University of New Haven

American Business Review

Volume 25 | Number 2 Article 7

11-2022

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American Business Review
Nov. 2022, Vol.25(2) 390 - 415

ISSN: 2689-8810 (Online)
ISSN: 0743-2348 (Print)

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https://doi.org/10.37625/abr.25.2.390-415

ABSTRACT

This paper extends research on attribution theory through three studies examining how the accuracy and explicitness of product safety information communicated to various entities within a causal chain influences blame attributions after an accident. Unlike prior research, we find consistent evidence that entities in the causal chain were able to limit blame attributions by communicating safety information that's quality met or exceeded the quality of information available to that entity. Entities did not, however, benefit from providing more accurate information than what had been communicated to them by previous members of the causal chain. This insight suggests that the controllability of information communicated played an important role in the relationship between accurate communication and blame attributions. Our findings provide meaningful insight into steps that organizations can take to limit their potential for receiving blame following an accident, helping to bridge the gap between basic and applied research.

KEYWORDS

Attribution Theory, Blame, Controllability, Causal Chains, Product Safety Communication

INTRODUCTION

Injuries resulting from consumer product use cause more than 10 million annual emergency room visits (National Safety Council, 2021) and have an annual financial impact of over one trillion dollars in the United States (Consumer Product Safety Commission, 2022). To reduce the risk of such outcomes, product sellers (e.g., manufacturers, distributors, retailers) have a legal responsibility to communicate warnings regarding relevant product safety concerns, even when the most prevalent dangers associated with a product are likely to result from a foreseeable misuse of the product (Polinsky & Shavell, 2010). When product sellers fail to meet these responsibilities, the financial impacts on businesses can be significant.

For example, following more than 80 lawsuits related to gas can explosions, Blitz USA filed for bankruptcy and Walmart agreed to contribute $25 million to a $161 million fund that was created by interested parties in order to settle outstanding lawsuits (Myers & Gardella, 2013). Although much of the Blitz case has focused on the physical components of the gas cans, attorneys have argued that a portion of Blitz's responsibility for accidents came from the company's failure to effectively warn consumers of relevant product safety risks (Zehl & Associates, 2022). While safety communication is often one of several components considered in product liability cases, failure to warn a retired union member of the dangers associated with asbestos was the primary factor that led to a Louisiana jury holding more than 20 companies liable in a $36.7 million judgment (Webb & Cordova, 2022).

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Recognizing that product safety communication contributes to blame attributions that influence organizations' financial responsibility for negative outcomes, this research seeks to better understand how the accuracy of product safety information communication influences blame attributions for various potentially blameworthy entities within a causal chain following an accident.

Whereas extant research has shown that choices regarding how to communicate product safety information can directly influence end-user behavior (Frantz & Rhoades, 1993; Kalsher et al., 2019; Wogalter & Young, 1994), there is limited literature related to how product safety communication *influences blame attributions* after an accident. In particular, there is little knowledge regarding how various *communications* within causal chains influence blame attributions following an accident. The distinction between impact on end-user behavior and influence on the development of blame attributions is critical as prior research has shown that attributions for responsibility are often influenced by factors that are unrelated to the actual causes of events (e.g., Greenhaus & Parasuraman, 1993). Given the potential financial ramifications that decisions pertaining to product safety communication can have on organizational outcomes, this is a critical issue to address.

PRACTICAL RELEVANCE OF PRODUCT SAFETY COMMUNICATION

Although litigation related to product safety warnings is more common in the United States than it is in other countries (Ramseyer, 2013), the business impact of product safety communication on attributions of blame has been felt globally. For example, Johnson and Johnson reached a $300 million settlement in a product liability case after Australian courts ruled that even if doctors should be aware of risks associated with a medical product, said risks should be communicated through the use of warnings (Davey, 2022). Although warning communication litigation is more common in some countries than others, global companies doing business in countries where such litigation is common are frequently impacted by this issue. For example, Canadian company Knix Wear, Inc., whose majority shareholder is based in Sweden, was named in a $5 million class action lawsuit for failure to communicate that its core products contain chemicals that have been associated with health problems (Greenberg, 2022). Similarly, Bayer, a German company, has settled more than 100 thousand lawsuits and lost one case in which a court awarded the plaintiff $25 million due to failure to warn consumers of possible cancer risks associated with its Roundup agricultural products (Miller, 2022).

A dearth of information regarding how individuals consider safety communication in attributing blame provides organizations with limited information as to how they can best protect themselves from product liability claims through the use of effective safety communication. Consequently, rather than updating safety communication practices proactively, organizations frequently update safety communication practices *in response to* determinations of liability. Take the infamous McDonald's hot coffee case for example. In 1994, a jury awarded Stella Liebeck $2.7 million[1] after she received third-degree burns as a result of spilling a cup of hot coffee on herself. One factor that contributed to the jury attributing a large portion of blame for the accident to McDonald's was that the warning on the coffee cup was perceived as inadequate (Cain, 2007). Prior to this case, McDonald's had responded to over 700 claims related to coffee temperature (Rutherford, 1998), but it wasn't until perceptions of the organization's responsibility for consumer injuries were clearly articulated through a jury's determination of liability in the Liebeck case that McDonald's modified how it communicated product safety information.

If McDonald's had better insight into how its safety communication would impact blame attributions and, ultimately, its financial responsibility in the event of a safety incident, it may have updated its safety communication practices long before Liebeck's accident. This is illustrated by evidence that the articulation of blame attributions and associated consequences in the Liebeck case

[1] This amount was later reduced by the trial judge.

not only influenced safety communication practices at McDonald's, but they sparked a series of safety communication changes within the industry (Swanger & Rutherford, 2002). Product sellers, however, typically have limited information available to inform them as to how product safety communications influence blame attributions as some estimates state that 95 percent of relevant cases settle out of court (K. Ross & Dorenkamp, 2020). Given that such settlements are often subject to nondisclosure agreements, they provide product sellers with little information regarding how evaluators attributed blame for the incident. Consequently, research examining this question has strong practical implications for organizations.

ATTRIBUTION THEORY AND PRODUCT SAFETY COMMUNICATION

Research on attribution theory seeks to address the process by which people infer causality as it relates to various outcomes (Kelley, 1973; Kelley & Michela, 1980; Shaver, 1985). Findings generally indicate that contextual information surrounding events plays an important role in shaping people's perceptions and attributions of blame for their occurrence (Karlovac & Darley, 1988). For example, contextual factors such as the framing of an entity's general safety practices (Kalsher et al., 1998; Williams et al., 2014), perceptions of safety climate (Hofmann & Stetzer, 1998), the evaluator's similarity to the accident victim (Kouabenan et al., 2001), and the evaluator's relationship to the accident (Hasle et al., 2009; Salminen, 1992) have all been shown to influence allocations of blame after an accident. These basic concepts have been extended to improve our understanding of how people allocate responsibility for events that involve multiple potentially blameworthy entities.

When events involve multiple entities, the actions of each entity are rarely independent of all other entities. Instead, there is typically a causal chain, or a sequence of interdependent events in which each decision or action is influenced by the preceding decision or action. Attributing blame in causal chains is a complex process because evaluators are rarely fully aware of the cognitive processes that drove decisions at each level in the causal chain (Laxmisan et al., 2005). Evaluators use the information available to attribute blame to entities within causal chains based upon their assessment of an entity's intentions (Lagnado & Channon, 2008). As responsibility for an outcome is attributed to one entity, or cause, the contributions of other entities to the outcome are typically discounted (Morris & Larrick, 1995). Research on how *information communicated* at different levels in causal chains influences attributions of responsibility for a negative outcome, however, has been limited.

There is tension in the early literature in this area as Laughery, Laughery, Lovvoll, McQuilkin, and Wogalter (1998) found no evidence that warning explicitness influenced blame attributions in causal chains using a between-subjects design (*N=71*), but did find a relationship when using a within-subjects design (*N=38*). Similarly, Wogalter, Brantley, Laughery, and Lovvoll (1998) found a relationship between warning explicitness and blame attributions, but only when participants were made aware of alternative communication options (*N=60*). Recent research, however, has found a relationship between warning explicitness in causal chains and allocations of blame using a between-subjects design (Kalsher & Obenauer, 2018; *N=186*).

While prior research in this space has included organizations in the middle of causal chains as potential blameworthy entities (e.g., Laughery et al., 1998; Wogalter et al., 1998), it has not systematically manipulated the safety-related information received or sent by these entities. This is a critical omission from the literature as the Consumer Product Safety Commission's recent lawsuit filed against Amazon (Hernandez, 2021) and the aforementioned Walmart case (Myers & Gardella, 2013) serve as evidence of the high level of responsibility for consumer safety held by entities in the middle of causal chains.

THE CURRENT RESEARCH

The current research advances attribution theory by informing our understanding of how product safety communication influences blame attributions in causal chains. Specifically, in a series of three studies, we measure blame attributions (dependent variable) for various entities (within-subjects) in causal chains, while manipulating warning explicitness, the quality of information that the manufacturer (early-stage entity) communicated to the distributor (mid-stage entity), and the quality of information that the distributor communicated to the purchaser (mid-stage entity). The warning explicitness represented quality of information that the manufacturer communicated to the purchaser. Although prior work has manipulated information quality sent by early-stage entities and received by late-stage entities, by systematically manipulating communication sent and received by mid-level entities in the causal chain, we address a critical gap in the literature pertaining to how the communication of mid-level entities influences blame attributions.

Due to the limited literature focused on how communication influences blame attributions in causal chains, this research took on an inductive approach. In Study 1 (*N=216*), we begin by examining the effects of warning explicitness and the six most-likely combinations of distributor and manufacturer communication accuracy on allocations of blame for different entities within a student sample. In Study 2 (*N=433*), once again, we test the effect of warning explicitness on blame attributions, but this time we incorporate a full panel of manufacturer (accurate, none, inaccurate) by distributor (accurate, none, inaccurate) information accuracy conditions into a model that is tested within a sample that is older, and likely more experienced, than that of Study 1. Finally, in Study 3 (*N=176*), we test the full panel of manufacturer by distributor information accuracy conditions within a second student sample. These manipulations allow us to examine the impact that differences in product safety communication sent by early and mid-stage entities, differences in product safety communication received by mid and late-stage entities, and their interactions have on blame attributions. Participants in our studies represent members of the general public whose perceptions of blame for product safety incidents could financially impact organizations through their roles as potential consumers or jurors.

Collectively, the findings of these studies suggest that entities can reduce their potential for blame by accurately and explicitly communicating product safety-related information downstream in the causal chain, even if that means acknowledging and disclosing safety concerns related to product design limitations. Additionally, our findings indicate that entities in causal chains are not expected to seek out more information than what is available to them, but they are expected to respond to information that is accessible to them. These findings make an important contribution to attribution theory as they diverge from previous research (Laughery et al., 1998; Wogalter et al., 1998). Specifically, they indicate that the control (DeJoy, 1994) that entities have over information communicated and the foreseeability of outcomes (Lagnado & Channon, 2008) resulting from said communications play an important role in the development of blame attributions in causal chains. Controllability and foreseeability have long played important roles in attribution theory but have not previously been incorporated into causal chain models. By fully replicating our findings across three samples, in two different sample types with different demographic compositions (*see Table 1*), while using larger samples than those of prior research, we present an argument that our contributions to attribution theory demonstrate strong generalizability.

STUDY 1

PARTICIPANTS

A total of 216 undergraduate students at a private university in the northeast United States participated in this study. Participants self-reported age ranged from 18 to 28 years (*M*=19.45, *S.D.*=1.43) with 149 participants identifying as male and 67 participants identifying as female. Twenty-four of the participants (11.11 percent) identified as smokers.

Table 1. Participant Demographics by Study

Sample	Study 1	Study 2	Study 3
N	*216*	*433*	*176*
Race / Ethnicity			
White	--	*80.60%*	*59.43%*
Black	--	*6.47%*	*5.71%*
Asian	--	*6.00%*	*21.14%*
Hispanic	--	*3.93%*	*7.43%*
2 or More Races	--	*1.15%*	*5.14%*
Not Listed	--	*1.85%*	*1.15%*
Gender			
Male	*68.98%*	*43.16%*	*58.29%*
Female	*31.02%*	*56.15%*	*41.14%*
Non-binary or Transgender	--	*0.69%*	*0.57%*
Mean in Years			
Age	*19.45*	*39.45*	*18.94*
Employment Status			
Employed Full-Time	--	*51.97%*	*1.14%*
Employed Part-Time	--	*12.99%*	*10.85%*
Self-employed	--	*14.15%*	*0.57%*
Retired		*4.87%*	*0%*
Total Currently Working	--	*83.98%*	*12.56%*
Smoking Experience			
Current or past smokers	*11.11%*	*53.35%*	*1.70%*

This sample was appropriate for the research question at hand as in the United States, citizens become eligible to participate in juries who determine the outcome of litigation cases at the age of 18. Consequently, the development of causal attributions in this sample is directly relevant to organizational outcomes resulting from litigation in the country in which data were collected. Additionally, prior research has empirically demonstrated that the responses provided by student participants in management research do not systematically differ from those of working professionals (Obenauer & Kalsher, 2022). An abbreviated manuscript based on a subsample of these data was published in the Proceedings of the 20th Congress of the International Ergonomics Association (Kalsher et al., 2018).

METHODS

After reading and signing a consent form, each participant read one of twelve variants of a scenario in which a warehouse sustained substantial damage from a fire. The experiment materials included the following: (1) a description of the incident, (2) a summary of the facts of the case, and (3) a set of installation and use instructions for the cigarette disposal receptacle, termed the *SafetyCig*,[2] where the fire is said to have originated. These instructions were described as having been provided by the manufacturer for the purchaser. According to the incident description, the *SafetyCig* was positioned next to the warehouse's rear entrance. The use instructions described the *SafetyCig* as being designed to accept cigarette refuse deposited via a small opening (.75-in/1.91-cm diameter) at the top of the receptacle's vertical tube.

The use instructions referenced a steel bucket positioned inside the base of the receptacle that holds discarded cigarette and cigar butts and explicitly stated that this bucket must be manually removed and emptied regularly. As discussed in the incident description, this instruction was critical because the plastic material encompassing the steel bucket was not protected with a fire-retardant agent. Instead, the SafetyCig relied on an "oxygen starvation" feature that could be defeated if the receptacle were breached (e.g., as a result of melting or puncture) or if the thumb screws used to secure the bottom and top halves of the unit together were not tightened, thereby allowing air to flow through the unit. Per the case materials, the SafetyCig was marketed to the general public, and therefore, many of the people who would purchase and/or use this product were unlikely to know that its plastic material was flammable and could be ignited by discarded smoking materials if the unit was not used properly.

Information communicated regarding the flammability of the unit was manipulated in the study through variations in the configuration of a warning embedded within the set of use instructions that manufacturers prepared for purchasers. In the "less explicit" warning condition, the signal word "CAUTION" was used in the warning's header and the warning text made no reference to the risk of fire. In this condition, the case also described the SafetyCig as having product information embossed directly onto the surface of the receptacle. In the "more explicit" warning condition, the signal word "WARNING" was used in the warning's header, was highlighted using boldface type, and was accompanied by the hazard alert symbol. In this condition, the warning text also stated that the SafetyCig was flammable, instructed users not to place the unit near buildings, and warned that failure to follow the instructions could result in fire. In this condition, the case described the unit as having safety information embossed on its surface.

We also manipulated the safety-related information communicated by the manufacturer and distributor. The information manipulation was achieved by varying the information communicated by the manufacturer to the distributor and the information that the distributor included in a product advertisement targeted at the purchaser. The manufacturer either 1) communicated accurate information to the distributor by stating that the SafetyCig plastic was flammable and making no claims that it had been treated with a fire-retardant additive, 2) communicated inaccurate information by falsely claiming that the SafetyCig had been treated with a fire-retardant additive, or 3) communicated no information regarding flammability of the unit. The distributor 1) communicated accurate information in its advertisement by disclosing flammability of the unit and making no claims about a fire-retardant additive, 2) communicated inaccurate information in its advertisement by falsely claiming that the SafetyCig had been treated with a fire-retardant additive, or 3) communicated no information regarding flammability of the unit in its advertisement.

[2] The name SafetyCig was created for this experiment in order to prevent responses from being biased based upon any knowledge of specific products or brands (e.g., Smokers Cease-Fire).

After reading the study materials, participants were asked to allocate blame to each of four entities: the manufacturer, distributor, purchaser (i.e., the warehouse owner), and the end-user who discarded the cigarette into the receptacle that started the fire. The study took on a 4 (entity: within-subjects) X 2 (warning configuration: between-subjects) X 6 (information communicated: between subjects) design.

Table 2. ANOVA Test of Within Subjects Effects on Allocation of Blame by Study

	Independent Variable	Type III SS	DF	F	Partial η^2
	Entity	*145503.614*	*2.707*	*90.320****	*0.307*
	*Entity*Warning*	*67490.267*	*2.707*	*41.894****	*0.170*
Study 1#	*Entity*Information*	*15088.411*	*13.535*	*1.873**	*0.044*
	*Entity*Warning*Info*	*8771.311*	*13.535*	*1.089*	*0.026*
	Residual	*328639.708*	*552.243*		
	Entity	*180200.392*	*2.788*	*82.035****	*0.165*
	*Entity*Warning*	*74827.533*	*2.788*	*34.065****	*0.076*
	*Entity*Manufacturer Info*	*47757.50*	*5.577*	*10.871****	*0.050*
	*Entity*Distributor Info*	*6216.708*	*5.577*	*1.415*	*0.007*
Study 2#	*Entity*Warning*ManInfo*	*12708.670*	*5.577*	*2.893***	*0.014*
	*Entity*Warning*DistInfo*	*1801.863*	*5.577*	*0.410*	*0.002*
	*Entity*ManInfo*DistInfo*	*17004.900*	*11.153*	*1.935**	*0.018*
	*Entity*Warning*ManInfo*DistInfo*	*9494.788*	*11.153*	*1.081*	*0.010*
	Residual	*911596.674*	*1157.135*		
	Entity	*223051.157*	*2.039*	*187.454****	*0.529*
	*Entity*Manufacturer Info*	*10618.866*	*4.078*	*4.462****	*0.051*
Study 3$	*Entity*Distributor Info*	*6272.382*	*4.078*	*2.636**	*0.031*
	*Entity*ManInfo*DistInfo*	*11020.129*	*8.157*	*2.315**	*0.053*
	Residual	*198713.219*	*340.555*		

Note: *** p < .001, ** p < .01, * p < .05, [t] p < .10
#DF adjusted using Huynh-Feldt correction, $DF adjusted using Greenhouse-Geisser correction.

Table 3. Mean Allocation of Blame by Condition and Study

			Information Accuracy			Manufacturer Blame		Distributor Blame		Purchaser Blame		Smoker Blame	
Study	Warning Explicitness	Com Cond	Manufacturer	Distributor	N	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	*All*		*All*	*All*	216	44.601	26.603	22.307	19.475	25.167	25.994	7.416	14.092
1	*Less*		*All*	*All*	113	55.641	23.702	24.472	19.948	12.566	17.187	6.658	13.731
1	*More*		*All*	*All*	103	32.490	24.328	19.932	18.752	38.990	27.038	8.248	14.499
1	*All*	1	*Accurate*	*Inaccurate*	35	40.383	27.245	32.094	20.478	19.829	21.071	7.694	13.187
1	*All*	2	*Accurate*	*None*	34	40.412	22.666	26.882	16.828	22.941	22.738	9.618	16.173
1	*All*	3	*Accurate*	*Accurate*	38	40.671	25.883	19.605	17.388	29.526	29.901	8.724	15.768
1	*All*	4	*Inaccurate*	*Inaccurate*	37	45.784	31.781	21.676	23.010	24.432	28.057	7.595	16.674
1	*All*	5	*Inaccurate*	*None*	37	53.162	23.757	17.270	14.487	24.757	23.279	4.135	8.145
1	*All*	6	*None*	*None*	35	46.857	26.432	17.000	20.190	29.143	29.568	6.857	13.066
2	*All*		*All*	*All*	433	43.351	29.990	25.965	23.427	22.700	26.841	15.254	24.220
2	*Less*		*All*	*All*	219	52.082	31.115	27.612	24.918	13.146	19.371	13.744	23.828
2	*More*		*All*	*All*	214	34.416	25.973	24.280	21.725	32.477	29.787	16.799	24.574
2	*All*		*Inaccurate*	*All*	139	54.079	29.628	19.791	20.005	19.626	23.770	15.741	25.130
2	*All*		*None*	*All*	153	43.216	29.387	25.745	22.219	20.719	25.810	16.817	26.973
2	*All*		*Accurate*	*All*	141	32.922	27.357	32.291	26.167	27.879	30.037	13.078	19.749
2	*All*		*All*	*Inaccurate*	146	43.432	30.661	29.644	24.455	20.918	25.046	15.240	25.534
2	*All*		*All*	*None*	145	43.766	29.941	25.593	23.304	20.979	24.315	16.069	24.958
2	*All*		*All*	*Accurate*	142	42.845	29.544	22.563	22.046	26.289	30.646	14.437	22.119
3	*Less*		*All*	*All*	176	51.131	23.660	31.727	21.348	10.733	13.332	6.438	10.789
3	*Less*		*Inaccurate*	*All*	55	57.545	23.051	25.164	15.494	9.291	13.011	8.000	12.624
3	*Less*		*None*	*All*	59	52.356	20.685	30.441	18.816	10.712	12.558	6.407	10.834
3	*Less*		*Accurate*	*All*	62	44.274	25.348	38.774	25.835	12.032	14.372	5.081	8.784
3	*Less*		*All*	*Inaccurate*	62	47.887	23.113	38.403	21.616	8.484	8.792	5.629	9.513
3	*Less*		*All*	*None*	63	51.270	25.368	31.254	21.946	10.127	14.257	7.349	11.607
3	*Less*		*All*	*Accurate*	51	54.902	21.956	24.196	17.732	14.216	16.020	6.294	11.316

RESULTS

ENTITY

The independent variables described above were entered into a mixed model ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, $X^2(5)$ = 60.815, *p*<.001, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (ε = .902). *Table 2* shows that the effect of entity on blame allocated was significant, *F(2.707, 552.243)=90.320, p<0.001, partial eta-squared=0.307.* Presented in the order that entities appear within the causal chain, within-subjects contrasts indicated that the manufacturer (*M*=44.601, *SD*=26.603; *see Table 3*) received significantly more blame than the distributor (*M*=22.307, *SD*=19.475), *F(1, 204)=82.171, p<0.001, partial eta-squared=0.287.* Blame allocated to the distributor did not significantly differ from blame allocated to the purchaser (*M*=25.167, *SD*=25.994), *p=0.141.* Finally, the end-user (*M*=7.416, *SD*=14.092) received significantly less blame than the purchaser, *F(1, 204)=86.189, p<0.001, partial eta-squared=0.297.*

WARNING EXPLICITNESS

The effect of warning explicitness on blame attributions differed by entity, *F(2.707, 552.243)=41.894, p<0.001, partial eta-squared=0.170.* To isolate this effect, we ran a series of four separate ANOVAs that were restricted by entity. To account for the increased likelihood of statistical significance when conducting multiple comparisons, we used *p<0.0125* as the threshold for statistical significance when evaluating these ANOVAs. Warning explicitness had a significant effect on blame allocated to the manufacturer, *F(1, 204)=51.012, p<0.001, partial eta-squared=0.200.* Post-hoc comparisons using Bonferroni corrections showed that significantly more blame was apportioned to the manufacturer in the less explicit warning condition (*M=55.641*) than in the more explicit warning condition (*M=32.490*), *t(214)=7.080, p<0.001, d=0.965.*

Warning explicitness also had a significant effect on blame allocated to the purchaser, *F(1, 204)=74.813, p<0.001, partial eta-squared=0.268.* Post-hoc comparisons also showed that significantly more blame was apportioned to the purchaser in the more explicit warning condition (*M=38.990*) than in the less explicit warning condition (*M=12.566*), *t(214)=8.648, p<0.001, d=1.178.* Warning explicitness did not have a significant impact on blame allocated to the distributor (*p=0.089*) or the end-user (*p=0.391*).

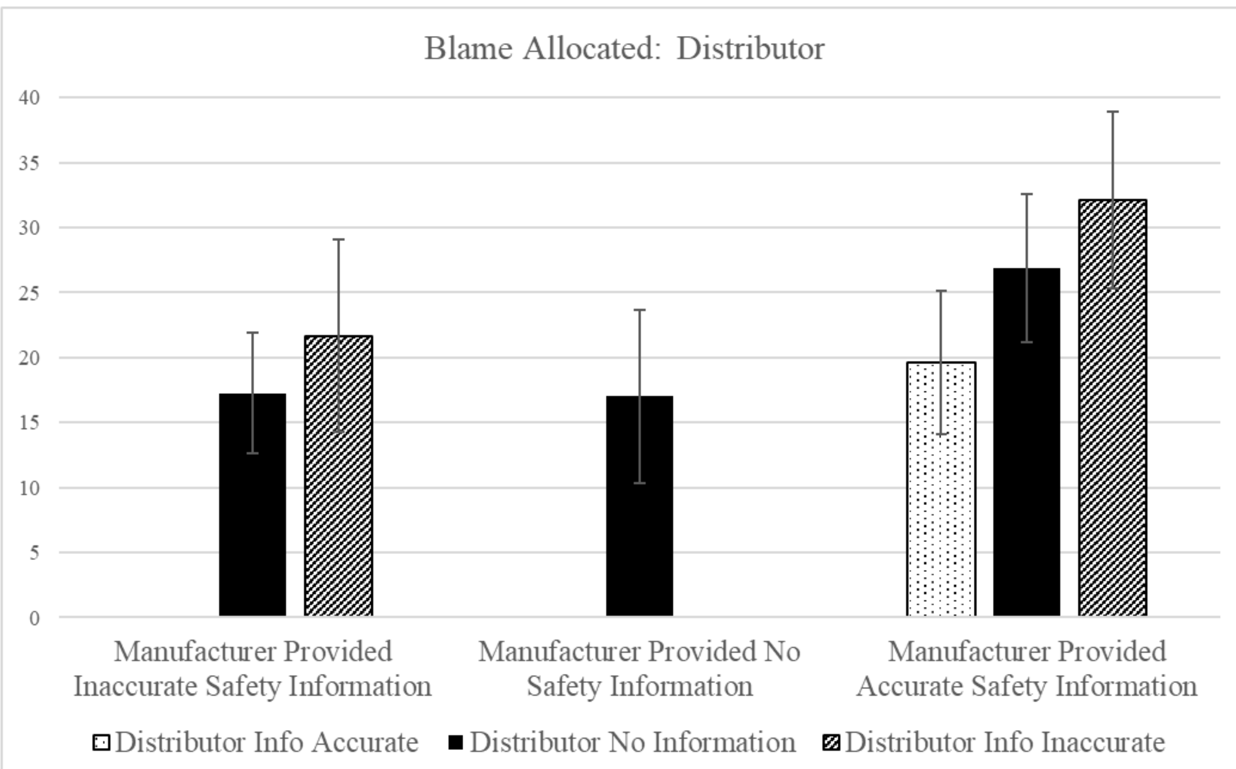

Figure 1. Blame Allocated to Distributor by Information Communicated (Study 1)

INFORMATION COMMUNICATED

The effect of information communicated also varied by entity, *F(13.535, 552.243)=1.873, p=0.028, partial eta-squared=0.044.* More specifically, information communicated had a significant effect on blame allocated to the distributor, *F(1, 204)=3.762, p=0.003, partial eta-squared=0.084.* Post-hoc comparisons showed that the distributor received significantly more blame when the manufacturer communicated accurate information (*Conditions 1&2; M=29.526*) than when the manufacturer communicated inaccurate information (*Conditions 4&5; M=19.472*), *t(141)=3.157, p=0.014, d=0.528.* Additionally, the distributor received significantly more blame when it communicated inaccurate information in its advertisement (*Condition 1; M=32.094*) than when it included accurate information in its advertisement (*Condition 3; M=19.605*), *t(71)=2.816, p<0.044, d=0.660* (see *Figure 1*). No other post-hoc comparisons were significant after applying Bonferroni corrections (*ps>0.216*).

STUDY 2

METHODS

The design of Study 1 prevented the examination of a full factorial of conditions pertaining to accuracy of manufacturer information and accuracy of distributor information. This was addressed in Study 2 as this study took on a 4 (entity: within-subjects) X 2 (warning: between-subjects) X 3 (manufacturer information accuracy: between-subjects) X 3 (distributor information accuracy: between-subjects) design. Additionally, in order to ensure that the materials performed well within an online environment, this study reduced the complexity of information provided to participants. Whereas the case materials in Study 1 comprised four pages, the content of the cases used in this study was reduced such that each case comprised two pages (approximately 600 words). Furthermore, the language used in this study's cases was simplified such that the Flesh-Kincaid Grade Level score indicated that materials were written at approximately a ninth-grade reading level.

All participants were randomly assigned to an experimental condition and directed to the appropriate electronic survey. On the first page of the survey, participants were asked to provide informed consent and verify that they were at least 18 years of age. On the next page of the survey, participants were asked to download a copy of the case that was associated with their survey and to confirm that they had read the case in its entirety.

The following pages asked participants specific questions about the facts of the case that served as attention checks. In addition to answering attention checks, participants were also required to correctly enter the case number into the survey in order to proceed with the task. After completing all attention checks, participants were asked to answer the same series of questions completed by participants in Study 1.

PARTICIPANTS

The sample used in Study 2 also addressed the generalizability of student samples to the overall population. Whereas Study 1 utilized a student sample, in this study, we recruited our sample through Amazon's Mechanical Turk (mTurk). MTurk is an online community that is frequently used to recruit research participants who complete tasks in exchange for financial compensation (e.g., Kalsher et al., 2019; Marchiondo et al., 2015; O'Reilly et al., 2017; Schaumberg & Flynn, 2017; Tucker et al., 2016). The mTurk community is comprised of individuals from a variety of different professional backgrounds which contributes to the generalizability of findings from studies conducted within this community. For the current study, participants were restricted to those located in the United States with at least a 70 percent task approval rate on mTurk. To ensure the quality of data, tasks completed in under thirty seconds, more than once by the same individual, or with more than one attention check answered incorrectly were rejected and excluded from analyses. These exclusion criteria were specified in the recruiting announcement and approved by our IRB.

A total of 433 individuals submitted responses that met the above criteria. Their self-reported ages ranged from 18 to 81 years of age (*M*=39.45, *S.D.*=13.23). Participants identified as male (43.16%), female (56.15%), and nonbinary/transgender (.69%). The most common self-reported races of participants were White (80.60%), Black/African-American (6.47%), Asian/Asian-American (6.00%), and Hispanic (3.93%). Over half of the participants (53.35%) identified as current or past smokers. Participants reported employment statuses of employed full-time (51.97%), self-employed (14.15%), employed part-time (12.99%), retired (4.87%), and not currently working (16.01%).

RESULTS

ENTITY

Similar to Study 1, the analysis was executed using a mixed model ANOVA. Once again, Mauchly's test was significant, $X^2(5) = 75.074$, $p<.001$, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = .929$). As shown in *Table 2*, the effect of entity on blame allocated was significant, *F(2.788, 1157.135)=82.035, p<0.001, partial eta-squared=0.165.* The manufacturer received the greatest portion of blame (*M*=43.351, *SD*=29.990; *see Table 3*) and within-subjects contrasts indicated this was significantly more blame than the distributor (*M*=25.965, *SD=23.427*), *F(1, 415)=91.128, p<0.001, partial eta-squared=0.180.* Blame allocated to the purchaser (*M*=22.700, *SD*=26.841) did not significantly differ from blame allocated to the distributor (*p=0.057*). Finally, the end-user (*M*=15.254, *SD*=24.220) received significantly less blame than the purchaser, *F(1, 415)=46.492, p<0.001, partial eta-squared=0.101.*

WARNING EXPLICITNESS

The interaction of warning explicitness and entity was significant, *F(2.788, 1157.135)=34.065, p<0.001, partial eta-squared=0.076.* Similar to Study 1, to isolate this effect, we ran a series of four separate ANOVAs that were restricted by entity, using *p<0.0125* as the threshold for statistical significance. These ANOVAs indicated that warning format had a significant effect on blame allocated to manufacturers, *F(1, 415)=42.267, p<0.001, partial eta-squared=0.092.* Consistent with Study 1, post-hoc comparisons using Bonferroni corrections showed that significantly more blame was apportioned to the manufacturer in the less explicit warning condition (*M=52.082*) than in the more explicit warning condition (*M=34.416*), *t(431)=6.406, p<0.001, d=0.616.*

Warning explicitness also had an impact on allocations of blame for purchasers, *F(1, 415)=65.209, p<0.001, partial eta-squared=0.136.* In the more explicit warning condition, more blame was apportioned to the purchaser (*M=32.477*) than in the less explicit warning condition (*M=13.146*), *t(431)=8.023, p<0.001, d=0.771* (*see Figure 2*). Warning explicitness did not have a significant effect on blame allocated to the distributor (*p=0.063*) or the end-user (*p=0.174*).

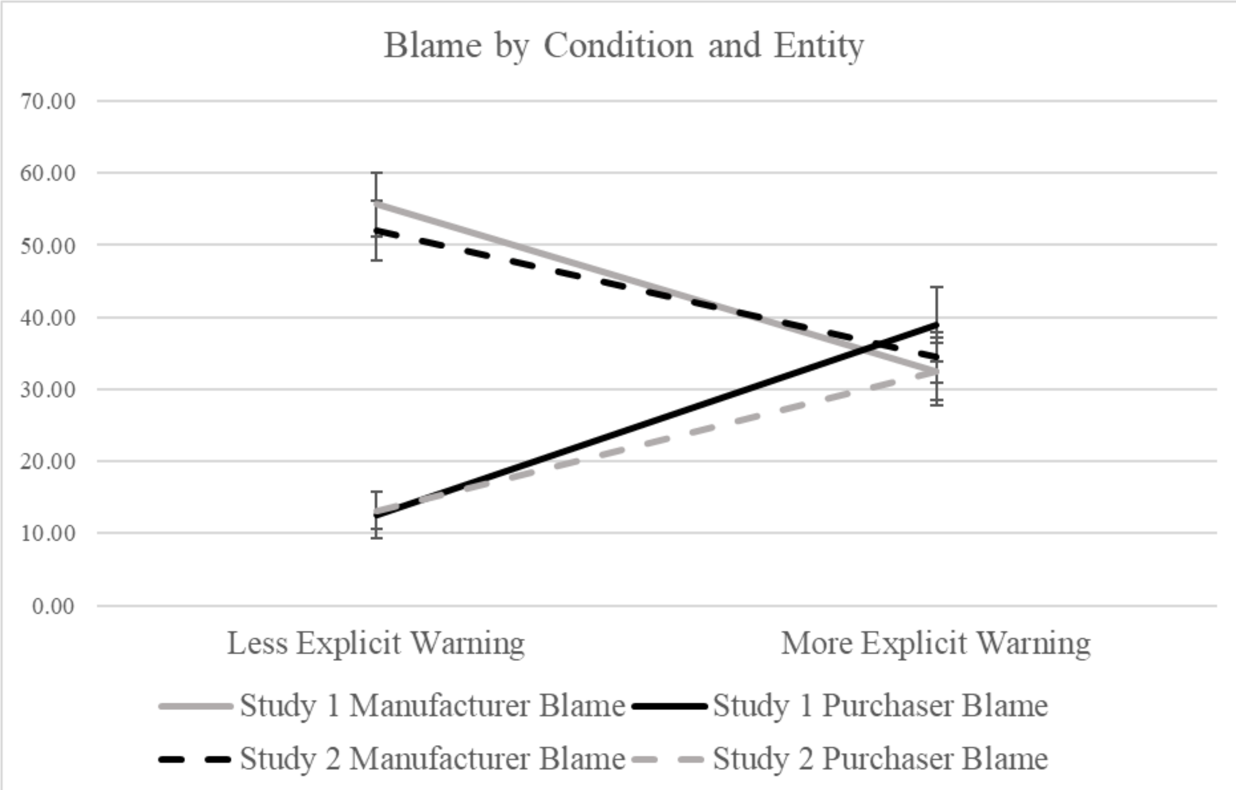

Figure 2. Influence of Explicitness of Warning

INFORMATION COMMUNICATED BY THE MANUFACTURER

Information communicated by the manufacturer had a significant interaction with entity, *F(5.577, 1157.135)=10.871, p<0.001, partial eta-squared=0.050.* More specifically, the accuracy of this information had a significant effect on blame allocated to the manufacturer, *F(2, 415)=19.870, p<0.001, partial eta-squared=0.087.* Post-hoc comparisons using Bonferroni corrections showed that the manufacturer received significantly more blame for the accident when it communicated inaccurate safety information to the distributor (*M=54.079*) than when it communicated no safety information at all (*M=43.216*), *t(290)=3.143, p=0.026, d=0.368*. Additionally, more blame was apportioned to the manufacturer when no safety information was provided to the distributor than when the manufacturer communicated accurate safety information (*M=32.922*), *t(292)=3.101, p=0.030, d=0.362*.

The accuracy of safety information communicated by the manufacturer also had a significant effect on blame allocated to the distributor, *F(2, 415)=12.232, p<0.001, partial eta-squared=0.056*. After Bonferroni corrections were applied, blame apportioned to the distributor when the manufacturer communicated accurate safety information (*M=32.291*) differed significantly from conditions in which the manufacturer communicated inaccurate safety information (*M=19.791*), *t(278)=4.486, p<0.001, d=0.536*. Blame allocated to the distributor in the manufacturer communicated no safety information condition (*M=25.745*) did not differ significantly from blame allocated to the distributor when the manufacturer provided accurate safety information (*p=0.296*) or when the manufacturer provided inaccurate safety information (*p=0.240*). The effect of safety information communicated by the manufacturer on blame allocated to the purchaser (*p=0.031*) and blame allocated to the end-user (*p=0.280*) did not meet the threshold for statistical significance described above.

The three-way interaction of information communicated by the manufacturer, entity, and warning explicitness was also significant, $F(5.577, 1157.135)=2.893$, $p=0.010$, *partial eta-squared=0.014*. The interaction of safety information communicated by the manufacturer and warning explicitness had a unique impact on the distributor, $F(2, 415)=5.306$, $p=0.005$, *partial eta-squared=0.025.* Post-hoc comparisons indicated that when a less explicit warning was present and the manufacturer provided the distributor with accurate product safety information, the distributor received more blame ($M=39.121$) than when a less explicit warning was present and the manufacturer did not provide the distributor with product safety information ($M=24.133$), $t(147)=3.709$, $p=0.004$, $d=0.612$. When a more explicit warning was present, differences in blame allocated to the distributor based on the accuracy of safety information provided by the manufacturer were not significant after applying Bonferroni corrections (*ps*>0.137). The interaction of safety information communicated by the manufacturer and warning explicitness did not have a significant effect on blame allocated to the manufacturer ($p=0.224$), the purchaser ($p=0.073$) or the end-user ($p=0.089$).

INFORMATION COMMUNICATED BY THE DISTRIBUTOR

The interaction of safety information communicated by the distributor with entity was not significant ($p=0.210$). The three-way interaction of information communicated by the distributor, information communicated by the manufacturer, and entity, however, did have a significant effect on allocations of blame, $F(11.153, 1157.135)=1.935$, $p=0.031$, *partial eta-squared=0.018.* The interaction of safety information provided by the manufacturer and safety information provided by the distributor had a significant effect on blame allocated to the distributor, $F(4, 415)=5.158$, $p<0.001$, *partial eta-squared=0.047.*

Post-hoc comparisons indicated that when the manufacturer communicated inaccurate information to the distributor, blame apportioned to the distributor was not significantly impacted by the information that the distributor communicated in its advertisement ($p=1.000$). When the manufacturer did not communicate any safety information to the distributor, the distributor received significantly more blame when communicating inaccurate information in its advertisement ($M=33.519$) than it did when providing accurate safety information or failing to communicate safety information in its advertisement ($M=21.743$), $t(151)=3.198$, $p=0.024$, $d=0.546$. When the manufacturer communicated accurate safety information to the distributor, providing accurate information in its advertisement resulted in lower levels of blame for the distributor ($M=23.087$) than when the distributor failed to communicate safety information or provided inaccurate information ($M=36.747$), $t(139)=2.987$, $p=0.047$, $d=0.537$ (*see Figure 3*).

This pattern indicates that the distributor received higher levels of blame when the quality of information that it communicated in its advertisement did not meet or exceed the quality of information that had been provided by the manufacturer. The interaction of information provided by the manufacturer and information provided by the distributor was not significant for the manufacturer ($p=0.489$), the purchaser ($p=0.295$), or the end-user ($p=0.609$).

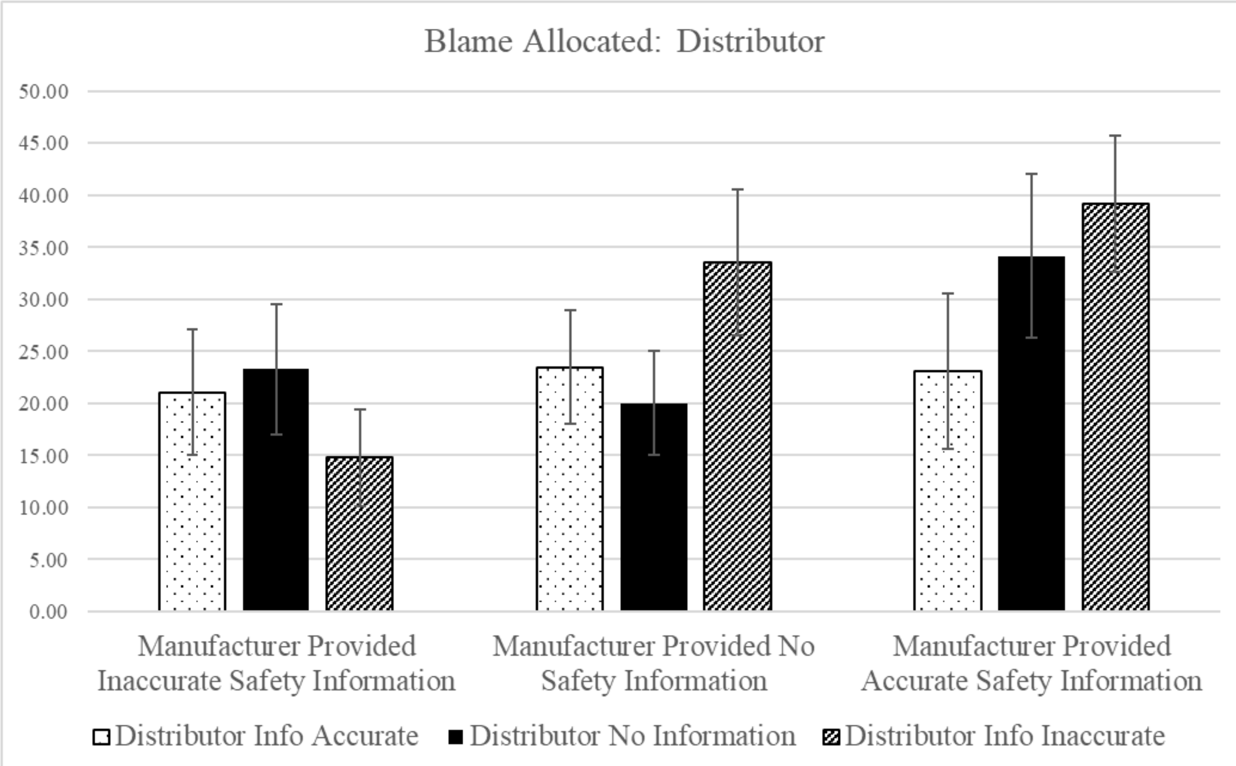

Figure 3. Blame Allocated to Distributor by Information Communicated (Study 2)

STUDY 3

PARTICIPANTS

Study 3 was designed to 1) conduct a second test of the full factorial of manufacturer communication by distributor communication conditions and 2) address the demographic limitations of the prior study. More than half of participants in Study 2 were past or current smokers, indicating that smokers may have been overrepresented in the sample (Centers for Disease Control and Prevention, 2018). The proportion of smokers in the sample is relevant because smokers are more likely to have interacted with a device like the SafetyCig, therefore, they may have different biases regarding how one should interact with such a device. Additionally, researchers have suggested that participant identity may influence allocations of blame in liability cases (Griffin et al., 1996; Ishaq, 2015). The racial diversity of the sample in Study 2 was limited. Study 3 allowed us to examine the replicability of Study 2's findings within a sample that more closely reflected the demographic composition of the United States.

Participants in Study 3 were undergraduate students recruited at a private university in the United States who identified as White (59.43%), Black/African-American (5.71%), Asian/Asian-American (21.14%), Hispanic (7.43%), and two or more races (5.14%). To participate in the study, they were required to provide informed consent and meet the same attention check criteria used in Study 2 in order to participate in the current study. A total of 176 individuals submitted responses that matched the above criteria. Their self-reported ages ranged from 18 to 23 years of age (*M*=18.94, *S.D.*=.96). Participants identified as male (58.29%), female (41.14%), and nonbinary (.57%). Only 12.56 percent of participants reported that they were currently employed. Three participants (1.70%) in Study 3 reported being current or past smokers.

METHODS

This study took on a 4 (entity: within-subjects) X 3 (manufacturer information accuracy: between-subjects) X 3 (distributor information accuracy: between-subjects) design. All participants were exposed to the same warning condition (less explicit) in this study. All study materials were direct replicates of the materials used in Study 2.

RESULTS

ENTITY

Variables were entered into a mixed model ANOVA. Mauchly's test was significant, $X^2(5) = 121.343$, $p<.001$ and degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .680$). Table 2 shows that consistent with the prior studies, the effect of entity on blame allocated was significant, $F(2.039, 340.555)=187.454$, $p<0.001$, *partial eta-squared=0.529.* Once again, the manufacturer received the greatest portion of blame ($M=51.131$, $SD=23.660$; *see Table 3*) and within-subjects contrasts indicated this was significantly more blame than the distributor ($M=31.727$, $SD=21.348$), $F(1, 167)=50.407$, $p<0.001$, *partial eta-squared=0.232.* The purchaser ($M=10.733$, $SD=13.332$), in turn, received significantly less blame than the distributor, $F(1, 167)=107.085$, $p<0.001$, *partial eta-squared=0.391.* Blame allocated to the end-user ($M=6.438$, $SD=10.789$) differed significantly from blame allocated to the purchaser, $F(1, 167)=11.087$, $p=0.001$, *partial eta-squared=0.062.*

INFORMATION COMMUNICATED BY THE MANUFACTURER

The interaction of information communicated by the manufacturer and entity was significant, $F(4.078, 340.555)=4.462$, $p=0.001$, *partial eta-squared=0.051.* Similar to Studies 1&2, to isolate this effect, we ran a series of four separate ANOVAs that were restricted by entity. These ANOVAs indicated that the effect of accuracy of information communicated by the manufacturer on allocations of blame for the manufacturer was significant, $F(2, 167)=4.900$, $p=0.009$, *partial eta-squared=0.055.* Post-hoc analyses using Bonferroni corrections showed that the manufacturer received significantly more blame when it communicated inaccurate information to the distributor ($M=57.545$) than when it communicated accurate information ($M=44.274$), $t(115)=2.949$, $p=0.046$, $d=0.546$. Blame allocated to the manufacturer when it communicated no safety information condition ($M=52.356$) did not differ significantly from blame allocated to the manufacturer when it provided accurate safety information ($p=0.693$) or inaccurate safety information ($p=1.000$).

The accuracy of information communicated by the manufacturer had a significant effect on blame allocated to the distributor, $F(2, 167)=6.808$, $p=0.001$, *partial eta-squared=0.075.* Post-hoc analyses indicated that the distributor received significantly less blame when the manufacturer communicated inaccurate information ($M=25.164$) than when the manufacturer communicated accurate information ($M=38.774$), $t(115)=3.401$, $p=0.011$, $d=0.630$. Blame allocated to the distributor when the manufacturer communicated no safety information ($M=30.441$) did not differ significantly from blame allocated to the distributor when the manufacturer provided accurate safety information ($p=0.548$) or inaccurate safety information ($p=1.000$).

INFORMATION COMMUNICATED BY THE DISTRIBUTOR

The effect of the interaction of information communicated by the distributor and entity on allocations of blame was significant, *F(4.078, 340.555)=2.636, p=0.033, partial eta-squared=0.031.* The accuracy of safety information communicated by the distributor had a significant effect on blame allocated to the distributor, *F(2, 167)=5.841, p=0.004, partial eta-squared=0.065.* Post-hoc analyses indicated that when the distributor communicated inaccurate safety information in its advertisement, it received significantly more blame (*M=38.403*) than when it communicated accurate information in the advertisement (*M=24.196*), *t(111)=3.765, p=0.003, d=0.712.* Blame allocated to the distributor when it communicated no safety information (*M=31.254*) did not differ significantly from blame allocated to the distributor when it provided accurate safety information (*p=0.791*) or inaccurate safety information (*p=0.828*).

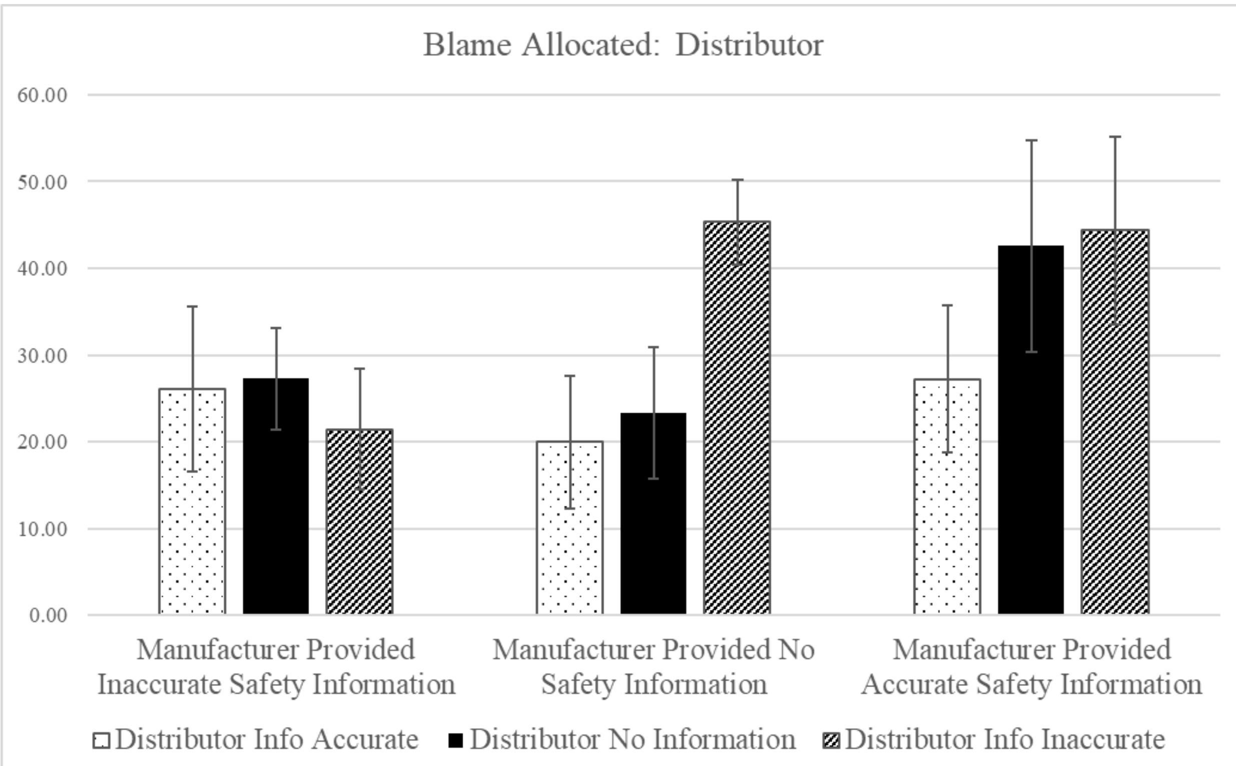

Figure 4. Blame Allocated to Distributor by Information Communicated (Study 3)

The three-way interaction of the accuracy of information communicated by the distributor, the accuracy of information communicated by the manufacturer, and entity was also significant, *F(8.157, 340.555)=2.315, p=0.019, partial eta-squared=0.053*. The interaction of manufacturer information and distributor information had a significant effect on blame allocated to the distributor, *F(4, 167)=4.084, p=0.004, partial eta-squared=0.089.* Consistent with Study 2, post-hoc analyses showed that when the manufacturer communicated inaccurate safety information to the distributor, the accuracy of information communicated by the distributor did not significantly influence blame attributed to the distributor after the accident (*p=1.000*). As shown in *Figure 4*, when the manufacturer failed to communicate any safety information to the distributor, the distributor received higher levels of blame when it communicated inaccurate information in its advertisement (*M=45.318*) than it did in the other communication conditions (*M=21.595*), *t(57)=5.887, p<0.001, d=1.585.* In the condition where the manufacturer communicated accurate information to the distributor, the distributor received more blame when it failed to include this information or provided inaccurate information in its advertisement (*M=43.500*) than it did when communicating accurate safety information in the advertisement (*M=27.222*), but this difference was not significant after Bonferroni corrections were applied (*p=0.277*).[3]

GENERAL DISCUSSION AND CONCLUSIONS

SUMMARY OF FINDINGS

Across three studies, when participants were asked to allocate blame for an accident in which a cigarette disposal unit caught fire and caused significant damage to a warehouse, they consistently assigned the greatest amount of blame to the early-stage entity (manufacturer) and the least amount of blame was consistently apportioned to the late-stage entity (end-user). More moderate levels of blame were apportioned to the mid-stage entities (distributor and purchaser).

Of all communication vehicles tested, the safety warning label had the greatest effect on allocations of blame. Studies 1 and 2 showed consistent evidence that when the manufacturer of the cigarette disposal unit used a more explicit safety warning label to communicate hazards to the purchaser, blame for the accident shifted downstream in the causal chain. Although Study 3 did not test the effect of the safety warning label used to communicate hazards to the purchaser, the overall distributions of blame in Study 3 were consistent with distributions of blame in the "less explicit" warning conditions in the first two studies.

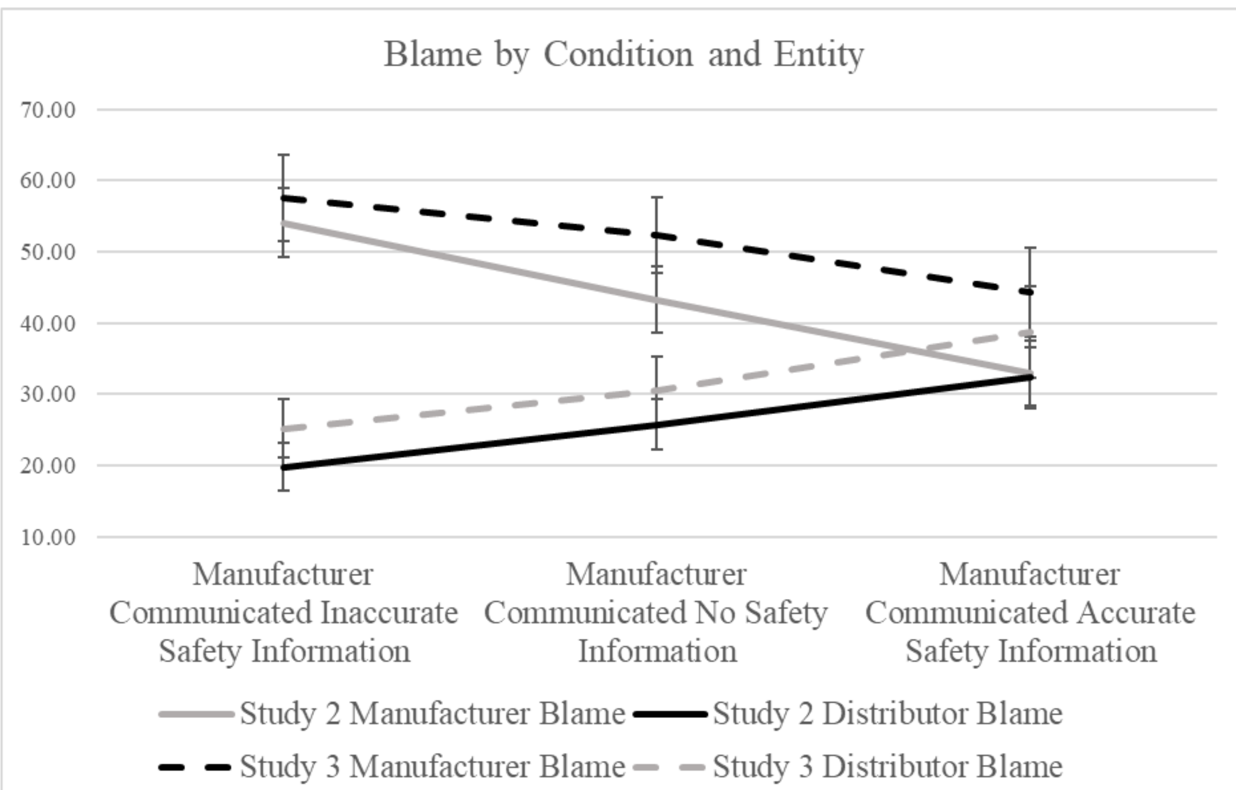

Figure 5. Influence of Accuracy of Information Communicated by Manufacturer

[3] Bonferroni corrections adjusted for 12 comparisons. The p-value prior to these corrections was 0.0230.

Similarly, as shown in *Figure 5*, the data revealed a pattern indicating that as the accuracy of safety information communicated from the manufacturer to the distributor increased, blame appeared to be reassigned from the manufacturer to the distributor. In all three studies, the distributor, a mid-stage entity who received and sent communication, was able to partially insulate itself from blame by communicating information with a quality that was greater than or equal to that received from the manufacturer. Because the effect of accuracy of information communicated by the distributor was not significant for any other entities, our findings suggest that blame reassigned from the distributor was distributed fairly evenly to other entities. Blame apportioned to the end-user was consistent across conditions in all three studies.

CONTRIBUTIONS TO ATTRIBUTION THEORY

THE FUNDAMENTAL ATTRIBUTION ERROR

The current research builds on prior work in attribution theory to help us better understand how communication of safety-related information influences allocations of blame in causal chains. The fundamental attribution error (FAE) states that evaluators have a tendency to attribute responsibility for an outcome to behaviors rather than contextual or environmental factors (Forgas, 1998; Jones & Harris, 1967; Malone, 1995; L. Ross, 1977). Building on the FAE, work in attribution theory indicates that evaluators work their way backwards through causal chains in search of voluntary actions that contributed to a negative outcome when apportioning blame (Hilton et al., 2010; McClure et al., 2007).

The current research's findings contribute to this stream by providing evidence that attributions of blame were influenced by voluntary choices regarding what information was communicated, how information was communicated, and responses to communication. For example, despite the fact that it was the end-user's cigarette that ignited the fire, in all three studies, the end-user received very little blame, likely because none of the safety information communicated provided guidance that would alter the behavior of the end-user. Similarly, when the purchaser did not receive communication informing it of the risks associated with product placement and installation, it received low amounts of blame. When the purchaser voluntarily disregarded safety communication by installing the disposal unit in a way that violated the safety warning, it received greater amounts of blame. Also, when the manufacturer or distributor chose not to accurately communicate product safety information, they also received higher amounts of blame.

Collectively, these findings indicate that evaluators carefully considered voluntary choices *regarding communication* within the causal chain when attributing blame for the fire. While prior research on the FAE has focused on tangible behaviors, the current research extends our understanding of the FAE to incorporate communication behaviors and brings us to our first proposition (*see Figure 6*):

Proposition 1: Accuracy of information communicated downstream in causal chains negatively influences blame allocated to the communicator.

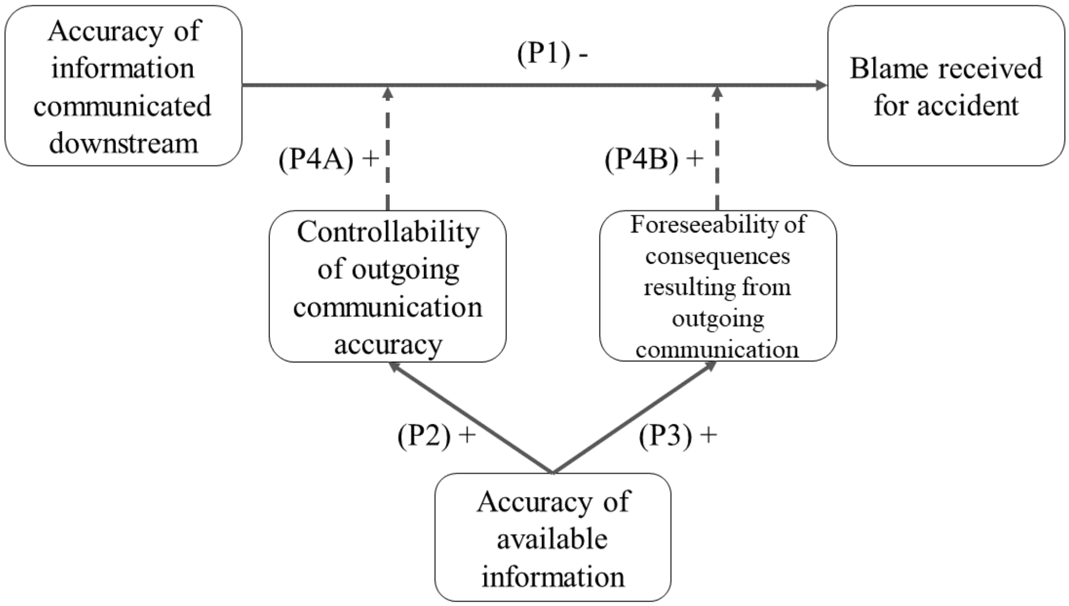

Figure 6. Theoretical Model

CONTROLLABILITY AND FORESEEABILITY

As summarized above, our findings show that the blame apportioned to the distributor was influenced by whether or not the distributor communicated less accurate information than what an earlier-stage entity had provided. This is likely because participants viewed an entity or actor as more responsible for an outcome when they had control over their actions (DeJoy, 1994).

For example, in the condition in which the manufacturer failed to provide the distributor with any safety information, the distributor was likely perceived as failing to be in control of whether or not it communicated accurate information in its advertisement, because the distributor was not in possession of accurate safety information. Conversely, in that same condition, it was likely considered to be in control over whether or not it provided inaccurate safety information because communicating inaccurate safety information would have required a conscious decision to fabricate information. The issue of controllability also helps to explain why the distributor did not benefit from providing more accurate information in its advertisement than what it received from the manufacturer. Providing higher quality information than what it received was likely perceived as a random act because:

> *Proposition 2: Accuracy of available information positively influences perceived controllability of outgoing communication accuracy.*

Similarly, when an actor or entity should have the ability to foresee the potential outcome resulting from an action, they are more likely to be held responsible for resulting outcomes (Kelley & Michela, 1980; Lagnado & Channon, 2008). When an entity fabricated and communicated inaccurate safety information, or when an entity was in possession of accurate safety information but failed to convey that information, one could argue that the resulting negative outcome was foreseeable. When an entity later in the causal chain simply passed along the information that had been provided by an entity earlier in the causal chain, however, one could easily argue that entity later in the chain could not have foreseen the consequences of conveying information from a trusted source, leading us to our next proposition:

Proposition 3: Accuracy of available information positively influences perceived foreseeability of outcomes resulting from outgoing communication.

In the current research, the manufacturer was always in possession of accurate information, thus it was likely perceived as being in control of the accuracy of information it communicated and able to foresee the consequences of such communication. Accordingly, the manufacturer was consistently perceived as more responsible for the accident when it failed to communicate accurate safety information. Conversely, the distributor's ability to control information accuracy and foresee outcomes was contingent upon the accuracy of the information that the manufacturer communicated. Consequently, the distributor was only perceived as having greater responsibility for the accident when the information it communicated to the purchaser was less accurate than what had been provided by the manufacturer. These findings contribute to attribution theory as they indicate that when allocating blame in causal chains, the location of an entity in a chain will not be of primary importance. Instead, the controllability of information communicated and foreseeability of outcomes resulting from communications will contribute to increased allocations of blame. More specifically:

Proposition 4: As the (A) controllability of information communicated and (B) foreseeability of outcomes resulting from communication increase, the strength of the relationship between accuracy of information communicated downstream and blame attributions also increases.

METHODOLOGICAL CONTRIBUTIONS

The results of this research were consistent across three different studies, indicating high replicability. Despite demographic differences between samples recruited on university campuses and the sample recruited through mTurk, we found no meaningful differences in research findings that could be attributable to our samples. Consequently, our findings support those of previous research (Obenauer & Kalsher, 2022) that find when incorporating appropriate attention checks and approval criteria (Harms & Desimone, 2015), cleansed data collected through mTurk may be of similar value to that collected through other mediums.

PRACTICAL IMPLICATIONS

ENTITIES EARLY IN THE CAUSAL CHAIN

Our findings have important practical implications for potential blameworthy entities at various points in the causal chain. In this research, the entity at the earliest point in the causal chain (the manufacturer) was able to reduce the amount of blame that it received simply by accurately and explicitly communicating information about safety hazards to entities further down the causal chain. Consequently, entities early in the causal chain can use this information to recognize that they can protect themselves from potential blame for an accident by accurately and explicitly communicating product safety information downstream in the causal chain. These findings should alleviate potential concerns that acknowledging risk through safety communication will lead to increased attributions of blame resulting in liability for accidents.

Accurate communication of safety information is not a sufficient methodology for absolving one of blame, however. In all three of our studies, the manufacturer received a considerable amount of blame, with several participants providing comments that expressed concerns about the product's design. Consequently, entities early in the causal chain should view accurate and explicit communication of safety information as a tool for augmenting the effects of proper product design rather than as a substitute for good design.

ENTITIES IN THE MIDDLE OF THE CAUSAL CHAIN

For potential blame-worthy entities in the middle of the causal chain (e.g., the distributor), our findings indicate that the blame they receive for an accident may be influenced by messages that are communicated to them from entities positioned earlier in the causal chain. In order to best insulate themselves from blame for an accident, entities in the middle of the causal chain should clearly relay all safety-related communications that they receive to downstream entities. Our findings indicate that mid-chain entities were expected to communicate safety-related information that was similar in quality to what they received, but they were not expected to provide higher quality information than what they received from entities earlier in the causal chain. These findings suggest evaluators do not hold mid-level entities responsible for discovering and conveying information beyond what has been communicated to them by entities earlier in the causal chain (*see Figure 7*).

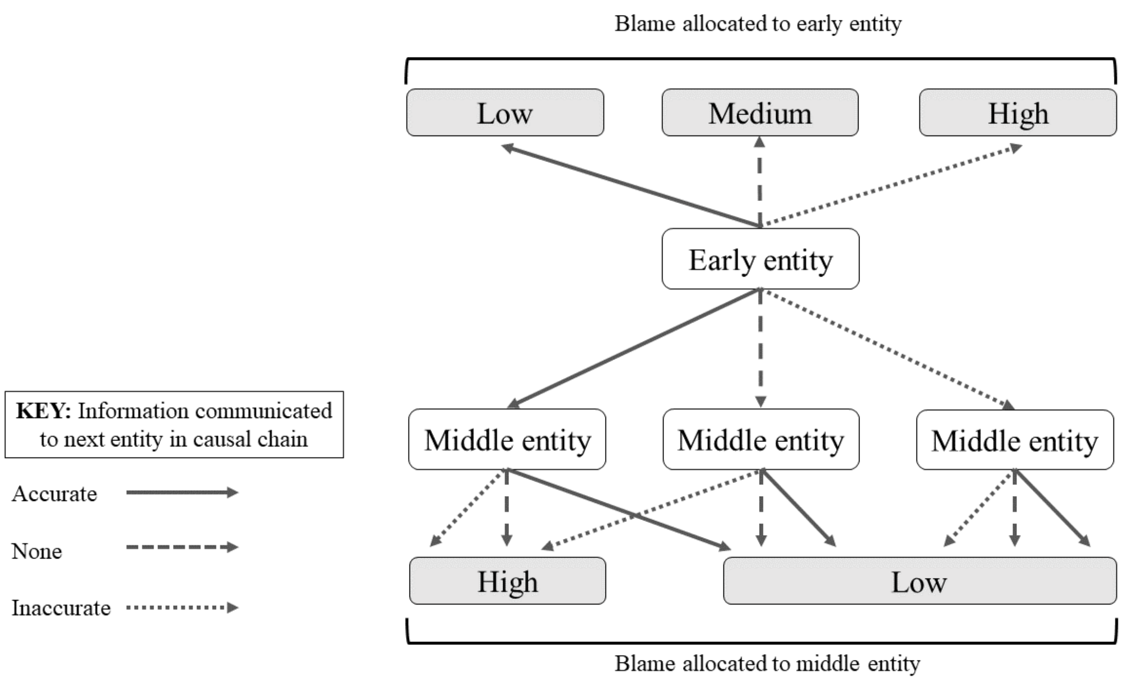

Figure 7. Practical Implications of Communication Accuracy

ENTITIES LATE IN THE CAUSAL CHAIN

Although prior research has shown the use of a more explicit safety warning label resulted in a shift of blame from the product manufacturer to the end-user (e.g., Laughery et al., 1998), that was not the case in the current research. Instead, we found that blame shifted from the manufacturer to the purchaser. This is likely because the purchaser was perceived as responsible for product installation. Consequently, the current research offers the following practical insight: in the presence of a more explicit safety warning label, perceived responsibility for product safety will not always shift to the end-user. Instead, it will likely shift to a late-stage entity who is perceived as having the greatest control over safety-related outcomes. In some cases, this may be the end-user, but in others, it may not.

Consistent with prior research, our findings indicate that entities late in the causal chain may not be held highly accountable for their actions when relevant safety-related information is not effectively communicated to them. Entities late in the causal chain may be held highly accountable for failing to respond appropriately to explicit communications of safety-related information. Additionally, as blame allocated to the purchaser was influenced by the manufacturer's product safety warning but not the distributor's advertisement, our findings indicate that for entities late in the causal chain, responding to communication that is received in close temporal proximity to interacting with the product is most important.

LIMITATIONS AND FUTURE RESEARCH

RESPONSES OF LATE-STAGE ENTITIES

One of the limitations of this research's design is that entities in the late stage of the causal chain behaved consistently in all experimental conditions. For example, neither the purchaser nor the end-user changed behavior in response to communications received from the manufacturer or distributor. Future research could further explore how allocations of blame are influenced by the *responses* of late-stage entities to safety-related communication.

ROLE OF ACTUAL PRODUCT RISKS

The current research examined the impact of communication of product safety risk on allocations of blame after an accident, but it did so within a design in which the product safety risks were constant. Future research could manipulate the safety features of a product's design along with the communication of safety-related information to explore the interactive effects of these two variables on allocations of blame.

SAMPLE SIZE

While our research design had sufficient power for detecting effects in ANOVA, our sample sizes may not have been large enough for post-hoc tests to be sufficiently powered. This potential limitation was clearly apparent in Study 3 where the blame apportioned to the distributor when it provided less accurate information than the manufacturer was almost 60 percent higher than when the manufacturer and distributor both provided accurate information. Despite this notable difference, in the "manufacturer provided accurate information" condition, post-hoc tests failed to find any significant differences in blame apportioned to the distributor attributable to distributor communication accuracy (*after* applying Bonferroni corrections). A power analysis showed that in order to detect this effect with a power of 0.80 after Bonferroni corrections, it would have required approximately 522 participants in Study 3.

ORGANIZATIONAL RECOGNITION

In the current research, we deliberately used a fictitious product name in order to minimize the effects of participant biases on their responses. In some cases, however, relevant evaluators (e.g., jurors) may have familiarity with product sellers that could influence their blame attributions. It is unlikely, however, that evaluators will be familiar with the majority of product sellers as there are more than 40,000 publicly traded companies globally (The World Bank, 2020) and even more privately held companies. Even so, future research could explore how the models developed in this research apply to widely recognized organizations and products.

CONCLUSION

The current research examined allocations of blame in causal chains. Unlike prior research examining the role of attribution theory in causal chains, this research focused on the impact of varying degrees of information accuracy within the chain. This research makes an important contribution to attribution theory as our findings indicate that within causal chains, as controllability of information and foreseeability of outcomes resulting from communication decisions increase, the relationship between information accuracy and allocations of responsibility for negative outcomes strengthens. Building on this insight, our work indicates that potentially blameworthy entities can reduce perceived responsibility for an accident by accurately communicating available safety information.

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