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Responsibility allocation for child injury: victim age and positive vs. negative framing of manufacturer's safety policy

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Two experiments examined allocation of responsibility in the context of a fictitious, but realistic, product-use scenario in which a young girl suffers serious brain injury after consuming a product with a non-obvious hazard (marshmallows). The research investigated whether the responsibility allocated to the various parties would depend on the age of the child and whether the manufacturer took, or failed to take, precautions. Scenarios given to participants stated the age of the girl as $1\frac{1}{2}$ years, 4 years, 8 years, or 16 years and had positive, negative, or no supplemental information about the manufacturer and its safety practices. Both experiments showed that the parents were considered most responsible for a young child's injury, but the allocation decreased with the older child. When negative information about the manufacturer's safety practices was given, allocations of responsibility for the girl's injury to the manufacturer increased significantly. In Experiment 2, the presence of warnings in the positive supplemental information condition reduced the manufacturer's responsibility for the oldest (16-year old) child. Negative impressions due to poor safety practices by manufacturers can lead to increased levels of responsibility allocated for injury. Primary caretakers are responsible for the safety of young children, but as they get older, children are viewed as being more responsible for their own safety. These results have implications for product-development decisions including labelling. They also point out a role for human factors professionals before and during product-related forensic litigation.

Keywords: responsibility allocation; child injury; warnings; litigation; framing

1. Introduction

The processes by which people assign blame and responsibility for injuries sustained during the use of, or exposure to, consumer products have been of interest to researchers examining jury decision-making (e.g., Walster 1966; Wilson and Jonah 1988). Within the human factors/ergonomics (HF/E) area, this interest has increased, at least partly, because of an increased demand for consultants and expert witnesses in product liability cases (e.g., Kalsher, Wogalter, and Williams 1999; Laughery, Lovvoll, and McQuilkin 1996; Lovvoll et al. 1996). Research in this area has generally focused on two main questions: (1) what factors determine how people assign responsibility and blame for injuries? and (2) how are the various entities, including those associated with the production, distribution, or use of consumer products, viewed in terms of responsibility for safety? Finding answers to these questions is of both theoretical and practical importance. From a theoretical perspective, understanding how responsibility is allocated to different parties sheds

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light on lay theories of causality (Shaver 1985). From a practical perspective, such research may provide insight into how people view responsibility for safety, which could have implications for safety practices and programmes.

Current research indicates that responsibility judgments are highly sensitive to contextual information. As a consequence of the variability associated with context, responsibility judgments have been found to be relatively unstable across people and settings (e.g., Karlovac and Darley 1988; Walster 1966).

One aspect of the injury context that has been relatively overlooked in previous research is the nature of the hazard, particularly its obviousness. Some of the dangers associated with certain products (e.g., scissors or chain saws) are salient and obvious to most observers. Salient hazards are 'open and obvious' when all adults and older children know the hazards, (e.g., points and sharpness of scissors). Dangers of many other kinds of products are less obvious and may not be known by many consumers. The obviousness of the hazard might affect not only the type and extent of precautionary behaviour by consumers, but also the allocation of responsibility for injuries. Indeed, results reported by Laughery, Lovvoll, and Wogalter (1995) suggested that injuries from highly hazardous, but also 'open and obvious' risks (e.g., chain saws, cutting torches), are considered less the responsibility of manufacturers as opposed to consumers. The purpose of the present research is to examine the impact of contextual information on allocations of responsibility for injuries sustained from using a consumer product with a non-obvious hazard. The product used in the present research is the marshmallow, as it has the hazard of potential blockage of the windpipe, particularly in children. We show later that this product has characteristics that are not apparent and obvious to most people.

Research on decision-making is important to HF/E professionals because of its pertinence to how people interact with products. Manufacturers have the responsibility of providing reasonably safe products, and so may need to use hazard control strategies, such as designing out, guarding against, or warning about dangers so as to avoid user attributions that their product is unsafe. With unsafe products, there could be personal injury and property damage, and potentially legal liability. HF/E professionals are needed before such consequences occur to try to prevent them; but if they do occur, to reduce their harmful effects. Additionally, some HF/E professionals become involved as expert witnesses to provide information about human-related causes of accidents and injury and to offer empirically based opinions on human-interface topics such as warnings, displays and controls, and response time.

1.1 Cognitive factors in the attribution of responsibility

Previous research suggests that the context and an observer's understanding of the situation play important roles in decisions about responsibility for injuries. Some evidence indicates that lay people use information about the severity of the harm risked by an act and the precautions taken to minimise harm when attributing responsibility for injuries (e.g., Brewer 1977; Karlovac and Darley 1988). Karlovac and Darley (1988) suggest that two principles in particular guide the decisions that observers make about negligence. First, they attempt to reconstruct the foreseeability of harm as it appeared to various parties prior to the accident. If the foreseeability of the risk is judged to be high for a particular party, then that party is likely to be seen as negligent. Second, they assess the degree of care taken to prevent foreseeable risks and harms. The parties involved should be held less accountable for foreseeable injury events to the extent that they took reasonable and prudent steps to minimise its likelihood and severity. In four experiments, Karlovac and

Darley (1988) showed that negligence ratings decreased with the number of precautions taken. They also found that negligence ratings increased as a function of the severity of harm being risked and that negligence was higher when the risk was to children than to property. This latter finding is also consistent with other research (e.g., Bornstein 1998; Green, Jones, and Bowman 1999; Robbennolt 2000; Walster 1966), indicating that people are sometimes assigned more blame when the injury outcomes are severe than when they are mild, although other studies have failed to find the 'severity' effect (e.g., Green 1967; Thomas and Parpal 1987).

In sum, research suggests that people and other entities will be held responsible for an injury event to the extent that it was foreseeable and they failed to take adequate or reasonable precautions. However, it is less clear how severity of injury figures into the allocation process.

Some of the earliest responsibility-allocation research concerning negligence examined the attributions of blame to a single individual entity or target (e.g., a company) at a time. However, in actual product liability cases, multiple parties are frequently involved and each entity may be seen to some extent as negligent, or contributing, to the injury in some manner and to a greater or lesser degree. The specific actions (or non-action) of the manufacturer, distributor, and consumer of a product may each contribute to the likelihood and severity of an injury event. The actions of those present or summoned to the scene of the event (e.g., emergency and medical personnel) could also potentially contribute to the injury severity, as well as potentially other entities depending on the circumstances. Hence, the decisions concerning assignment of responsibility for an injury, and the extent of culpability for the entities involved, are more complex than the simple negligence cases studied in earlier research. Of particular interest is the question of how responsibility is allocated or spread among different parties under different circumstances or context. Based on previous research, responsibility allocations should depend to a large extent on the circumstances or context in which an injury event occurs. In the present research, one way that circumstances were manipulated was through information supplied about the age of the child involved in the injury. Another manipulation of context was the presence or absence of supplemental information about precautionary actions taken by the product manufacturer.

Support for a potential effect of these manipulations is supplied by Phoenix, Kalsher, and Champagne (1997) who used Kelley's (1972) theory of causal attributions to explain responsibility allocations for consumer product injuries. Participants read scenarios in which a person was injured during the use of one of the products. When the facts in the injury scenario evoked an 'internal' causal attribution – i.e., the injury appeared to stem from dispositional characteristics and actions of the injured person – they attributed most of the responsibility to that person. In contrast, when the facts in the injury scenario evoked an external causal attribution – i.e., the injury appeared to stem from factors external to the injured person – they allocated significantly less responsibility to the person, and more responsibility to the product manufacturer.

The power of the context in shaping culpability judgments can also be seen in instances in which jury awards for compensation and damages stemming from consumer product injuries contrast sharply with the public's lay theories concerning assignment of blame and appropriate compensation. Take, for example, the infamous McDonald's hot coffee case in which an older woman suffered serious burns when she spilled coffee obtained from the drive-through window onto her lap. The woman sued McDonald's and eventually received a settlement involving a large, but publicly undisclosed, award. Media reports of public reaction to this case showed that most people were dumbfounded

by the decision, questioning the basis for the conclusion of McDonald's negligence. After all, it was suggested, people understand that hot coffee is, well... hot. Yet there is more to this case than the negatively valenced sound bites that have been influential in furthering the agenda of entities touting tort reform, acceptance of personal responsibility, and the capping of punitive damage awards. However, in light of the research already mentioned, the apparent 'win' of the hot coffee victim is explainable. It is understandable if we allow for the possibility that contextual information about the event (extensive details about the event that jurors might have heard during the trial) served to channel jurors' attributions away from the injured victim and towards McDonald's. A field investigation by Kalsher et al. (1998) supports this reasoning. These researchers examined how participants allocated responsibility in fictitious scenarios based loosely on the McDonald's hot coffee case. Supplementary information intended to be either positive or detrimental to the company and its safety practices was either present or absent from the scenario. Information that portrayed the company's practices in a negative light indicated that the company regularly serves its coffee about 40° higher than home-brewed coffee and that it has not changed its safety procedures or improved its warnings despite numerous lawsuits filed against the company for burns sustained from spilled coffee. In contrast, when the same information was recast to place the company's safety practices in a more positive light, it informed participants that the company had responded to complaints by decreasing the temperature of its coffee and placing more effective warnings on its coffee cups. After reading the scenario and the supplementary information (if it was provided), participants were asked to indicate the amount of responsibility (in percentage terms summing to 100%) that should be allocated to the injured woman and McDonald's, respectively. Participants attributed significantly less responsibility to the consumer when the scenario was accompanied by information that placed McDonalds' policies and practices in an unfavourable light, compared to when positively framed or no supplementary information was provided. The supplemental information can be interpreted as having successfully influenced observers' perceptions of foreseeability and precautionary action: the company knew about the risks of its product and either did or did not take action to minimise the risk of injury to its customers.

In summary, past research shows the effects of context in allocation decisions. As Karlovac and Darley (1988) point out, 'an act itself cannot be judged negligent or non-negligent; it can only be judged as such in the context in which it was committed (p. 289).' An explanatory approach that has been successfully applied in the organisational justice area may be useful here. Cropanzano and Folger (1989) suggest that when deciding whether a decision is fair, people ask themselves whether better outcomes would have been attained if the decision maker had instead applied other procedures. An affirmative answer to this question is associated with perceptions of injustice. Analogous processes may occur for perceptions of negligence. The decision maker may ask the question: 'could or should the entity (e.g., consumer, manufacturer) have done something else, based on the risk's foreseeability, that would have prevented or minimised the chances of injury to self or others.' Perceived negligence should increase to the extent that this question is answered affirmatively.

1.2 Non-obvious 'hidden' hazards

The attribution of responsibility for injuries in which the hazards are non-obvious or unknown warrants special attention. In the legal setting, this condition is called a 'hidden hazard' which is defined as a potential risk associated with use or consumption of a

product in which the hazard is not obvious or not well known to or easily discovered by users or those affected. Note that this definition does not include the manufacturer because it is assumed that the manufacturer is in a superior position to discover the hazards and they are not hidden to them or at least should not be. There is a concept in the USA legal system that even if it cannot be proved that the manufacturer knew about the hazards, that because of their positioning or role in producing the product, they had the best opportunity to discover the hazardous propensities about the product. In other words, except in very rare circumstances, it is assumed that the manufacturer knew or should have known about the hazards. For example, in USA tort law the manufacturer is responsible for selling a 'safe' product and in litigation may need to show that it took steps to discover the hazards and attempted to control them by designing them out, guarding against them, or effectively warning about them, as this is a well-accepted hierarchical strategy of hazard control.

Product manufacturers are considered to have superior knowledge relative to the consumer. The term 'hidden' hazard is generally reserved to consumers and users of the product who as a group are likely less sophisticated about the product's danger than the manufacturer is assumed to be. When a product has hazards but they are not obvious to users, consumers may not take proper precautions to protect from harm when using or consuming the product, thereby increasing their chances of being injured. Thus, warnings are used to make the hazards known and thus more obvious.

The presence of a hidden hazard may also affect how observers attribute responsibility. When the hazard is hidden, users' foreseeability of being hurt is low. Hence, decision makers may be reluctant to hold the user responsible for their injury but rather may attribute more responsibility to the manufacturer. When the hazard is highly apparent the likelihood of getting hurt is reduced. Effective warnings serve the purpose of alerting about the hazard. In other words, warnings can potentially make hazards apparent. If manufacturer provided information in terms of well-designed warnings, then observers may shift responsibility towards the injured person, concluding perhaps that the injuries were the result of carelessness or recklessness on his or her part. Also, the amount of responsibility assigned to the injured person may be tempered as a function of personal characteristics. Able-bodied adults, who presumably have the knowledge and reasoning capacity to make sound judgments about risk, are likely to shoulder more of the responsibility for accidents involving non-obvious hazards than persons less able to make these types of judgments (e.g., young children, cognitively impaired individuals).

Some entities may not be attributed much responsibility even though they had involvement in the chain of custody or commerce involving the product. Entities involved simply in distribution might not be expected to absorb much responsibility unless they have greater involvement or the facts make them more relevant (e.g., Williams, Kalsher, and Wogalter 2006). Kalsher, Williams, and Viale (2003) suggest that distributors and retailers might be held to substantial responsibility if they did not pass on warning materials from the manufacturer (see also Kalsher, Williams, and Denio 2001). If the product has a hazard and the manufacturer has adequately warned about it, then the manufacturer might be considered to have fulfilled its responsibility or duty to warn about a hazard, and in doing so has shifted its responsibility (i.e., reduced it) to the user (who has thusly been adequately warned). In this case, one could expect less responsibility to be allocated to the manufacturer and more to the entity that was injured. If the party that is injured is seen as not capable of sound judgment, such as young children, then the caretaker such as the parent is responsible for safety. Able-minded individuals (including caretakers) would be

responsible for attending to informative and effective warnings that the manufacturer has put out to maintain safe use of the product.

If after an injury the data show that the manufacturer of a product with a hidden hazard took no efforts to warn effectively, then assignment of responsibility is likely to shift towards the manufacturer. In other words, observers should judge the manufacturer more blameworthy to the extent that it did not take precautionary action to prevent injuries. The extent to which responsibility is shifted may depend on the circumstances of the situation and the manufacturer's actions and safety policies. Kalsher et al.'s (1998) McDonald's study supports this. The negative information presented to observers indicated that the company did not take precautionary action to protect consumers from foreseeably injury despite considerable knowledge such as customer complaints. The significantly greater responsibility placed on the company in this condition is likely due to perceptions on the part of the participants that the manufacturer could have taken action to reduce the likelihood and severity of injury based on its foreseeability.

1.3 Present research

The objective of the present research is to examine how individuals allocate responsibility to various entities involved in a consumer product injury case that involves a hidden hazard. Two experiments are reported in which participants were asked to read one of several variants of a fictitious scenario in which a girl suffers serious brain damage after choking on a marshmallow taken from a package given to her by her mother. The girl's age and contextual information about the manufacturer's safety-related actions were manipulated in the scenarios. Contextual information was positive, negative, or absent with respect to the manufacturer based its safety practices. In the positive and negative contextual information conditions, the manufacturer clearly had prior knowledge of the hazards associated with its product (i.e., the risk was foreseeable) and either it took precautionary action to reduce the risk, including the action of adding a product warning to the packaging, or it did not take any precautionary action. Marshmallows were chosen as the 'carrier' product for this study for several reasons. First, two of the authors previously worked on a case involving marshmallows in which a young girl was asphyxiated by a marshmallow lodged in her windpipe. There is a real hazard of marshmallows and the authors were aware of the facts concerning the hazardous nature of this consumer product. Second, marshmallows' hazards are largely 'hidden' since most adults would not consider them dangerous. Third, medical evidence suggests that marshmallows pose a special hazard to children under the age of 4 because they lack the physical coordination to masticate (chew) well; that is, young children do not chew food completely before swallowing. Finally, the marshmallow product also possesses several characteristics that make them especially dangerous to children: (1) they are sweet, and therefore attract children; (2) they are often marketed to children; (3) marshmallows appear soft, and therefore, innocuous; (4) marshmallows become stickier and swell when they contact the moisture present in the mouth and throat; (5) marshmallows are light and can therefore be easily inhaled into the respiratory system, and (6) an aspirated piece of marshmallow continues to expand after entering the airway, thereby making it very difficult to dislodge (e.g., Rothman and Boeckman 1980).

We predicted that contextual information about the safety practices of the manufacturer would influence responsibility assigned to the various parties involved in the injury event. In other words, contextual information should interact with the target being evaluated (child, parent, manufacturer). We also predicted that responsibility assigned to the

manufacturer should be highest relative to all other entities when contextual information indicates that the manufacturer, having knowledge of the potential risk of its product, did not take precautionary action to warn consumers. Second, when the victim is unable to make decisions to avoid hazards (e.g., a young child) then observers will hold those individuals involved in the care of the child (e.g., parents) most responsible for the injuries. However, if the victim is able to make decisions (e.g., an older child) then more responsibility will be assigned to the victim. In other words, the amount of responsibility assigned to the injured person will be tempered as a function of ability to avoid the hazard. Able-bodied individuals (e.g., older children and parents of young children) who presumably have the knowledge and reasoning capacity to make sound judgments about risk are likely to shoulder more of the responsibility for accidents involving hazards than people less able to make these types of judgments (e.g., young children).

2. Experiment 1

This experiment examines the effects of type of supplemental information (framing: positive, none, and negative), source of responsibility, and age of an injured child in a scenario involving an injury by a non-obvious 'hidden' hazard on participants' allocations of responsibility. In addition, the presence of an actual warning or textual description of a warning in the positive frame condition was also examined.

2.1 Method

2.1.1 Participants

A total of 225 individuals participated: 138 were males (M age = 22.2 years; SD = 8.5), and 86 were females (M age = 24.0 years, SD = 10.5). Of these, 166 were undergraduate students (M age = 19.9; SD = 5.9) at a private university in the Northeastern USA; the remaining 59 participants were non-student volunteers (M age = 36.3; SD = 11.7) from the surrounding community. The majority of the student sample (69%) was male, whereas the majority of the non-student sample (58%) was female. Given the demographic differences between the student and non-student samples, analyses were conducted to test for significant differences between the samples on the study variables. Analyses (i.e., t-tests) performed on the mean differences for all study variables revealed only one significant difference: the non-students (M = 18.12; SD = 29.04) were less likely than the students (M = 26.65; SD = 27.71) to hold the child victim responsible for injuries, $t(220) = 1.99$, $p < .05$). The non-student sample was older and included more parents and thus may have been more sensitive to children's capabilities. Further analyses revealed that student vs. non-student status did not moderate any of the significant effects reported below. Overall, the differences between students and non-students were judged to be slight and hence the two samples were combined into one larger sample in order to maximise statistical power.

2.1.2 Pre-scenario survey

After they had read and signed a consent form, participants were asked to complete a consumer product survey that assessed their experience with the product (marshmallows), their perceptions concerning the hazards associated with handling and consuming it, and the likelihood of being injured by the product. These items were measured on seven-point Likert-type scales.

2.1.3 Scenarios

After they had completed the pre-scenario survey, participants were asked to read a fictitious product-use scenario in which a young girl named Amy Lyons chokes on marshmallows given to her by her mother. Despite efforts by her parents to dislodge the obstruction, it is not removed until paramedics arrive on the scene. The extended period of oxygen deprivation results in permanent brain damage. Upset by the incident, Amy's parents take legal action against the company that manufactured the marshmallows, the grocery store that sold the marshmallows, and the paramedics who treated Amy. Several versions of the scenario were created that differed in the following ways. First, Amy Lyons is described as being one of four ages: (a) a $1^1/_2$-year old, (b) a 4-year old, (c) an 8-year old, or (d) a 16-year old.

Second, supplementary information on the actions of the manufacturer was either provided following the scenario or it was not. When it was present, the information cast the manufacturer (Vantage Food Corporation – a fictitious company) and its practices in either a favourable or unfavourable light with regard to precautionary actions (positive vs. negative framing, respectively). The supplementary information was presented in vignette format (approximately 600 words) in a separate section labelled 'Relevant Facts'. The Relevant Facts section contained a number of statements about the special hazards associated with marshmallows, along with specific information about Vantage Food Corporation's safety practices. Each version of the relevant facts indicated that evidence of choking hazards associated with certain types of food has been published in medical journals, such as the *JAMA,* the *Journal of the American Medical Association*, for 20 years, and that the company was aware of statistics showing that nearly 90% of food-related choking deaths occur in children under the age of 4. The *positively framed version* of the 'Relevant Facts' stressed that in response to this evidence, the company took two steps to alert its customers to the potential choking hazard posed by marshmallows: (1) it provided a warning on its packaging, and (2) prior to implementation of a television marketing plan that targeted young children, it conducted a nationwide information campaign aimed at heightening parents' awareness of the choking dangers associated with marshmallows and similar foods. In order to explore whether seeing an actual warning would affect responsibility allocations over and above just knowing that a warning was used, a sample warning supposedly used by the manufacturer was attached to half of the positively framed scenarios. The warning included a black and white pictorial symbol of a child choking.

The *negatively framed version* of the 'Relevant Facts' indicated that the company did *not* provide a warning on its marshmallow packages. Furthermore, it was mentioned that the manufacturer intended to heavily market their product to young children by sponsoring certain Saturday morning children's TV shows. It was also mentioned that Vantage Foods Corporation had not developed or distributed any information materials that warn of the hazards associated with marshmallows.

Thus, participants in the positive and negative frame conditions were presented with the same facts about the dangers associated with the product. The exception is that participants in the positive condition read that the manufacturer took two precautions (warning and information campaign) to alert consumers about the hazards, whereas participants in the negative condition read that the manufacturer took neither precaution. A control condition without this information was also included.

2.1.4 Post-scenario survey

After they had read the scenario and the supplementary information (if it was present), participants were asked to allocate responsibility for the injury (in percentage terms, summing to 100%) to each of several entities, including: (1) Amy Lyons (the injured child), (2) Amy's parents, (3) Vantage Food Corporation (the manufacturer), (4) Food Super Savers (the fictitious grocery chain whose stores sold the marshmallows), and (5) the paramedics who treated Amy. Finally, items requesting basic demographic information were included. Later, participants were debriefed and thanked for participating.

2.2 Results

2.2.1 Risk perceptions

Preliminary analyses were conducted on responses to items on the pre-scenario survey that assessed the extent to which participants perceived the product (marshmallows) to be hazardous. Participants perceived low risk associated with eating marshmallows. The mean hazard rating (on a scale from 0 = no risk to 6 = high risk) was 0.98, and the mean expected severity of injury was 1.02 (on a scale from 0 = no injury to 6 = severe injury). Thus, prior to experimental manipulations, the risk of choking can assumed to be relatively 'hidden' from participants.

2.2.2 Allocation of responsibility

Initial analyses compared the two positive frame conditions (showing a warning vs. describing the warning). No significant difference was found using the responsibility assignment data or in any other analysis involving other variables; hence, the two positive scenario conditions were combined in the analyses described below.

Allocation of responsibility was analysed using a 5 (source of responsibility: Amy, Amy's parents, the grocery store, the manufacturer, and the paramedics), X 3 (type of Supplementary Information: positive frame, negative frame, and no information), and X 4 (age of injured person: $1\frac{1}{2}$ years, 4 years, 8 years, and 16 years) mixed-model design with source of responsibility as the within-subjects factor, and the others, between-subjects variables. This analysis was based on responses from 212 participants; 13 participants did not furnish complete data and were dropped from the analysis. The dependent measure in this analysis consists of the percentage of responsibility allocated, which sums to 100% across the five entities or sources of blame. Such data are ipsative in nature, which raises a possible concern about violations of the assumption of homogeneity of the variance–covariance matrix for repeated-measures analysis of variance (ANOVA). However, in a Monte Carlo study testing the extent to which ANOVA is affected by ipsative data, Greer and Dunlap (1997) found that ANOVA was virtually unaffected. Nonetheless, to guard against any potential inflation of Type I error, the Greenhouse–Geisser epsilon correction for degrees of freedom was applied. The significance levels presented below are based on this correction.

The means for this analysis are presented in Table 1. Results revealed a significant main effect of source $F(4,852) = 147.69$, $p < .01$, $\eta^2 = 0.41$, a significant Source X Type of Information interaction, $F(8,852) = 5.03$, $p < 0.01$, $\eta^2 = 0.05$, and a significant Source X Age of Injured Person interaction, $F(12,852) = 6.23$, $p < 0.01$, $\eta^2 = 0.08$.

Table 1. Mean responsibility ratings (Percentages) by source of blame, age of injured person (Amy), and type of supplemental information (Experiment 1).

	Positive information				
Source of blame	1½ years	4 years	8 years	16 years	Mean
Amy	17.26 (25.9)	5.77 (7.4)	21.48 (24.1)	39.00 (32.0)	20.85 (26.6)
Amy's parents	68.11 (28.6)	65.92 (27.2)	55.18 (28.7)	33.69 (25.2)	55.84 (30.4)
Manufacturer	12.70 (16.5)	22.15 (24.4)	18.70 (20.3)	20.96 (24.9)	18.58 (21.7)
Store	1.00 (3.9)	3.46 (6.7)	1.30 (4.3)	2.65 (4.9)	2.08 (5.1)
Paramedics	0.93 (3.9)	2.69 (7.6)	3.33 (7.7)	2.73 (8.3)	2.42 (7.0)
	No information (control)				
Amy	17.00 (22.0)	31.25 (32.6)	33.50 (30.3)	59.29 (29.4)	36.81 (32.1)
Amy's parents	63.00 (27.0)	52.08 (28.5)	50.00 (30.9)	31.07 (24.2)	47.84 (29.3)
Manufacturer	16.80 (20.3)	13.75 (16.9)	12.17 (18.5)	8.21 (21.4)	12.36 (19.0)
Store	3.20 (6.3)	2.91 (6.2)	4.33 (7.3)	0.71 (2.7)	2.78 (5.8)
Paramedics	0.00 (0.0)	0.00 (0.0)	0.00 (0.0)	0.71 (1.8)	0.20 (1.0)
	Negative information				
Amy	13.81 (15.8)	24.33 (35.1)	29.40 (27.9)	15.91 (14.6)	21.35 (25.7)
Amy's parents	51.88 (26.6)	45.00 (36.1)	48.53 (28.6)	35.00 (24.5)	45.71 (29.4)
Manufacturer	29.02 (24.6)	21.53 (19.5)	15.20 (15.9)	34.55 (22.5)	24.31 (21.3)
Store	4.50 (6.7)	7.07 (11.9)	6.87 (12.8)	11.82 (11.9)	7.31 (11.6)
Paramedics	0.00 (0.0)	2.00 (5.6)	0.00 (0.0)	2.72 (6.5)	1.09 (4.2)

Note: Standard deviations are given in parentheses.

All other effects were non-significant. For the source main effect, post-hoc pair-wise comparisons using a modified Bonferoni correction procedure to protect against Type 1 error revealed that the parents were held significantly ($ps < 0.05$) more responsible ($M = 50.2$) than all other parties, and that Amy ($M = 24.2$) and the manufacturer ($M = 18.5$) did not differ from one another in terms of responsibility, but were held significantly more accountable than the grocery store ($M = 3.8$) and the paramedics ($M = 2.1$). The latter two did not differ significantly from one another. Relatively low allocations for the retailer have been found in previous research involving the intermediate parties in the chain of commerce distribution chain. As far as we know, this study was the first to examine the allocations to an emergency rescue source. The relatively low allocation given to the paramedics probably reflects that not much information (such as positive and negative aspects) was given in the scenarios about their standard of performance.

The Source X Type of Supplementary Information interaction indicated that comparative responsibility judgments vary as a function of contextual information. Inspection of the means along the rightmost column in Table 1 shows that the greatest responsibility was consistently placed on the parents in all three supplemental information conditions. In the negative frame condition, the manufacturer received the second highest mean responsibility allocations in the negative frame condition, whereas in the no-information (control) condition, Amy received the second highest blame. The positive frame was intermediate.

Since these results were at least partially supportive of our prediction that the negative context condition would result in greater blame to the manufacturer, additional analyses were conducted with respect to the manufacturer allocations. A 2 (manufacturer vs. others) X 3 (Supplemental Information) interaction contrast was statistically significant, $F(2,222) = 5.02$, $p < 0.01$, with the specific pattern indicating that responsibility

assigned to the manufacturer relative to others was higher in the negative information condition ($\psi_{diff} = 5.9$) compared to the control ($\psi_{diff} = -9.4$) and positive information conditions ($\psi_{diff} = -1.5$). Additionally, the simple main effect of information was significant for responsibility to the manufacturer, $F(2,222) = 4.87$, $p < 0.01$. Comparisons showed that manufacturer's responsibility was significantly higher in the negative condition ($M = 24.0$) than in the control condition ($M = 12.0$; Bonferoni-adjusted $p < .05$), but that the difference between the positive vs. control conditions was not statistically significant.

Subsequent analyses of the significant Source of Responsibility X Age of Injured Child interaction revealed that the responsibility assigned to Amy and her parents varied significantly with Amy's age. The other entities' responsibility assignments were relatively constant across Amy's age. Amy's responsibility increased from 15.6% for the $1^1/_2$-year-old Amy to 36.9% for the 16-year-old Amy, $t(221) = 4.53$, $p < 0.001$. The percentage blame assigned to Amy's parents showed a decrease with the child's age, from 62.2% for the $1^1/_2$-year-old Amy to 32.1% for the 16-year-old Amy, $t(221 = 5.56$, $p < 001$.

2.2.3 Risk perceptions and allocation of responsibility

Additional analyses were conducted on the relationship between risk perceptions of marshmallows and allocation of responsibility for injuries. Only two were significant. People who gave higher attributions of responsibility to the manufacturer were participants who: (a) reported eating more marshmallows, $r = .21$, $p < 0.01$, and (b) believed the severity of injury from eating marshmallows to be greater, $r = 0.14$, $p < 0.05$.

2.3 Discussion

The main finding of this experiment is that people's responsibility allocations for a child's injury from a non-obvious 'hidden' hazard are affected by the way in which details of the situation are presented. The significant Source X Type of Supplemental Information interaction showed a pattern indicating that people use information about manufacturer's untaken precautions in the negative frame condition to assign greater responsibility for injury to the manufacturer. More specifically, when participants were given information that the manufacturer did not act on knowledge that the product is potentially harmful, they assigned significantly greater responsibility to the manufacturer than they did in the no-information (control) condition, apparently believing the manufacturer to be negligent in its safety practices by failing to act in a sufficient way to protect consumers. In fact, responsibility attributed to the manufacturer in the negative frame condition was double that assigned to the manufacturer in the control condition. Judgments about the extent of fault increased with respect to the manufacturer when it did not take action to reduce the occurrence of injury.

Even with the variation of assignments to the manufacturer depending on the supplemental information condition, Amy's parents always received the most responsibility. This is interesting even though in two of the three framing conditions (negative and the no-information control) the parent would not have an opportunity to know that the product was dangerous to children. Indeed, the participants did not believe that at the outset the product was hazardous. Perhaps when people think a product to be generally harmless, they tend to hold manufacturers less at fault, and instead assign the majority of the responsibility elsewhere – in this case, to the parents – at least for the victim when

portrayed at younger ages. One explanation for this finding is that when hazards are hidden from observers, they may not envision scenarios by which different actions by the manufacturer would have reduced the chances of the accident occurring. In the absence of such counterfactuals, there may be more of a tendency to blame the victims.

The percentage of responsibility affixed to Amy increased linearly with age. Correspondingly, the inverse was true with respect to Amy's parents. With increasing age there is less responsibility allocated to the child's parents. These results support previous findings with regard to child injury (e.g., Laughery, Lovvoll, and McQuilkin 1996; Resnick, Zanotti, and Jacko 1997; Resnick and Jacko 1998).

Providing participants with positive information about the manufacturer's policies and practices (e.g., that it took precautionary action by including a well-designed warning on the product's package) did not significantly affect the responsibility allocated to the manufacturer relative to the other conditions. The trend of the means indicated that the level of responsibility attributed to the manufacturer in the positive condition was lower than that assigned in the negative condition, but it was higher than the control condition. However, none of these differences were significant. Thus, these results did not show a clear-cut benefit for manufacturers taking precautionary action. Nevertheless, the failure to do so (as in the negative frame condition) had a much greater influence on the allocations.

Confidence in these results would be strengthened by replication. Therefore, a second experiment was conducted with one goal being to support these findings. A second objective was to examine whether different kinds of warnings presented in the positive frame condition might affect the allocations. Previous research has suggested that 'good' warnings (i.e., ones that have features such as colour and pictorials) may reduce allocations of responsibility allocated to the manufacturer and correspondingly increase the allocations given to the injured party (Laughery et al. 1998). We predicted that the presence and type of warnings in the positive frame condition would reduce the responsibility allocation to the manufacturer.

3. Experiment 2

One objective of Experiment 2 is to replicate and support the findings of Experiment 1. A second objective is to examine whether enhancing the warning in the positive frame supplemental information conditions would decrease responsibility allocations to the manufacturer and correspondingly increase the allocations to the consumer.

Moreover, it was expected that as a child gets older and is more cognitively aware and able to process complex information, such as information pertaining to products, they should absorb more responsibility for their injury than a younger child whose parents would likely be held responsible. An effect of warnings was not found in Experiment 1, but it might have been due to the fact that the manipulation was insufficiently powerful to produce an effect. In the Experiment 2, the warnings viewed by different subgroups of the positive frame condition had features that have been shown in previous research to enhance warning effectiveness, such as colour and pictorials (e.g., Laughery and Smith 2006; Laughery, Wogalter, and Young 1994; Wogalter, Young, and Laughery 2001; Young and Wogalter 1990) and multiple panels (Dewar and Arthur 1999; Kalsher et al. 2000; Williams et al. 2000). Low-perceived product hazard (applicable to marshmallows as confirmed in Experiment 1) hurts warning effectiveness (Wogalter, Brems, and Martin 1993; Wogalter et al. 1991) and so having beneficial features in the warning might produce a greater impact on allocations.

3.1 Method

The specific manipulations were nearly identical to Experiment 1 except that the relative effectiveness of different warnings used in the positive frame condition was also examined.

3.1.1 Participants and procedure

A total of 95 undergraduate students (M age = 18.0 years, SD = 0.46) at a private university in the Northeastern USA participated. Seventy-five percent of the sample was male. The materials and procedures were nearly identical to those used in Experiment 1. One exception was that in the positive context condition, the warning presented in the Relevant Facts sections was varied. The warning was varied to be either a single-frame (static) pictorial depicting a person choking or a multiple-frame (dynamic) pictorial that depicted a choking sequence from Kalsher et al. (2000). In addition, the pictorial was either printed in black-and-white (no colour) or in colour. Other additions were that participants reported their education level and were asked whether they have ever choked in the past or observed someone else choking.

3.2 Results

As in Experiment 1, participants perceived low risk associated with eating marshmallows. The mean hazard rating (on a scale from 0 = no risk to 6 = high risk) was 1.44 and the mean injury severity rating was 0.83.

3.2.1 Allocation of responsibility

The means are shown in Table 2. Once again, the parents were assigned more responsibility for the child's injury. Depending on the type of supplemental information condition, either Amy or the manufacturer received the second most responsibility. This pattern was confirmed by a significant Source of Responsibility X Type of Supplemental Information interaction, $F(8,332) = 3.77$, $p < 0.01$, $\eta^2 = 0.08$. Contextual information influenced responsibility allocated to both the manufacturer, $F(2,83) = 7.06$, $p < 0.01$, and to Amy, $F(2,83) = 5.88$, $p < 0.01$. Bonferoni-adjusted comparisons among the means (shown in Table 3) indicate that the percentage of responsibility allocated to the manufacturer was significantly higher in the negative frame condition than in the no supplemental information (control) and positive frame conditions, ps < 0.01. Responsibility allocated to the manufacturer dropped in the positive information condition as compared to the control condition, but this change was not statistically significant. Amy's responsibility was significantly lower in the negative frame condition than in the control or positive conditions, ps < 0.01. Thus, the negative frame information shifted more responsibility to the manufacturer, and less to Amy.

The Source of Responsibility X Age of Injured Person interaction was statistically significant, $F(12,332) = 13.73$, $p < .001$, $\eta^2 = 0.33$. Simple main effect tests revealed that the amount of responsibility allocated to Amy, $F(3,83) = 29.14$, $p < 0.01$, and to her parents, $F(3,83) = 16.69$, $p < .01$, varied with Amy's stated age, whereas responsibility assigned to other parties was consistent across age. Responsibility was significantly higher for the 16-year-old Amy than all of the other ages, and higher for the 8-year old than the $1^1/_2$-year old (ps < 0.05). Allocation of responsibility to the parents showed a

Table 2. Mean responsibility ratings (Percentages) by source of blame, age of injured person (Amy), and type of supplemental information (Experiment 2).

	Positive information				
Source of blame	$1^1/_2$ years	4 years	8 years	16 years	Mean
Amy	4.44 (5.8)	8.89 (10.8)	11.88 (17.1)	85.00 (22.4)	20.65 (31.7)
Amy's parents	80.00 (26.6)	73.78 (25.3)	65.63 (33.0)	11.00 (15.2)	63.35 (34.9)
Manufacturer	11.67 (18.7)	15.11 (21.4)	17.50 (23.5)	2.00 (4.5)	12.61 (19.3)
Store	2.22 (6.7)	0.56 (1.7)	1.25 (3.5)	1.00 (2.2)	1.26 (4.1)
Paramedics	1.67 (5.0)	1.67 (3.5)	0.00 (0.0)	1.00 (2.2)	1.13 (3.3)
	No information (control)				
Amy	2.14 (3.9)	17.50 (22.7)	22.22 (22.2)	58.89 (30.1)	27.42 (30.6)
Amy's parents	85.00 (29.0)	67.50 (18.9)	49.22 (26.9)	16.89 (16.2)	51.45 (34.1)
Manufacturer	12.14 (25.8)	13.30 (21.6)	20.55 (30.9)	15.00 (16.2)	15.65 (23.4)
Store	0.00 (0.0)	0.00 (0.0)	3.89 (8.6)	2.78 (5.1)	1.94 (5.4)
Paramedics	0.71 (1.9)	1.67 (4.1)	4.11 (8.5)	0.89 (1.8)	1.94 (5.1)
	Negative information				
Amy	2.50 (4.6)	9.56 (22.9)	11.67 (29.5)	23.14 (18.2)	11.30 (21.6)
Amy's parents	66.25 (29.9)	57.11 (33.0)	54.44 (34.4)	35.29 (22.5)	53.97 (31.2)
Manufacturer	30.63 (28.6)	30.00 (27.8)	32.22 (29.2)	39.00 (23.0)	32.67 (26.4)
Store	0.65 (1.8)	2.22 (3.6)	1.67 (5.0)	0.71 (1.9)	1.37 (3.4)
Paramedics	0.00 (0.0)	1.11 (3.3)	0.00 (0.0)	1.86 (3.8)	0.70 (2.5)

Note: Standard deviations in are given parentheses.

negative relation with child age. Parents were assigned less responsibility in the 16-year-old condition than in the other three age conditions. Parents were also held less responsible when Amy was portrayed as eight years of age than when she was portrayed as $1^1/_2$ years of age (ps < 0.05).

A specific comparison was made involving the blame given to the child victim as a function of age and supplemental information condition. There were no significant effects associated with the three youngest Amy's, Fs < 1.0. However, there was a significant effect for the 16-year-old Amy, $F(2,18) = 9.36$, $p < 0.01$. Comparisons among the means show that the percentage of responsibility allocated to Amy was significantly higher in the positive frame condition ($M = 85.00$) than in the negative ($M = 23.14$) frame condition ($p < 0.01$). The no supplemental information (control) frame condition was intermediate ($M = 58.89$) and not significantly different from the other two conditions, most

Table 3. Tests of the simple main effect of supplemental information: Post-hoc comparisons for mean responsibility ratings (Percentages) for each source of blame (Experiment 2).

	Supplemental information		
Source of blame	Positive	None	Negative
Amy	20.65_a	27.42_a	11.30_b
Amy's parents	63.35_a	51.54_a	53.97_a
Manufacturer	12.61_a	15.65_a	32.67_b
Store	1.26_a	1.94_a	1.37_a
Paramedics	1.13_a	1.94_a	$.70_a$

Note: Means with different subscripts within a row are significantly different.

likely because of low statistical power. Thus, blame to victim was only influenced by type of framing condition when the victim was 16-year old. The older Amy was given greater blame when the manufacturer took precautionary actions such as warning about the hazard.

In addition, the simple main effects of the supplemental condition on blame to manufacturer were conducted. Here, blame to manufacturer was not affected by framing condition when the victim was $1^1/_2$ years old, $F(2,21) = 1.57$, $p > 0.20$; 4 years old, $F(2,21) = 1.19$, $p > 0.30$; or 8 years old, $F(2,23) < 1.0$. However, when the victim was 16-year old, blame to manufacturer varied across supplemental information (framing) conditions, $F(2,18) = 7.37$, $p < 0.01$. Comparisons showed that for the 16-year old, responsibility allocated to the manufacturer was significantly lower in the positive frame condition (when warnings were used) than in the negative frame condition ($p < 0.01$).

None of the other terms in the ANOVA were significant. Demographic factors such as gender, age, and education level were added individually as factors to the analysis and they all failed to show any significant effects. Having choked in the past or having observed someone else choking also did not moderate the effects.

3.2.2 Warning

The effects of warning design on attributions of responsibility were examined within the positive information condition (the only condition in which warnings were manipulated) using a 5 (Source of Responsibility) X 2 (Warning Colour) X 2 (Number of Panels) mixed-model ANOVA. No significant effects were found for the warning attribute factors.

Supplemental analyses were conducted to test the conspicuity and perceived effectiveness of the warnings. Only 10 of 17 (58%) of participants who received a black and white warning reported that they were given a copy of a warning in their packet, whereas 11 of 14 (79%) reported seeing a warning when it had colour, $\chi^2(1) = 3.68$, $p < 0.06$. Yet, differences in responsibility assigned to the manufacturer (13.1 vs. 11.5), parents (64.0 vs. 62.0) and victim (19.0 vs. 25.0) were roughly equivalent for those who reported seeing vs. not seeing a warning. Perceived warning effectiveness was higher in the colour warning condition ($M = 3.6$) than in the black and white condition ($M = 2.5$), but this difference was not statistically significant, $t(20) = 1.69$, $p < 0.11$.

3.3 Discussion

The results of Experiment 2 replicate most of the findings of Experiment 1 and provide further evidence that contextual information affects how people allocate responsibility for consumer product injuries. The results also confirm that the hazard of choking on marshmallows is not obvious (i.e., the hazard is 'hidden') and that marshmallows are generally viewed as relatively harmless. When not given much hazard information (i.e., the control condition), people assign most of the injury responsibility to the victim and her parents. Consistent with Experiment 1, most responsibility was allocated to the parents of the 'youngest' Amy. The relative amounts of responsibility assigned to Amy and her parents varied as a function of her age. More specifically, as Amy's age increased, responsibility allocated to Amy also increased, whereas responsibility allocated to her parents decreased. People seemed to have a greater tendency, when not knowing much about the hazard, as in the control condition, to blame the victim (Amy and her parents). As Amy 'matured', participants may have believed that she had greater cognitive capacity to

understand the warnings provided on the labels. This 'shifting' pattern of responsibility observed for Amy and her parents in Experiment 1 was even more pronounced in Experiment 2, especially in the positive frame condition where warnings were given. This may have been the result of differences in the warnings used in the two studies. The warnings used in Experiment 2 were more prominent and conspicuous than the warnings used in Experiment 1.

Participants who received the negatively framed supplemental information (i.e., they are told that the manufacturer did not act on knowledge that the product is potentially harmful) allocated significantly more responsibility to the product manufacturer relative to participants in either the positive frame condition, in which the manufacturer takes precautionary action, or when not much hazard (control) information is given. This result is consistent with Karlovac and Darley's (1988) observation regarding negligence: greater responsibility is assigned to the manufacturer when the harm is foreseeable and no precautionary steps were taken.

We were not able to detect any significant differences between the two types of warnings used for the 'positive frame' condition in this study. There are several potential reasons for this. First, the warnings were roughly of the same relative salience, contained similar information, and were explicitly presented in the scenarios. Therefore, the remaining differences in these stimuli may have been insufficient to produce meaningful differences in responsibility allocations (i.e., they were equally successful). Second, allocation of responsibility measure is only an indirect measure of warning effectiveness. The individual contributions of the manipulated features of the warning are more likely to be detected in studies explicitly evaluating them with a more direct measure of warning effectiveness than the allocation of responsibility measure used in this research. A third, related, reason is that sample sizes in the warning conditions were small, and therefore, statistical tests applied to these data were underpowered. Finally, a type of floor or ceiling effect may have been operating, in that there is little room for revision in ratings due to the ipsative nature of the data. Nevertheless, several studies have found significant differences using responsibility-allocation methodology similar to that used in the present research (Laughery et al. 1998; Wogalter et al. 1998). A more definitive explanation for the null findings among the separate warning conditions will require additional investigation.

A substantial number of participants who received the black and white warning reported that they had not received a warning. This did not affect their ratings, however, since they allocated similar amounts of responsibility to the manufacturer, victim, and parents as those who recalled receiving the warning. Perhaps the black and white photo was not conspicuous enough to attract participants' attention, or if they did see it, they might not have associated it as the actual warning used by the manufacturer. Whatever the explanation, the findings imply that the characteristics of the actual warning may be less important in determining the manufacturer's responsibility than is the general tone and level of precaution reflected in the manufacturer's actions. Future research should attempt to clarify the precise role, if any, that characteristics of the warning play in responsibility judgments.

4. General discussion

Overall, these results support the notion that people's perceptions concerning the assignment of blame are sensitive to contextual information. In the positive and negative framing conditions, we emphasised two aspects in the context of scenario information given

to participants about a child severely injured by choking on a marshmallow: the foreseeability of harm and the degree of care taken by the manufacturer to prevent foreseeable risks and harms. A control condition lacked this information. The results indicate that when information about the manufacturer's safety practices was cast in a negative light (i.e., the manufacturer knew about the hazard and yet failed to take adequate or reasonable precautions), the manufacturer received significantly more responsibility than when the same information was framed more neutrally (Experiments 1 and 2) or positively (Experiment 2).

These findings have important implications for product manufacturers as it pertains to risk control planning. First, they suggest that observers' (e.g., jurors, plaintiffs, the public) perceptions concerning a manufacturer's safety practices could influence whether a company receives negative publicity or is the target of a lawsuit should someone be injured or killed through the use of or exposure to its products. Manufacturers could potentially reduce blame when there is tangible evidence that its has taken active steps to effectively inform consumers about the hazards of its products.

Second, they also indicate that decision makers may scrutinise the behaviour of all entities involved – including the manufacturer, the injured party, and other relevant entities in the chain leading from the manufacturer to end users (e.g., distributors, retailers, etc.). In this research, participants clearly took characteristics of the injured person into account when attributing responsibility for injuries they incurred. We observed that the percentage of responsibility affixed to the injured person increased linearly with age, supporting previous research in this area (Laughery, Lovvoll, and McQuilkin 1996; Resnick, Zanotti, and Jacko 1997). Young children are generally viewed as not being capable of making sound judgments about risks, especially for hidden hazards, and thus the majority of responsibility for injuries they sustain will fall on those responsible for their care (e.g., their parents or guardians). Across both studies, parents received the most responsibility for the injury when the child was 8-years old or younger, regardless of the actions of the manufacturer. However, the 'oldest' Amy (portrayed as 16 years of age) received a larger share of responsibility relative to the parents and younger Amy's. Participants probably assumed that 16-year-old Amy is physically and cognitively competent to take the steps necessary to look out for her personal safety, particularly as it relates to the choking hazard depicted in this research. Few people would expect that parents could continuously monitor the behaviour of their 16-year-old children even if they wanted to!

A related finding pertains to the role of the warnings used for this research, in particular the warnings used (in the positive frame condition) in Experiment 2. Here, regardless of the warnings used, participants apparently expected the 16-year-old Amy to heed the warnings, and as a result, participants assigned greater responsibility to the 'oldest' Amy, as compared to the 'younger' Amy's for her injury. In contrast, the manufacturer is assigned less responsibility in this particular instance. Thus, the results of Experiment 2 suggest that there is a benefit to manufacturers (i.e., they received less blame) when they did the right thing by providing their customers with the information they need to use the manufacturer's products safely and (hopefully) avoid injury.

These findings have practical implications in that they provide the basis for persuading manufacturers that safety pays. Specifically, they show that when companies are perceived as making a 'good faith' attempt to look out for the safety of their customers, their customers and their peers, in return, may be less likely to hold them responsible when injuries do occur. These results are also important to HF/E professionals. Hazard and usability analyses by HF/E professionals can assist manufacturers in limiting the likelihood of negative effects of their products on people and property. The findings also are

important in that they support the basic notion that building safety into products at the front end of the product development processes has positive value beyond its main purpose of limiting injury and damage. Safety-related policies by manufacturers could also help in maintaining a positive image of the company and assist in less attribution of responsibility in the courtroom in product liability proceedings. Also, the findings are relevant to HF/E professionals who participate in expert witness work. Analysis could assist triers of fact (juries and judges) to make decisions based on better and more complete notions of the processes involved in humans using products.

Some limitations of this research are worth noting. First, our sample of participants was predominantly white college students attending a private university in the Northeastern USA. However, in Experiment 1 it is notable that a sample of non-student adult volunteers was included and when analysed separately from the college students, the patterns of findings were not substantially different between them and the college students. Nevertheless, other segments of the population may yield different results. Second, the stimulus material lacked the vividness and extensiveness that might be available in actual settings. Information collected in actual legal cases can be extremely detailed and lengthy. In sessions that took less than an hour, information was not available to participants that decision makers such as jurors might consider when allocating responsibility in product accident cases. Third, our dependent measures were ipsative, or perfectly dependent, in nature. Thus, participants who assigned high responsibility towards one entity were forced to assign low responsibility to the other parties (and vice versa). We chose this measure, in part, because it reflects the type of judgment that is often required in negligence court cases. However, ipsative data violates assumptions of independence of observations and raises concerns about the most appropriate way to analyse the data. However, experimental simulations show that repeated measures ANOVA is fairly robust against violations of dependency, especially when a correction for correlated degrees of freedom is used as it was done in our analyses (Greer and Dunlap 1997).

Although we have argued that foreseeability of harm and precautionary action are the two main principles guiding responsibility judgments in these studies, alternative explanations exist and need to be considered. Our contextual facts manipulation varied not only attempts to warn consumers of possible product hazards, but also the marketing practices of the manufacturer. The negative information condition informed participants that the manufacturer intended to market its product to young children directly, whereas in the positive information condition the manufacturer was described as not marketing their product heavily to young children. It is possible that participants' responsibility ratings in the negative condition were caused by negative reactions to the manufacturers' marketing practices rather than, or in addition to, its failure to warn consumers of hazards. In essence, the marketing practices in the negative condition may have created a 'stain' on the manufacturer and hence increased its moral culpability (Alicke 1992). According to Alicke's (1992, 2000) model of culpable causation, the entity that evokes the greatest negative effect in observers will receive the greatest blame for accidents and adverse outcomes. Unfortunately, we did not measure participants' emotional reactions to the scenarios and thus cannot disentangle the effects of moral culpability and precautionary action. However, the level of responsibility allocated to the manufacturer, even in the negative information condition, was relatively low compared to that allocated to the victim and her parents. In fact, the responsibility allocated to the manufacturer never exceeded 40% and was consistently lower than the sum allocated to the victim and her parents. This might suggest that the practices of the manufacturer did not elicit strong emotional reactions in participants, otherwise harsher ratings of the manufacturer would be expected.

Nonetheless, the manufacturer's moral culpability may have contributed to the observed differences and future research should attempt to isolate the effects of precautionary action and moral culpability.

These results indicate that judgments of responsibility for injuries are influenced by both actions and inactions on the part of the product manufacturer and the capability of the injured party. When companies do not make a good faith attempt to look out for the safety of their customers, people may hold them more responsible when injuries occur. Consultants who advise companies on safety, such as HF/E professionals, should advise them to do the 'right thing', since not doing so may result in greater blame being assigned (to the manufacturer) when an injury event becomes an instigator of litigation. When its safety practices are viewed positively in injury cases, manufacturers may reduce loss in terms of company executives' time and company resources, litigation support and insurance costs, and part of this may be due to their actual effect on injury prevention.

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