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E. James Baesler  
*Old Dominion University*

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## PERSUASIVE EFFECTS OF STORY AND STATISTICAL EVIDENCE

E. James Baesler

Facts and opinions, when offered in support of a communicator's claim, constitute the domain of factual evidence (Reinard, 1988), which can be subdivided into report evidence,<sup>1</sup> such as a story narrative, and statistical evidence, defined as numerical representations of events.

Cognitive response theory (see Petty, Ostrom, & Brock, 1981 for a review) would suggest that if an agent attempted to support a persuasive claim with evidence, then a target would generate cognitive responses (CRs) to the message. Petty and Cacioppo (1986) found that high quality message arguments produce more favorable and fewer unfavorable cognitive responses (UCRs) than low quality arguments. These favorable cognitive responses (FCRs), in turn, are positively correlated with persuasive outcomes.

Petty and Cacioppo do not address the *characteristics* of the message arguments that may be related to CRs or persuasive outcomes. Thus, two evidence issues that might increase our understanding of persuasion remain unaccounted for by current CR models: (a) What characteristics distinguish

story from statistical evidence? and (b) Which of these discriminating characteristics are positively correlated with persuasive outcomes?

### INVOLVEMENT, CREDIBILITY, AND VIVIDNESS

Persuasive effects of evidence are moderated by at least three variables not subsumed by any one persuasion theory, but nonetheless that need to be accounted for when attempting to explain effects of evidence. First, higher degrees of *topic involvement* facilitate the persuasive effects of evidence when compared to low topic involvement apparently because of systematic processing of central message cues (Stiff, 1986). Second, *communicator credibility* interacts with involvement, such that as involvement increases, the effect of credibility on persuasion increases to some point beyond which further increases in involvement decrease persuasiveness (Stiff, 1986). Third, several studies have shown support for the persuasive advantage of *vivid* when compared to *nonvivid* evidence types of evidence (e.g., Kazoleas, 1993; Baesler & Burgoon, 1994); other research has not revealed support for the vividness hypothesis (e.g., Iyengar & Kinder, 1987; see review by Taylor & Thompson, 1982). This study attempted to control these potentially confounding variables by creating messages that are comparable on topic involvement, communicator credibility, and message vividness.

### CHARACTERISTICS OF STORY AND STATISTICAL EVIDENCE

In a social influence context, given sufficient target motivation (such as an involving

<sup>1</sup> The story narrative is one common operationalization of "report evidence." Other researchers operationalize report evidence as case history, exemplar, or opinion (Reinard, 1988).

E. James Baesler (Ph.D., University of Arizona, 1991) is Associate Professor of Communication at Old Dominion University, Department of Communication and Theater Arts, Norfolk, VA, 23508; (757) 683-3828, (757) 465-2595; e-mail [ejb100f@oduvm.cc.odu.edu](mailto:ejb100f@oduvm.cc.odu.edu)

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message topic), story evidence may be easier to argue against than statistical evidence. A persuader's use of a story narrative could be refuted by the target's recall of a single contradictory story. This is not the case for arguing against statistical evidence. Typically, only experts in particular knowledge domains would routinely have access to statistical data in memory, whereas most individuals have a storehouse of stories on many topics. Thus, it would be difficult for most adults to marshal statistical data to counterargue a claim, but story data, since they are based on one's personal experience or the experience of others that is readily accessible, would be the preferred mode of arguing against both story and statistical claims.

Other features of evidence that distinguish story from statistical evidence, and might also be related to persuasiveness, include readability, complexity, personalness, and scientificness.<sup>2</sup> Since the numerical representation of statistics is encountered less frequently in everyday life than in stories, and since statistics are more difficult to interpret than a story, statistics are expected to be less readable and more complex than stories.

Personalness and scientificness of evidence were included in this study since they are characteristics unique to a particular type of evidence. The content and structure of the story, with characters engaged in a dialogue, are inherently more personal than statistics; statistics, by including numerical data based on some type of research, are often perceived as inherently more scientific than stories.

Given the review of evidence characteristics and persuasion, the following hypotheses and research questions were posed:

H1: Story and statistical types of evidence should be persuasive in: (a) changing

*beliefs* in the direction advocated in a message and (b) producing a greater number of favorable than unfavorable *cognitive responses*.

H2: Statistical evidence, when compared to story evidence, generates: (a) greater belief change in the direction advocated by the message and (b) fewer unfavorable cognitive responses.

RQ1: Are there differences in perceptions of the readability, complexity, personalness, and scientificness of story and statistical evidence?

RQ2: Given differences in evidence characteristics, do any of these differences covary with persuasion as indicated by belief change or cognitive responses?

## METHOD

### *Subjects and Procedures*

Participants ( $N=100$ ) were undergraduate students who participated in the study for extra credit. There were no significant differences in age ( $M=22.93$ ) or sex (56% female) across experimental conditions. The cover story for the investigation asked participants to evaluate *three different articles* for possible publication in the campus newspaper. Each participant completed the following sequence of activities for three story or three statistical messages: pre-test of beliefs, read article, list CRs, post-test beliefs, rate the exploratory variables, and complete manipulation checks.

### *Design and Independent Variables*

A 2 (evidence) X 3 (message topic) mixed design was employed to test the hypotheses and answer the research questions. Evidence was the fixed factor, and message topic was the random (or within subjects) factor in the design.<sup>3</sup> Evidence was operationalized as

<sup>2</sup> It was impractical to manipulate all of these variables for both story and statistical types of evidence; instead, these exploratory variables were measured rather than directly manipulated.

<sup>3</sup> Other scholars, such as Jackson (1992), might describe this design as message-by-treatments with multiple responses (evidence crossed with message replications, and persons nested under evidence but

story or statistical, and message topics included crime, internships, and birth-control. Three variations in the order of messages were created, and no significant differences in persuasion attributable to order were found.

*Evidence and Message Topics.* Story and statistical evidence were developed on the basis of Jackson's (1993) recommendation for *message instantiation* rather than attempting to manipulate all possible message variables that might be related to persuasion. Stories were based on the opinion of a single individual and contained a scene, characters, plot, and resolution. Statistics were based on large samples and were presented as percentages and simple odds (e.g., 80%, 4 out of 10).

Prior research comparing story and statistical evidence has involved only one message topic and topics of low involvement (Baesler & Burgoon, 1994; Kazoleas, 1993). Thus, three message topics were employed to increase the generalizability of potential results. The results indicated that all topics were perceived to be moderately high in involvement (scores on a 1-9 single item involvement scale ranged from 7.16-7.62), with no significant differences between evidence conditions within a given topic.

### *Dependent Measures*

*Beliefs and Message Persuasiveness.* A mean score for two items representing pre- and post-beliefs measured agreement with the main message argument on 1-9 point Likert-type scales and had a Cronbach inter-item alpha reliability coefficient of .69.

*Cognitive Responses.* Two pairs of trained coders classified the polarity of CRs into favorable, unfavorable, or neutral/irrelevant categories (Cacioppo & Petty, 1981). Scott's phi inter-coder reliability coefficients were .86 and .89 for each pair of coders. Ratings of

CRs from both pairs of coders were summed for subsequent analysis.

*Exploratory Variables.* Single item 1-9 point bipolar semantic differential-type scales were created to measure the following exploratory variables: complexity (simple/complex), readability (easy/difficult to read), personalness (personal/impersonal), and scientificness (scientific/unscientific).

### *Manipulation Checks for Credibility and Vividness*

*Credibility.* The competence and trustworthiness of the source of the messages (authorship of articles was attributed to graduate students majoring in journalism) were assessed to confirm that the messages were "credible" on two 9-point bipolar semantic differential scales and had a Cronbach inter-item alpha of .72. Average credibility scores did not differ for story and statistical evidence conditions *within* each of the three messages.

*Vividness.* All messages were created to be moderately vivid by manipulating the linguistic quality of the message. Four 9-point bipolar items colorful, concrete, interesting, and stimulating<sup>4</sup> captured degree of vividness and had an inter-item Cronbach alpha reliability coefficient of .77. Average vividness scores did not differ between evidence conditions *within* each of the three messages. Overall means for vividness ranged between 5.87 and 6.51, which indicated that all messages were perceived to be moderately vivid.

## RESULTS

### *Independent Persuasive Effects of Evidence*

Hypothesis 1 predicted that both types of evidence would be persuasive and was tested

crossed with replications). I have opted for the more traditional design language used by Keppel (1982).

<sup>4</sup> There is a substantial body of literature on vividness that supports this particular operationalization (see Baesler's review, 1991).

TABLE 1  
MEANS FOR BELIEFS—EVIDENCE BY MESSAGE TOPIC

Message Topic	Evidence Type			
	Story		Statistical	
	Pre	Post	Pre	Post
Crime	4.61 <sub>a</sub> (1.41)	6.99 <sub>ac</sub> (1.01)	4.58 <sub>b</sub> (1.09)	7.44 <sub>bc</sub> (1.01)
Internship	6.56 (2.08)	6.73 (2.03)	6.26 (2.21)	6.35 (2.38)
Birth control	3.74 <sub>d</sub> (2.49)	2.58 <sub>de</sub> (1.45)	3.76 (2.34)	4.05 <sub>e</sub> (2.44)

Note: Higher numbers indicate greater agreement with the position advocated in the message. Within a row, common letter subscripts indicate that the respective means were significantly different,  $p < .02$ , and numbers in parentheses are standard deviations.

in relation to belief change and the ratio of favorable to unfavorable CRs.

**Belief Change.** Both story and statistical evidence were persuasive in *changing beliefs* in the direction advocated by the crime topic (a modified alpha level of .02 was used to account for family wise error rates, Keppel, 1982),  $t(50)=9.77$ ,  $t(48)=13.30$ ,  $p < .02$  (See Table 1 for means), but not for the internship and birth control topics,  $p > .02$ .

**Cognitive Responses.** Both types of evidence produced *more favorable than unfavorable CRs* for the crime,  $t(50)=4.41$ ,  $t(48)=5.22$ , and internship topics,  $t(50)=3.75$ ,  $t(48)=4.04$ ,  $p < .02$ , but not for the birth-control topic,  $p > .02$  (See Table 2 for means).

#### Comparative Persuasive Effects of Evidence

To compare the persuasiveness of story *versus* statistical evidence (H2), two 2 (evidence) X 3 (message topic) repeated measures analyses of variance were conducted, with post beliefs and UCRs as dependent measures. Separate ANOVAs rather than a single MANOVA were employed since the underlying metric for the dependent variables was different.

**Post Beliefs.** The most direct test of H2, which focused on whether a particular type of evidence is more persuasive across all

TABLE 2  
MEANS COGNITIVE RESPONSES—EVIDENCE BY MESSAGE TOPIC

Message Topic	Evidence Type			
	Story		Statistical	
	Favorable	Unfavorable	Favorable	Unfavorable
Crime	7.30 (5.45)	2.61 (3.65)	8.73 (4.21)	3.22 (5.00)
Internship	6.80 (4.67)	3.00 (3.64)	7.34 (5.28)	2.93 (3.81)
Birth control	4.05 (4.20)	6.48 (5.24)	3.67 (4.10)	6.97 (4.69)

Note: For each type of evidence, all paired contrasts between favorable vs unfavorable cognitive responses within each topic were statistically significant ( $p < .02$ ) except for story evidence/birth control topic. Numbers in parentheses represent standard deviations.

three message topics, is the main effect for evidence. This analysis necessitated the hand computation of a quasi- $F$  ratio ( $F'$ ) (See Jackson, 1992, p. 76 for the formula) since the proper error term and degrees of freedom for testing the main effect of evidence (see Keppel, 1982, pp. 530–531) are not provided in standard repeated measures analysis. The  $F'$  value was 1.32, and comparison with the critical  $F'_{1,2} = 18.5$  (the df for  $F'$  are hand calculated based on mean square ratios, which enables one to use a standard  $F$  table, see Keppel, 1982, p. 533 for transformation formulae) showed this to be nonsignificant.

In addition, a 2 (evidence) X 3 (message topic) analysis of variance on post beliefs was conducted to determine if the persuasiveness of evidence varied by topic. This yielded a significant two-way interaction between evidence and message topic,  $F(2,196)=4.14$ ,  $p < .05$ ,  $\omega^2=.01$ . Overall, neither type of evidence demonstrated persuasive superiority across all three messages.

**Unfavorable Cognitive Responses.** Hypothesis 2 predicted that statistical evidence would be more difficult to counterargue (and thus should generate *fewer* UCRs) than story evidence; however, the results indicated that

TABLE 3  
MEANS PERSONAL AND SCIENTIFIC CHARACTERISTICS  
OF EVIDENCE—EVIDENCE BY MESSAGE TOPIC

Message Topic	Characteristics of Evidence			
	Personal		Scientific	
	Story	Statistic	Story	Statistic
Crime	7.13 (2.19)	5.06 (2.45)	3.41 (2.33)	4.89 (2.07)
Internship	6.96 (1.95)	5.36 (2.27)	3.45 (2.04)	5.26 (2.00)
Birth control	7.62 (1.38)	5.67 (2.35)	5.25 (2.58)	5.87 (2.27)

Note: Higher numbers indicate greater amounts of the evidence characteristic. Numbers in parentheses are standard deviations. All paired contrasts of evidence within each topic were statistically significant except scientificness of evidence for the birth control topic.

there were no differences in the number of UCRs generated by either type of evidence.

*Exploratory Variables.* Research question 1 focused on whether several variables might differentiate story from statistical evidence. These analyses required the calculation of a quasi- $F$  ratio according to the same procedures outlined under results for post-beliefs. The *personalness* of stories was rated high in comparison to the moderate ratings of personalness for statistics for all three message topics,  $F' = 22.37$ ,  $p < .05$ ,  $\omega^2 = .15$ , critical  $F(1,28) = 4.20$  (See Table 3 for means). In contrast, the *scientificness* of statistics was rated moderate in comparison to lower ratings of scientificness for story evidence across all three message topics,  $F' = 6.29$ ,  $p < .05$ ,  $\omega^2 = .06$ , critical  $F(1,6) = 5.99$  (Refer to Table 3 for means). No *patterns* of statistical significance emerged in the evidence contrasts within each message topic for readability and complexity.

Research question 2 asked whether the exploratory variables that reliably distinguish story from statistical types of evidence would also predict persuasive effects related to beliefs or CRs. For each of the three message topics, Pearson product moment correlations indicated that the evidence characteristics of scientificness and personal-

ness were *not* reliably related to the persuasive outcome measures ( $r$ s ranged between  $-.04$  and  $.10$ ,  $p > .05$ ).

## DISCUSSION

Story and statistical evidence were persuasive in: (1) changing beliefs (pre to post test) related to the crime topic, and (2) generating more favorable than unfavorable CRs for the crime and internship topics (H1). Statistical evidence was no more persuasive than story evidence when measures of beliefs and UCRs were employed as outcome measures (H2). Statistical evidence was rated as more scientific and less personal than story evidence (RQ1); however, neither of these variables covaried with persuasion (RQ2).

In comparison to prior research, which has shown a persuasive advantage for statistical over story evidence when employing a *low involvement* topic (Baesler & Burgoon, 1994), the test of the main effect for evidence in this study suggested that statistical evidence is neither more nor less persuasive than story evidence for topics of *moderately high involvement*. This finding, when coupled with the results that indicated both types of evidence generated comparable levels of UCRs, does not lend support to the counterargument hypothesis. It appears that simple statistics (percentages and odds) are no more difficult to counterargue than story narratives. It remains for future research to determine whether there are any differences in the *quality* of arguments used to discount statistical versus story evidence in contexts suited to interactive communication, such as interpersonal compliance-gaining.

The significant two-way interaction between evidence and message topic indicated that persuasive effects of evidence varied by topic. This finding could be interpreted in a number of ways. The process of ruling out some interpretations in favor of others is akin to Popper's (1961) notion that theoretical explanations are like a fishing net whose

mesh we endeavor to make finer and finer. For the net used to catch the message-evidence interaction some interpretations are more plausible than others given the control and exploratory variables (the mesh of the net) built into the design of the study. That is, the message-evidence interaction is *not* attributable to the variables of credibility, involvement, vividness, scientificness, personalness, readability, or complexity.

Since message topic was a random factor in the design, there are a multitude of other moderating variables that might explain the message-evidence interaction. While speculative, one possible explanation might be related to initial beliefs. Differences in the persuasiveness of evidence by message topic may be associated with differences in initial beliefs among the three messages (unfavorable for birth control, neutral for crime, and favorable for internships). It would be premature, however, to conclude that initial beliefs are the moderating variable for the message-evidence interaction since there are no replications of messages based on type of initial belief. Future research might include message replications for initial belief in order to explore this hypothesis further.

The exploratory research questions were designed to uncover other message variables that might (a) distinguish story from statistical evidence and (b) predict persuasiveness. Perceptions of evidence's personalness and scientificness reliably distinguished between stories and statistics, but were not related to persuasiveness. Future research might experimentally vary the personal and scientific features of story and statistical evidence to provide a better representation of the bandwidth of these variables before discounting their potential persuasive impact.

Future research might also investigate the effects of story and statistical evidence independently of each other since complex studies like this one only allow for a limited number of experimental manipulations. Two potentially fruitful studies are apparent. One

investigation might explore statistical features of evidence, such as sample size, numerical presentation (e.g., confidence interval, percent, odds), and sampling method, under conditions of high and low involvement. Second, the story features of evidence, could be experimentally varied and tested for their persuasive effects using an instrument that assesses story coherence and fidelity (Baesler, 1995) on the basis of Fisher's (1989) narrative theory.

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