

## SHORT COMMUNICATIONS

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### A REVIEW OF EXPERIMENTAL RESEARCH ON THE RELATIVE PERSUASIVENESS OF ANECDOTAL, STATISTICAL, CAUSAL, AND EXPERT EVIDENCE

Persuasive texts in which evidence is employed to support claims are more effective than texts without evidence. Text writers may use different types of evidence, such as anecdotal, statistical, causal, and expert evidence. Over the years, a number of experimental studies have investigated the persuasive effectiveness of these evidence types. In these experiments, various definitions and operationalisations of evidence and evidence types have been used. As a consequence, there is no clear picture of which type of evidence is the most persuasive. This review analyses fourteen experiments on the relative persuasiveness of evidence types. Results show that statistical and causal evidence are more persuasive than anecdotal evidence.

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## 1. Introduction

Persuasive texts are written to convince their readers to behave in a certain way, such as travelling by train, voting on an environmental party, or implementing a comprehensive exam. If text writers use argumentation in these texts, it usually is pragmatic argumentation (Schellens & Verhoeven 1994). The prototypical example of pragmatic argumentation is the recommendation of an action on the basis of its positive consequences. The implementation of comprehensive exams, for example, may be recommended by putting forward higher starting salaries for graduates. Pragmatic argumentation will be more persuasive, when the text writer makes it highly probable that the action will indeed lead to the consequence, and when the text writer shows that the consequence is highly desirable (cf. Feteris 2002). In order to achieve these goals, evidence can be employed to show that (a) the implementation of comprehensive exams will very likely lead to higher starting salaries for graduates, and that (b) higher starting salaries are highly desirable. Evidence can be defined as “data (facts or opinions) presented as proof for an assertion” (Reynolds & Reynolds 2002: 429). Schellens and De Jong (2004) suggested that evidence for the desirability of consequences, such as higher salaries or a good health, is redundant if the consequences are personally relevant to the receivers of the message. People are capable themselves to judge the desirability of consequences. This suggestion was supported in a corpus study of persuasive public information leaflets (Hornikx et al. 2003). In this study, evidence was given over three times more in support for the probability than for the desirability of consequences. Evidence in support for the probability of the occurrence of the consequence is therefore an important determinant of the persuasiveness of argumentation in a text.

A number of studies have investigated the effect of evidence on the persuasiveness of texts. These studies have compared the effect of different types of evidence. As these experimental studies have had a lot of different definitions and operationalisations of evidence, there is no clear picture of which type of evidence is the most persuasive (cf. McGuire 2000; O’Keefe 2002). Studies in cognitive psychology, for instance, have repeatedly shown the great impact of anecdotes on judgments and decisions (e.g., Kahneman & Tversky 1972; Nisbett & Borgida 1975), whereas other evidence studies showed that statistical evidence was more persuasive than anecdotal evidence (e.g., Slater & Rouner 1996). In Section 2, I will discuss the inconsistencies of these experimental studies.

There have been a few reviews on the relative persuasiveness of evidence types, but they also differed considerably. In Section 3, therefore, I will propose a new review of experimental studies on the relative persuasiveness of evidence types.

## 2. Inconsistencies in studies on the relative persuasiveness of evidence types

The first article on the persuasiveness of evidence types was Cathcart (1955). He hypothesised that a debater should use adequate evidence in support of his claims in order to be persuasive. Cathcart prepared a speech in favour of the abolition of capital punishment, and four types of evidence. Messages with evidence, or with documented evidence with source characteristics proved to be more convincing than messages without evidence.

Current studies still resemble this study, both with respect to their central research question (which type of evidence is the most persuasive?) as to their research design (a speech or text with different types of evidence that are presented to participants in a between-subject design). However, these studies have been quite inconsistent when it comes to their definitions and operationalisations of evidence and evidence types. Kellermann (1980) wrote a critical review about the concept of evidence. Although, in general, all studies agree that evidence constitutes a form of proof, the “definitions of ‘evidence’ are almost as numerous as the individuals who work in the area” (1980: 162). The same goes for operationalisations of the evidence types. Source evidence, for instance, has been operationalised through the presence or absence of an authority attribution, a general or vague attribution, the amount of attribution (such as date or place), or the source reliability (1980: 163).

As evidence studies are so different, it is interesting to examine reviews on evidence types. These can be expected to provide more insights into the relative persuasiveness of evidence types. Five reviews have been presented throughout the years: McCroskey (1969), Reinard (1988), Baesler and Burgoon (1994), Allen and Preiss (1997), and Reinard (1998). Unfortunately, these reviews often appear to have avoided the issue of evidence definition. Moreover, there were no clear criteria concerning evidence operationalisations. The selection of studies even considerably differed from review to review. This may explain the opposite findings in some reviews: anecdotal evidence was more persuasive than statistical evidence in Baesler and Burgoon (1994), and Reinard (1988), but statistical evidence was more convincing than anecdotal evidence in Allen and Preiss (1997).

In conclusion, studies that investigated the relative persuasiveness of evidence types used various definitions and operationalisations of evidence and evidence types. Next, reviews apparently have not taken into account the differences in definitions and operationalisations. It is therefore important to set up more rigid criteria for a systematic review of the relative persuasiveness of the four types of evidence. A new review is also desirable, because a number of new experiments have been published since 1998.

### 3. Review on the relative persuasiveness of evidence types

Published experiments about the relative persuasiveness of evidence types were selected according to six criteria.

- (1) Evidence is used as a form of proof for a claim. A claim can be explicitly stated, but may also be inferred from the text message. Evidence, whether it is called information or data, is employed to enhance the probability of the claim.
- (2) Type of evidence is an independent variable (statistical, anecdotal, causal, expert evidence, or combinations), and at least two types of evidence are compared.
- (3) The definitions of the types of evidence correspond to those of Rieke and Sillars (1984). This partly covers the problem of different operationalisations. Anecdotal evidence consists of a specific instance (1984: 92), and statistical evidence is a numerical summary of a series of instances (p. 94). Causal evidence, next, consists of an explanation for the occurrence of the effect (p. 74), and expert evidence consists of the testimony of an expert (p. 94). Operationalisations were also taken into account. A few studies were not selected, because their operationalisations were unknown or unacceptable. In Rook (1986), for instance, the operationalisation of statistical evidence was not clear. The claim about the health risks for women was supported by “information with reference to women in general” (1986: 528).
- (4) There is a fair comparison of the types of evidence. Differences in media were not accepted. The Borgida and Nisbett (1977) study, therefore, was not selected: statistical evidence was given on a piece of paper, whereas the anecdotal evidence had been videotaped. Differences in length and vividness, however, were accepted, as anecdotal evidence has traditionally been operationalised as a long, vivid story.
- (5) Participants are exposed to only one type of evidence per claim. This

research design was chosen in the majority of the persuasion studies on evidence. In a large number of studies in cognitive psychology, however, the impact of information that corresponds to either statistical or anecdotal evidence was examined by providing participants both types of evidence at the same time. The fact that anecdotal evidence proved to be more persuasive than statistical evidence was an artefact of the research designs. Because of this criterion, a lot of studies were discarded from the review (cf. Allen & Preiss 1997). Finally, studies in which participants were given two different claims with each time another type of evidence were included (e.g., Koballa 1986). Here, the judgement of the first claim with evidence is expected not to affect the judgement of the second claim with evidence, as the claims are different.

- (6) The acceptance of the claim is measured as dependent variable. Acceptance may be measured in terms of probability (e.g., Hoeken 2001a), prediction (e.g., Dickson 1982), as an attitude toward an object or behaviour (e.g., Koballa 1986), or as an intention (e.g., Sherer & Rogers 1984).

Publications were searched in various ways. In the first place, previous reviews on the effectiveness of the use of evidence (e.g., McCroskey 1969), reviews on the effectiveness of different types of evidence (e.g., Allen & Preiss 1997), and other non-empirical articles on evidence (e.g., Reynolds & Reynolds 2002) were consulted. In the second place, searches were made through databases and document-retrieval services (PsychINFO, Sociological Abstracts, Econlit, Current Contents Weekly, Current Contents Archives, and Social Sciences). Finally, the snowball method on the basis of the publications that had been found was used to increase the number of publications. This led to fourteen studies on the relative persuasiveness of evidence types<sup>1</sup>.

The studies that met the six criteria will be discussed below on the basis of comparisons between two types of evidence: statistical versus anecdotal, statistical versus causal, anecdotal versus causal, and expert evidence versus the other three types of evidence. Each comparison contains an overview of the results, a short presentation of the studies, and a discussion. Table 1 lists these studies and their results.

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*Table 1. Results of studies on the relative persuasiveness of evidence types*

result	reference
statistical > anecdotal	Allen et al. (2000) Baesler & Burgoon (1994) Dickson (1982) Hoeken (2001a) Hoeken & Hustinx (2003) Slater & Rouner (1996)
statistical = anecdotal	Baesler (1997) Cox & Cox (2001) Hoeken (2001b) Kazoleas (1993) Sherer & Rogers (1984)
anecdotal > statistical	Koballa (1986)
statistical > causal	Hoeken (2001a)
statistical = causal	Hoeken & Hustinx (2003)
causal > statistical	Slusher & Anderson (1996, study I) Slusher & Anderson (1996, study II)
causal > anecdotal	Hoeken & Hustinx (2003)
causal = anecdotal	Hoeken (2001a)
expert > anecdotal	Hoeken & Hustinx (2003)
expert = statistical	Hoeken & Hustinx (2003)
expert = causal	Hoeken & Hustinx (2003)

*Statistical – anecdotal evidence*

Overview – Twelve studies compared the relative persuasiveness of anecdotal and statistical evidence. Statistical evidence proved to be more persuasive in six studies (Allen et al. 2000; Baesler & Burgoon 1994; Dickson 1982; Hoeken 2001a; Hoeken & Hustinx 2003; Slater & Rouner 1996), anecdotal evidence in one study (Koballa 1986), and in the five remaining studies, no differences were found (Baesler 1997; Cox & Cox 2001; Hoeken 2001b; Kazoleas 1993; Sherer & Rogers 1984).

Studies – In Allen et al. (2000), participants received one of fifteen texts (such as about an aptitude test) that contained either statistical or

anecdotal evidence. The definitions and operationalisations of both types of evidence correspond to criterion 3. Statistical evidence proved to be more persuasive than anecdotal evidence. Baesler and Burgoon (1994) investigated the relative persuasiveness of statistical and anecdotal evidence in support of the claim that most juvenile delinquents do not become adult criminals. Statistical evidence proved to be more convincing than anecdotal evidence. Next, the finding of Dickson (1982) can be interpreted as a persuasive advantage for statistical evidence. Participants were given a report about a breakdown rate of a brand of refrigerator with either anecdotal or statistical evidence. Anecdotal evidence consisted of four housewives that had not had any problem with their refrigerator, and one housewife that had indeed encountered a problem. In the statistical evidence, 395 housewives were reported to have had no problem, whereas 105 housewives said to have experienced a breakdown. Note that in both versions, around 80% of the persons did not have any problem with their refrigerator. Participants had to predict, amongst others, the breakdown rate of twenty refrigerators. If the message had had a persuasive character, its objective would have been to convince the readers that only 20% of the refrigerators of this brand break down. Participants with statistical evidence were highly persuaded, as their judgments approached the 20%. Readers of anecdotal evidence, on the contrary, overestimated the breakdown rate, and were therefore less persuaded. In Hoeken (2001a), participants were given statistical, anecdotal, or causal evidence in support of the specific claim that a new cultural centre would be successful. The anecdotal evidence stated that a similar centre in another city had been very successful. In the statistical evidence, success of 27 such cultural centres was reported. Statistical evidence proved to be more convincing as support of this specific claim. In Hoeken and Hustinx (2003), participants were given twenty general claims with either statistical, anecdotal, causal, or expert evidence. Each evidence type occurred in support of four claims. An example of a claim is 'Relaxation rooms in offices lead to a sharp decline of absence through illness'. Statistical evidence proved to be more persuasive than anecdotal evidence. In Slater and Rouner (1996), the claim was that alcohol is a harmful presence in society, because it leads to health risks, economic and career harm, and drunk driving. Anecdotal evidence consisted of a person who had experienced these problems because of alcohol. An example of statistical evidence was that 25% of men who occasionally drink have these problems. Statistical evidence proved to be more convincing.

Five studies reported no difference in the persuasiveness of statistical and anecdotal evidence. In Baesler (1997), the two types of evidence were used to support three messages about crime, internships, and birth control. Evidence definitions and operationalisations were similar to those of Baesler and Burgoon (1994). In Cox and Cox (2001), female participants were given information about the benefits of regular screening mammographs. In the statistical evidence, an early treatment was said to reduce the risk to die of breast cancer with 30%. The anecdotal evidence consisted of a report of a successful story of a woman. Statistical and anecdotal evidence proved to be equally persuasive. In Hoeken (2001b), the specific claim was that local taxes in a certain town should be raised in order to install extra streetlights on the sidewalks, because that would reduce the number of burglaries. The statistical evidence consisted of a study among 48 towns showing that installing extra streetlights decreased the number of burglaries with 42%. In the anecdotal evidence, the effect was shown to have occurred in another town. Both types of evidence were equally persuasive. The participants in Kazoleas (1993) received a message that advocated the use of safety belts. The message was supported by statistical evidence (people have a 50% smaller risk to get injured when wearing a safety belt) or anecdotal evidence (an example of a person who used the safety belt). The attitude toward the use of safety belts was the same after statistical or anecdotal evidence. Sherer and Rogers (1984) constructed an essay in which the main claim was that less drinking avoids certain dramatic consequences. Anecdotal (two drinkers) and statistical evidence (statistics about 2000 problem drinkers) were used to support that claim. Both types of evidence were equally effective in influencing the intention to limit alcohol use, and to abstain from it.

Koballa (1986) found that anecdotal evidence was more persuasive than statistical evidence in support of two general claims that the introduction of new science programs would be useful, because it would lead to better results. Participants were given two messages, each time for a different science program with another type of evidence. The types of evidence did not compete with each other, as they each supported another message (otherwise this study would not have met criterion 5). Anecdotal evidence consisted of a report of a person who had experienced the program. In the statistical evidence, the usefulness of the programs was demonstrated in numerous studies.

Discussion – Statistical and anecdotal are the two types of evidence that have received the most research attention. The results of these twelve



studies correspond to the meta-analysis of Allen and Preiss (1997): statistical evidence is more persuasive than anecdotal evidence. Two previous reviews reported a stronger persuasive advantage for anecdotal over statistical evidence (Baesler & Burgoon 1994; Reinard 1988). This discrepancy of conclusions can be explained by the selection of studies. In my review and in the meta-analysis of Allen and Preiss (1997), studies where more than one type of evidence was given per claim (criterion 5) were discarded from selection.

#### *Statistical – causal evidence*

Overview – In three studies, the persuasive power of statistical evidence was compared with that of causal evidence. The results are mixed: sometimes statistical evidence was more persuasive (Hoeken 2001a), sometimes causal evidence was more convincing (Slusher & Anderson 1996; experiments I and II), and sometimes there was no difference (Hoeken & Hustinx 2003).

Studies – In Hoeken (2001a), participants were given statistical, anecdotal or causal evidence in support of the specific claim that a new cultural centre would be successful. In the causal evidence, three reasons were provided why this centre would be profitable. One of them was that a movie theatre in a nearby town had burnt down. Statistical evidence was more convincing. In a follow-up study that contained more claims, Hoeken and Hustinx (2003), there was no difference in the persuasiveness of statistical and causal evidence. Finally, Slusher and Anderson (1996) supported the general claim that Aids is not transmitted by personal contact or mosquitoes with causal and/or statistical evidence. In two conditions, participants were exposed to causal or to statistical evidence. An example of the statistical evidence was that in rural villages, where mosquitoes are likely to spread the disease, only 0.8% of the people have the Aids virus. Causal evidence consisted of reasons why mosquitoes do not spread the disease, for instance, because they are too small to carry enough viruses to infect a person. Causal evidence was more persuasive.

Discussion – There is no clear indication whether causal and statistical evidence are equally persuasive or whether one of them is more persuasive than the other.

#### *Anecdotal – causal evidence*

Overview – The two studies that compared these types of evidence showed opposite results: in Hoeken (2001a) both types were equally persuasive, whereas in Hoeken and Hustinx (2003) causal evidence was more convincing.

Discussion – As there are only two studies that directly compared the persuasiveness of anecdotal with causal evidence, it is impossible to draw reliable conclusions about which type of evidence is more persuasive. It seems that causal evidence is more convincing. This result was obtained in a study that investigated the effect of evidence for twenty claims, which enhances the generality of its result. Next, although there was no difference in the actual persuasiveness of anecdotal and causal evidence in Hoeken (2001a), participants did perceive the persuasive power of causal evidence as higher than that of anecdotal evidence.

*Expert evidence – other types of evidence*

In the only study that investigated expert evidence with other types of evidence (Hoeken & Hustinx 2003), this type of evidence was as persuasive as statistical and causal evidence, and more persuasive than anecdotal evidence.

#### 4. Conclusion and discussion

When the results of this review are taken together, it appears that statistical and causal evidence are more persuasive than anecdotal evidence. As one study suggests that expert evidence too is more persuasive than anecdotal evidence, the overall, tentative conclusion would be that anecdotal evidence is the least persuasive type of evidence.

In order to gain more insights into the relative persuasiveness of evidence types, it is important to know what kind of factors influence this persuasiveness, in what direction, and to what extent. One of the factors that seems essential is the quality of evidence itself. Reynolds and Reynolds (2002: 433) stress that, in order to be effective, evidence has to have a high quality. When evidence is employed to support a claim, there is an underlying argumentation scheme, such as the argument by generalization in case of statistical evidence. For each argumentation scheme, there are different criteria, such as a large sample size for the argument by generalization. The quality of evidence can be manipulated with reference to the degree that an instantiation of evidence meets such normative criteria. Normatively strong statistical evidence, for instance, consists of numerical information that is based on a large sample size. Evidence that meets such conditions should be persuasive. Taking into account the quality of evidence manipulations allows a fair comparison of the types of evidence. Other factors that have been identified are, for instance, the type of claim (Hoeken 2001b), the involvement of receivers

of evidence (Slater & Rouner 1996), and their cultural background (Hornikx et al. 2003). Research on the effect of such factors on the relative persuasiveness of evidence types will contribute to our understanding of which type of evidence is the most persuasive under which conditions.

## References

References marked with an asterisk indicate studies that are included in the review.

- \*ALLEN, M. et al. (2000). Testing the persuasiveness of evidence: combining narrative and statistical forms. *Communication Research Reports* 17: 331-336.
- ALLEN, M. & PREISS, R. W. (1997). Comparing the persuasiveness of narrative and statistical evidence using meta-analysis. *Communication Research Reports* 14: 125-131.
- \*BAESLER, E.J. (1997). Persuasive effects of story and statistical evidence. *Argumentation and Advocacy* 33: 170-175.
- \*BAESLER, E.J. & BURGOON, J.K. (1994). The temporal effects of story and statistical evidence on belief change. *Communication Research* 21: 582-602.
- BORGIDA, E. & NISBETT, R.E. (1977). The differential impact of abstract vs. concrete information on decisions. *Journal of Applied Social Psychology* 7: 258-271.
- CATHCART, R.S. (1955). An experimental study of the relative effectiveness of four methods of presenting evidence. *Speech Monographs* 22: 227-233.
- \*COX, D. & COX, A.D. (2001). Communicating the consequences of early detection: the role of evidence and framing. *Journal of Marketing* 65: 91-103.
- \*DICKSON, P.R. (1982). The impact of enriching case and statistical information on consumer judgments. *Journal of Consumer Research* 8: 398-406.
- FETERIS, E.T. (2002). Pragmatic argumentation in a legal context. In: EEMEREN, F.H. VAN (ed.). *Advances in Pragma-Dialectics*, Amsterdam: Sic Sat: Vale Press.
- \*HOEKEN, H. (2001a). Anecdotal, statistical, and causal evidence: their perceived and actual persuasiveness. *Argumentation* 15: 425-437.
- \*HOEKEN, H. (2001b). Convincing citizens: the role of argument quality. In: JANSSEN, D. & NEUTELINGS, R. (eds.). *Reading and writing public documents*, Amsterdam: Benjamins.
- \*HOEKEN, H. & HUSTINX, L. (2003). The relative persuasiveness of different types of evidence. In: EEMEREN, F.H. VAN et al. (eds.). *Proceedings of the fifth conference of the International Society for the Study of Argumentation*, Amsterdam: Sic Sat.
- HORNIKX, J.; STARREN, M. & HOEKEN, H. (2003). Cultural influence on the relative occurrence of evidence types. In: EEMEREN, F.H. VAN et al. (eds.). *Proceedings of the fifth conference of the International Society for the Study of Argumentation*, Amsterdam: Sic Sat.
- KAHNEMAN, D. & TVERSKY, A. (1972). Subjective probability: a judgment of representativeness. *Cognitive Psychology* 3: 430-454.

- \*KAZOLEAS, D.C. (1993). A comparison of the persuasive effectiveness of qualitative versus quantitative evidence: a test of explanatory hypotheses. *Communication Quarterly* 41: 40-50.
- KELLERMANN, K. (1980). The concept of evidence: a critical review. *Journal of the American Forensic Association* 16: 159-172.
- \*KOBALLA, T.R. (1986). Persuading teachers to reexamine the innovative elementary science programs of yesterday: the effect of anecdotal versus data-summary communications. *Journal of Research in Science Teaching* 23: 437-449.
- MCCROSKEY, J.C. (1969). A summary of experimental research on the effects evidence in persuasive communication. *Quarterly Journal of Speech* 55: 169-176.
- MCGUIRE, W.J. (2000). Standing on the shoulders of ancients: consumer research, persuasion, and figurative language. *Journal of Consumer Research* 27: 109-114.
- NISBETT, R.E. & BORGIDA, E. (1975). Attribution and the psychology of prediction. *Journal of Personality and Social Psychology* 32: 932-943.
- O'KEEFE, D.J. (2002). *Persuasion: theory and research*, Thousand Oaks, CA: Sage.
- REINARD, J.C. (1988). The empirical study of the persuasive effects of evidence: the status after fifty years of research. *Human Communication Research* 15: 3-59.
- REINARD, J.C. (1998). The persuasive effects of testimony assertion evidence. In: ALLEN, M. & PREISS, R.W. (eds.). *Persuasion: advances through meta-analysis*, Cresskill, NJ: Hampton.
- REYNOLDS, R.A. & REYNOLDS, J.L. (2002). Evidence. In: DILLARD, J.P. & PFAU, M. (eds.). *The persuasion handbook: developments in theory and practice*, Thousand Oaks, CA: Sage.
- RIEKE, R. & SILLARS, M.O. (1984). *Argumentation and the decision making process*, New York: Harper Collins.
- ROOK, K. (1986). Encouraging preventive behavior for distant and proximal health threats: effects of vivid versus abstract information. *Journal of Gerontology* 41: 526-534.
- SCHELLENS, P.J. & JONG, M. DE (2004). Argumentation schemes in persuasive brochures. *Argumentation* 18: 295-323.
- SCHELLENS, P.J. & VERHOEVEN, G. (1994). *Argument en tegenargument. Een inleiding in de analyse en beoordeling van betogende teksten*, Groningen: Martinus Nijhoff.
- \*SHERER, M. & ROGERS, R.W. (1984). The role of vivid information in fear appeals and attitude change. *Journal of Research in Personality* 18: 321-334.
- \*SLATER, M.D. & ROUNER, D. (1996). Value-affirmative and value-protective processing of alcohol education messages that include statistical evidence or anecdotes. *Communication Research* 23: 210-235.
- \*SLUSHER, M.P. & ANDERSON, C.A. (1996). Using causal persuasive arguments to change beliefs and teach new information: the mediating role of explanation availability and evaluation bias in the acceptance of knowledge. *Journal of Educational Psychology* 88: 110-122.