequently provide more detailed information. Questions the mothers had were also answered, and the mothers were told that they could call the interviewers later in the week in case

there were any remaining questions. On the evening of the last day of recording, the interviewers called to remind the mothers to use envelopes they had received for mailing the material.

All mothers were paid after the interview and before they started recording. They were debriefed when the interviewer called the last time.

## *Results*

From 57% to 67% of all events were anticipated. Not more than between 4% and 13% of them actually resulted in injury. As Table 1 shows, of all injuries or near-injuries, a majority (56.6%) were falls. Hurting oneself on something was also rather frequently reported (21.7%), whereas the remaining injury types (being caught 9.5%, pulling something down 5.8%, burns 2.6%, cuts 1.7%, poisonings 1.2%, and suffocations 0.6%) were less frequent. However, the frequencies of anticipated injury types differed. The main differences were that hurting oneself on something was less often anticipated (accounting for only 4.4% of all anticipated injuries), and that cuts (15.8%) and burns (10.6%) were anticipated more often. The frequencies for the remaining injury types differed less (falls 50.6%, pulling something down 7.0%, being caught 4.9%, poisonings 3.4%, and suffocations 2.9%).

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Table 1 about here

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Table 2 shows how often injury was anticipated when the child was in another room as the injury-causing agent, when the child was passive in the same room, and when the child actively interacted with the agent. In an ANOVA these frequency differences were significant, $F(2, 252) = 78.89$, $p < .001$. As the table shows, the mothers anticipated injuries more often when the child was in the same room. However, that the child interacted with the agent did not seem to be necessary. Sex and age differences failed to reach significance.

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Table 2 about here

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## *Study 2*

### *Sample*

Another 72 mothers were randomly selected from the same population of mothers living in Umeå, Sweden. Equally many of the mothers' children were firstborn boys and girls who were 1, 2 and 3 years of age. Twenty two (31%) mothers were replaced either because they were inaccessible or because they refused to participate.

### *Procedure*

The procedure was essentially the same as in Study 1. Interviews were conducted in the mothers' homes by one of three trained, female students. After general questions, sets of vignettes were presented in three sessions with two other sessions interpolated in between. The interpolated sessions were intended to prevent the mothers from remembering how they responded to the vignettes in the preceding session(s).

The mothers were asked to respond to vignettes which described a potential injury to their child. Different types of injury included being caught, burns, electrical injuries, falls, poisonings, and suffocations. As Table 3 shows, there were three different vignettes of each. They all had the general form of a statement about a potentially injury-causing agent being present in the environment, the child attending to it, and the child interacting with it. The child's relation to the injury-causing agent was manipulated by decomposing the vignettes into three parts, one consisting only of the statement that the injury-causing agent is present, another one consisting of that statement as well as the second one that the child attends to the injury-causing agent, and the third one consisting of all three statements. The three parts into which each vignette in this way was decomposed were presented in different sessions to each subject. Order of presentation was counterbalanced in a way which guaranteed that, across subjects in each subgroup, all vignettes were

presented equally often in each session. Order was otherwise individually randomized.

Table 3 about here

The mothers responded to each vignette by first rating on a 9-point numerical scale ranging from 0 (also defined verbally as not at all) to 8 (verbally defined as very much) how likely they perceived injury to their child. After that they indicated in their own words what injury they anticipated. The interviewers recorded verbatim the mothers' ratings as well as answers to the questions.

In all, the interviews lasted for approximately 90 minutes. After their completion the mothers were paid and debriefed.

*Results*

In 51% of all vignettes the mothers anticipated an injury, and in 90% of these cases they were also accurate in their anticipations. Further analyses of the results were confined to the number of accurately anticipated injuries.

An analysis of variance (ANOVA) indicated that there were differences in how frequently the different types of injuries were anticipated, $F(5,330) = 25.09$, $p < .001$, and that these differences were modified by the child's age, $F(10,330) = 5.89$, $p < .001$. As revealed by Tukey post hoc tests at $p < .05$, suffocations, poisonings, and injuries resulting from being caught all changed from being frequently anticipated by the mothers of the youngest children to being reliably less frequently anticipated by the mothers of the older children. In contrast, burns, falls, and electrical injuries were anticipated with almost the same frequency.

Significant interactions were also found between injury type and when the injury was anticipated, $F(4,132) = 5.18$, $p < .001$, and between both these factors and the child's age, $F(20,660) = 2.29$, $p < .001$. Although the differences were

attenuated for the 2- and 3-year-olds because their mothers anticipated fewer injuries (see Table 4), for each age group Tukey tests at $p < .05$ confirmed the following differences in when the injuries were anticipated. Firstly, suffocations were anticipated early since no reliable increase was found when the vignettes described the child as being present either without interacting with or interacting with the injury-causing agent. Secondly, poisonings were anticipated slightly later. In this case the increase was reliable when the child was present without interacting with the injury-causing agent. Thirdly, suggesting that burns and falls were anticipated even later, reliable gradual increases were in these cases observed from when the child was absent to when the child was present without interacting with the agent and from the latter to when the child was present interacting with the injury-causing agent. Finally, being caught and electrical injuries were anticipated late. Not until the child interacted with the injury-causing agent did the frequency with which these types of injuries were anticipated increase reliably.

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Insert Table 4 about here

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The ratings of risk of injury yielded similar results as the number of anticipated injuries did (Table 5). Another ANOVA on the ratings again indicated that the differences due to injury type were reliable, $F(5,330) = 42.16$, $p < .001$. Injury type and child's age also interacted reliably, $F(10,330) = 3.96$, $p < .001$. In all age groups, the risk of burns were rated to be the highest. Risk tended furthermore to decrease similarly across age for all injury types, but Tukey tests showed at $p < .05$ that the decrease was only reliable for burns, poisonings, suffocations, and injuries resulting from being caught.

The effect of injury type on the risk ratings was reliably modified by the child's relation to the injury-causing agent, $F(4,132) = 3.05$, $p < .05$, and by both this factor and the child's age, $F(20,660) = 2.50$, $p < .001$. Tukey tests showed

($p < .05$) that, except for suffocations and being caught, the increase of risk was in all age groups gradual from when the child was absent to when the child was present without interacting with the injury-causing agent and from the latter to when the child was present interacting with the agent.

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Insert Table 5 about here

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*Discussion*

A main finding emerging from the present studies was that, in the home environment, mothers anticipate injury to their 1 to 3 years old children before the child interacts with the injury-causing events. Thus, as the results of Study 1 suggested, the mothers were in a majority of cases able to interfer in the injury-causing events, thereby preventing the child from being hurt. Although Study 1 did not find any differences depending on type of injury, such differences were observed in Study 2. In particular, electrical injuries and injuries resulting from being caught differed from the others. Since the former is both serious and was anticipated late, the present results are important to consider in attempts at preventing injuries in home environments. For example, mothers may need to learn about the temporal characteristics of events which are likely to lead to electrical injuries.

In Study 2 the frequency with which mothers identified a potential injury also varied with the child's age. Of particular interest is to note that the mothers of 1, 2, and 3-years-olds, on average, anticipated injury in roughly 60%, 50%, and 40% of the vignettes. These figures are slightly lower than the proportion of anticipated injury relative to actual, unanticipated injury/near-injuries in Study 2. To account for this difference as well as the decrease with age, it is plausible to assume that the mothers took into account both the perceived injury potential of the event and knowledge of their child's safety skills. It is not unlikely, however, that mothers

overestimate the latter (Svensson-Gärling, Gärling, & Valsiner, 1985), thus suggesting a possible contributing cause of injury to at least the older children. Another factor which may partly account for the difference is that the mothers presumably assumed that they were supervising the child when responding to the vignettes. Gärling and Gärling (1993) found that supervision reduced perceived risk.

A question deserving further attention is what makes possible for mothers to early anticipate injury to their children? One requirement appears to be that one is able to perceive an agent as injury causing. The more previous experience the mothers have of the injury-causing agent, the more accurate their perceptions of it should be. Thus, that infrequent injuries are not anticipated is explainable. There may also be biases in mothers' ability to remember previous injuries, depending on their recency and saliency (Svensson-Gärling et al., 1985). On the other hand, some injury-causing agents (e.g., a newly used iron) may be more salient threats than others (e.g., a potted plant) because of an understanding of the harm they cause. Another factor appears to be whether or not the presence of the injury-causing agent is part of daily routines. For instance, the threat of a hot teapot, left as usual on the table, may go undetected, whereas the threat of an open guitar case may not since leaving it open is not routine.

The ratings of risk changed more gradually in Study 2 with the proximity of the child to the injury-causing agent. This result may simply follow from how the ratings were related to the anticipations of injury. Obviously, if the mothers did not anticipate an injury, they would perceive no risk. However, if they did, the risk was not necessarily rated maximally high until the child interacted with the injury-causing agent. In effect, the more gradual change reflects that the mothers took into account information about the child's proximity to the injury-causing agent.

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TABLE 1

Frequency of Unanticipated Injury/Near-Injury and Anticipated Injury (Study 1)

| Unanticipated Injury/Near-Injury (n=345) | Anticipated Injury (n=612) |
|---|---|
| Falls (195) | Falls (310) |
| Hurting oneself on something (75) | Cuts (97) |
| Being caught (33) | Burns (65) |
| Pulling something down (20) | Pulling something down (43) |
| Burns (9) | Being caught (30) |
| Cuts (6) | Hurting oneself on something (27) |
| Poisonings (4) | Poisonings (21) |
| Suffocations (2) | Suffocations (18) |

TABLE 2

Mean Frequency of Anticipated Injury As Related to Proximity of Injury-Causing Agent (Study 1)

| Group | Child absent | Child present | |
|---|---|---|---|
| | | Passive | Active |
| Mothers of 1-year-olds | | | |
| Boys (n=27) | 1.26 | 4.62 | .26 |
| Girls (n=27) | .63 | 2.33 | .15 |
| Mothers of 2-year-olds | | | |
| Boys (n=24) | .29 | 2.67 | .21 |
| Girls (n=24) | .67 | 3.54 | .21 |
| Mothers of 3-year-olds | | | |
| Boys (n=24) | .58 | 3.42 | .00 |
| Girls (n=24) | .83 | 2.67 | .00 |

# TABLE 3

## Vignettes Presented to Mothers in Study 2

| |
|---|
| BEING CAUGHT |
| A drawer is left open which the child notices and tries to close |
| A door is left open which the child notices and tries to close |
| An open guitar case is on the floor which the child notices and tries to close |
| BURNS |
| A hot teapot is on the table which the child notices and tries to reach |
| A newly used iron is on the table which the child notices and tries to reach |
| A hot coffeepot is on the table which the child notices and tries to reach |
| ELECTRICAL ACCIDENTS |
| A chord to the reading lamp is unplugged which the child notices and tries to connect |
| An unplugged vacuum cleaner is on the floor which the child notices and tries to connect |
| A lamp in the book shelter has no bulb which the child notices and tries to reach |
| FALLS |
| Leaflets are on the floor which the child notices and tries to ran over |
| The child's towel hangs over the toilet which the child notices and climbs the toilet to reach |
| The child's pacifier is on the book shelter which the child notices and climbs a chair to reach |
| POISONINGS |
| A box of washing detergent is on the floor which the child notices and tries to open |
| A potted plant is on the floor which the child notices and tries to reach |
| The trash on the floor contains cigarette-ends which the child notices and tries to reach |
| SUFFOCATIONS |
| A plastic bag is on the table which the child notices and tries to reach |
| Grapes are in the basin which the child notices and tries to reach |
| A bag of peanuts is on the table which the child notices and tries to reach |

# TABLE 4

## Mean Number of Correctly Anticipated Injury As Related to Child's Proximity to Injury-Causing Agent (Study 2)

| | 1-year-olds | | | 2-year-olds | | | 3-year-olds | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Child present | | | Child present | | | Child present | |
| Type of injury | Child absent | Passive | Active | Child absent | Passive | Active | Child absent | Passive | Active |
| Being caught | 1.7 | 1.8 | 2.1 | 1.0 | 1.0 | 1.2 | 0.8 | 0.7 | 1.0 |
| Burns | 1.8 | 1.9 | 2.1 | 2.1 | 2.3 | 2.3 | 1.9 | 2.1 | 2.5 |
| Electrical accidents | 0.9 | 1.0 | 1.6 | 0.8 | 0.8 | 1.4 | 0.8 | 0.9 | 1.1 |
| Falls | 0.6 | 1.9 | 2.2 | 1.1 | 1.3 | 1.6 | 0.9 | 1.1 | 1.5 |
| Poisonings | 1.3 | 2.0 | 2.1 | 0.9 | 1.3 | 1.4 | 0.2 | 0.5 | 0.7 |
| Suffocations | 2.0 | 2.0 | 2.1 | 1.3 | 1.1 | 1.3 | 0.9 | 0.9 | 0.8 |

# TABLE 5

## Mean Ratings of Risk of Injury As Related to Child's Proximity to Injury-Causing Agent (Study 2)

| | 1-year-olds | | | 2-year-olds | | | 3-year-olds | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Child present | | | Child present | | | Child present | |
| Type of injury | Child absent | Passive | Active | Child absent | Passive | Active | Child absent | Passive | Active |
| Being caught | 2.12 | 2.07 | 2.18 | 0.88 | 1.29 | 1.14 | 0.61 | 0.60 | 0.88 |
| Burns | 3.31 | 3.49 | 4.01 | 3.60 | 4.06 | 4.76 | 2.22 | 2.14 | 3.29 |
| Electrical accidents | 1.76 | 2.28 | 2.24 | 1.43 | 1.46 | 2.24 | 1.10 | 1.39 | 1.51 |
| Falls | 0.71 | 2.44 | 2.85 | 1.11 | 1.43 | 1.90 | 0.74 | 1.00 | 1.63 |
| Poisonings | 1.93 | 3.19 | 3.81 | 1.62 | 2.24 | 2.75 | 0.29 | 0.68 | 0.96 |
| Suffocations | 2.28 | 2.61 | 2.57 | 1.82 | 1.81 | 1.82 | 0.86 | 0.89 | 0.89 |