



The damages of negative information: illustration from two markets

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Abstract We measured the damage done by negative information to a crowdfunding campaign and to the sale of products and services by performing three different studies. In the first study, we presented 1055 participants with positive and negative information about a crowdfunding campaign using credible and less credible sources of information. Although the participants could distinguish between the credible and less credible sources of information, they made similar decisions in both cases, regardless of whether the information was negative or positive, implying the irrelevance of credibility of the information. Further findings indicate that it might be possible to rectify the damage done by the negative information, but it is easier to do so when the information is from a less credible source. In the other two studies, we measured the extent of the damage of negative information on several products and services. We find that the extent of the damage is positively correlated with the amount of negative information. Furthermore, services suffer more than products from such negative information. Finally and consistent with our findings in the first study, it is possible to rectify the damage to some extent. The findings are important in light of recent phenomena such as shaming and fake news. The contribution of the studies is both practical and theoretical as it expands various research fields such as: (1) Behavioral economics, Applied economics and

Marketing; (2) Communication; (3) Decision making processes; (4) Social psychology.

Keywords Negative Information · Crowdfunding · Credibility · Decision Making

Introduction

A famous saying maintains that, “There is no such thing as bad publicity”. It refers to the notion that any publicity in the media will promote a person’s cause, even if it puts them in a bad light. This saying might have been true in the nineteenth century¹ or might even be true today for some businesses or professions, but in general, it is clear that negative publicity or information causes economic, social, psychological or other forms of damage to whomever it is directed.

The recent global COVID-19 virus epidemic, which led to the forced isolation of large parts of the population, exacerbated the already strong and constant demand for information.² In this work, we are in particular interested in negative information since as the literature indicates, negative information has a strong impact, much stronger than positive information. This

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¹ The saying is associated with Phineas T. Barnum, the nineteenth century American showman and circus owner.

² <https://www.visualcapitalist.com/media-consumption-covid-19/>

impact of information is our main focus in all three studies this work consist.

In what specific ways does negative information affect decision making? How easy or difficult is it to rectify the damage done by such information? What factors affect the ease of doing so? Is the credibility of the source of the information a factor in this regard?

To answer these questions, we explored two aspects of the impact of negative information on decision-making processes. First, we examined the behavior of the recipients of the negative information when receiving the information. Then, we explored and measured the economic results of this behavior.

To conduct our studies, we used two settings: a crowdfunding platform and a real market. In both cases, there is a great deal of asymmetry of information between the parties so that the recipients of the information are less informed than the other party. In the crowdfunding setting, the entrepreneurs and the platform itself have all of the information regarding the crowdfunding project. In the marketplace, the sellers have all of the information regarding their services or products.

Our study was motivated by the extensive growth of social phenomena such as shaming and fake news and the already proven damage they cause to businesses as well as to private people and public figures.

Literature review

The literature relevant to this work mainly falls into one or more of the following four categories: (1) crowdfunding and asymmetric information in crowdfunding; (2) negative information; (3) shaming and fake news; and (4) the credibility of sources of information.

Crowdfunding and asymmetric information in crowdfunding

Crowdfunding is a fundraising method based on the cooperation and trust between the entrepreneurs and the crowd. Although crowdfunding is a relatively new form of financing projects, it is a rapidly growing phenomenon with over 1,000 platforms worldwide (led by Canada and the US) and an estimated revenue of \$114 billion in 2021.

Crowdfunding is considered a market with more asymmetric information than other markets (Belleflamme et al. 2013, 2014). As Stiglitz explained

(2002), asymmetric information occurs when “Different people know different things”. People make decisions based on public information available to all and private information that only some people have. The latter form of information might give these people an advantage (Akerlof 1978). Asymmetric information affects the decision-making processes of individuals, households, businesses and even governments (Connelly et al. 2011). The asymmetric information between parties creates various problems (Hillier 1997) that could result in losses (not necessarily solely monetary) to the less informed party.

The asymmetry of information is even more pronounced in crowdfunding for several reasons. First, the information the entrepreneurs present to investors is quite limited, usually accounting for only one page on the crowdfunding platform. Second, for individual investors, it is almost impossible to verify the information regarding the entrepreneur or the project. Third, the entrepreneurs themselves might object to revealing information to investors because of their large number and lack of professionalism (Sannajust et al. 2014). Finally, unlike more traditional funding methods, where investors perform due diligence and rely on personal contacts and face-to-face encounters with entrepreneurs, in crowdfunding such steps are not possible. The entrepreneurs reveal the information they want to share and in return ask for the investors’ trust (Agrawal et al. 2011).

Given this background, we felt that crowdfunding was a useful setting for our first study about asymmetric information problems. Therefore, we conducted Study 1 using a reward-based crowdfunding platform in which the backer of a project receives a reward that depends on the size of the sum s/he gives. The reward can be tangible or intangible, depending on the entrepreneur (Giudici et al. 2012).

Negative information and negativity bias

As the literature indicates, negative information is “stronger” than positive information. Furthermore, people react more quickly and more intensely to negative information than to positive information (Weinberger et al. 1981; Fiske 1992; Fox et al. 2000). It is also more difficult to disprove negative information (Richey et al. 1975). Rozin and Royzman (2001) referred to the “negativity bias”, as the tendency of animals and human beings to give greater weight to

negative entities. One of the explanations for this bias is that organisms that are attentive to negative signals from their environment are more likely to survive (Baumeister et al. 2001).

The literature on negative information addresses a variety of areas mainly in psychology, sociology and marketing. Empirical studies beginning in the 1950s have documented the stronger impact of negative versus positive information (Goodman 1950), with more research constantly expanding the range of relevance of this subject.

A large number of studies in the crowdfunding literature address the implications of both negative and positive information (in crowdfunding literature this information is referred to as “signals”) for the probability of successful funding as well as for the number of backers for a project. As the signaling theory suggests (Spence 1974; Ross 1977), these signals can reduce the uncertainty in crowdfunding and provide valuable clues about the true quality of the campaign. These signals include information regarding a project or an entrepreneur provided by the campaign itself (Mollick 2014; Ahlers et al. 2015). In contrast with former studies, in our study, we will provide information about the crowdfunding project from an external source of information, an approach that is rarer in the crowdfunding literature.

Research about negative information regarding businesses in the “real market” usually refers to this information in the marketing literature as word of mouth (WOM). Many definitions exist for WOM: “...oral, person to person, communication between a receiver and a communicator whom the receiver perceives as non-commercial, concerning a brand, a product or a service” (Arndt 1967) or “...the interpersonal communication between two or more individuals, such as members of a reference group, or a customer and a salesperson” (Kim et al. 2001; Goyette et al. 2010). The information communicated by the senders of the message could be negative, positive or a mixture of both. Studies indicate that WOM is a force that influences attitudes and predicts consumers’ purchase behaviors (Ghosh et al. 2014). Some studies maintain that negative WOM is more influential than positive WOM but contradictory studies also exist (Charlett et al. 1995).

Our main focus of interest in our studies is assessing the economic effect of negative information and exploring possible ways to rectify the damage this

information inflicts. The second issue has received much less attention in the literature. Therefore, our studies contribute to both theory and practice.

Shaming and fake news

Shaming is the informal public punishment for supposed wrongdoing usually on social media or the Internet. Online shaming is a rapidly growing phenomenon whose effects are extensive and widespread (Laidlaw 2017). Nevertheless, while news articles have recognized this phenomenon as a dangerous and growing issue (Muir et al. 2021), the literature exploring its negative implications is scarce. Some earlier studies presented shaming as a legitimate tool to eliminate undesirable actions and an alternative method of sanctioning offenders (Kahan 2019; Rebellon et al. 2010). However, many recent studies argue that online public shaming is ethically wrong (Aitchison and Meckled-Garcia 2021). The targets of shaming could be private people or public figures as well as firms or small businesses.

There are several definitions of fake news. One is the deliberate presentation of false or misleading claims as news, whose intended goal is to manipulate the audience’s cognitive processes (Gelfert 2018). A few studies have argued that fake news poses a threat to society and to democracy (Brody and Meier 2018; Fallis and Mathiesen 2019). There is increasing academic interest in fake news, but most studies focus on the implications of fake news for political communications and debate (Domenico et al. 2021).

In this study, we provide a new perspective on the outcomes of both shaming and fake news: a demonstration of the possible economic damage created by the dissemination of negative information, regardless of whether it is true or false.

The credibility of sources of information

In an environment of asymmetric information, the uninformed party is often uncertain regarding the credibility of the sources of the information s/he receives. The credibility of information refers to the “judgments made by the perceiver...concerning the believability of a communicator” (O’Keefe 2015). Despite studies of this issue since the 1950s, there is no consensus regarding the definition or the exact factors involved in assessing the credibility of information

sources. Most studies agree that the expertise, trustworthiness and goodwill of the source help determine its credibility (Hovland et al. 1953; Westerman et al. 2014). In general, studies indicate a positive correlation between the credibility of the source of information and its persuasiveness (Dholakia and Sternthal 1977). In other words, the more a source is regarded as credible, the more persuasive it will be.

Jones et al. (2003) examined the influence of the credibility of the source of information and message framing on promoting a desirable behavior (physical exercise in university students). Their findings indicate that a positively framed message from a credible source had a stronger effect on the desired intentions and behaviors than other formats. In our study, we used their scale to measure the credibility of the source, with the necessary adaptation to our study.

Methods

Overview of the studies

We conducted three different studies. In Study 1 we asked participants to make decisions regarding a crowdfunding campaign. In Studies 2 and 3 we asked participants to make decisions regarding real-life products and services. In all three studies, the decisions were similar. In all three, we measured the effects of negative information, and the effectiveness of attempts to rectify the impact of negative information. The participants were all recruited from the general population.³

Study 1

We first conducted a pilot study between May 14 and May 15, 2019 with 135 students from Ben-Gurion University of the Negev in Israel. The main purpose of the pilot was to validate the conditions of the study.

³ The poll company we used in all 3 studies assured the heterogeneity of the samples which was later also re-checked by several statistical tests. The sampling method was quota sampling.

Participants

Having established the validity of our study, we recruited 1,055 participants between July 15 and July 21, 2019 to fill out questionnaires. We used a poll-company to send the participants the questionnaire. The first question asked if they were familiar with crowdfunding. We eliminated those who answered no.

Instruments

We selected a real crowdfunding campaign—“The cacao forest”—from the Israeli crowdfunding platform “Headstart” (www.headstart.co.il)—a reward-based crowdfunding platform, founded in 2012 and one of the best known and prominent platforms in Israel.⁴

We used all of the background information that the campaign provided to the participants.⁵ The campaign included a “menu” of 22 levels of rewards from 18 NIS to 70,000 NIS. We chose this campaign because it was gender neutral and had an unusually large number of rewards for a crowdfunding platform, which was necessary to provide our participants with various choices.

After receiving the information regarding the campaign, the participants received the additional information described below that was not included in the real campaign and was part of the experiment.

Procedure and design

We allocated the participants randomly to one of four categories in our factorial design experiment (2X2)⁶: negative information from a credible source; negative information from a less credible source; positive information from a credible source and positive information from a less credible source (Fig. 1).⁷

⁴ “Headstart” and the entrepreneur of “The cacao forest” campaign consented to the use of the campaign for the purposes of this study.

⁵ Since the campaign was actually successful, all signs of the success of the campaign were omitted from the information given to the participants (number of real backers, amount of actual funding etc.).

⁶ .

⁷ The study also included two control groups, for the negative and positive conditions (without the credibility condition).

	Negative information	Positive information
Credible source		
Less credible source		

Fig. 1 Illustration of Study 1's factorial design

The positive and negative information we provided included two sentences: one concerning the entrepreneur (“The entrepreneur has/doesn’t have experience in the field of the campaign”), and the other concerning the campaign itself (“The campaign is behind schedule/The campaign is on time”).⁸

The credible source was “the vice-president of the platform”, whereas the less credible source was “a student who heard about the campaign”.

The credibility of the sources was measured by four items on a 7-point Likert scale.⁹

We first asked all of the participants to choose the amount they were willing to invest in the campaign, in light of the information they had received. We made this request three times. The first time was when they had only the information provided on the crowdfunding campaign. The second time was after receiving the positive or negative information. The third time was after being told that the negative or positive information they received was actually false. Measuring the change between the first and second responses indicated the impact of the new information they received. Measuring the change between the second and third responses indicated the impact of the attempt of rectifying any damage that might have been done.¹⁰

Study 2¹¹

We first conducted a pilot study between June 12 and June 19, 2019 with 41 students from Ben-Gurion

University of the Negev in Israel. The main purpose of the pilot was to validate the conditions of the study by grading the different attributes of the negative comments we used in Study 2 and Study 3 and to validate them for use in the main studies.¹²

Participants

Having validated the conditions of our study, we recruited 1090 participants during January 2020 to fill out questionnaires. We used a poll-company to send the participants the questionnaire.

Procedure and design

We allocated the participants randomly to one of four categories (two for products, two for services): restaurant meal (service); a tablet (product); garage car treatment (service) and a living room lamp (product).¹³

We asked the participants to make three decisions. First, we asked all of the participants to estimate the price of the product or service. Next, they were all presented with the same negative comment—a real comment taken from the Internet¹⁴—supposedly regarding the product or service. Then, they were asked how much they were willing to pay for the product or service, in light of the information they received. Finally, they were told that the negative comment was actually false. Once again, we asked them how much they were willing to pay in light of the recent information. Measuring the change between the first and second responses indicated the impact of the negative comment (the “Damage”). Measuring the change between the second and third responses

⁸ The sentences in Hebrew were the same for the positive and negative information conditions, except for one word that changed the sentence from positive to negative. This was important in order to maximize the homogeneous information that the participants in all of the conditions received.

⁹ The credibility of the sources was measured in accordance with Jones et al.’s (2003) study.

¹⁰ We refer to damage, despite the impact of positive information, which did not cause damage, because the main focus of the study is the impact of negative information.

¹¹ Studies 2 and 3 were funded by The Moshe Sanbar Institute for Applied Economic Research & School of Business Administration at the College of Management Academic Studies.

¹² The students indicated their agreement regarding 12 different negative comments collected from the Internet according to several criteria such as negativity and intent to shame. We used a 7-point Likert scale. One negative comment was selected and was used in both Studies 2 and 3.

¹³ We chose these two products and two services as they are commonly consumed, are average in price, and are part of different categories of the Consumer Price Index in Israel. Future research referring to other products and services could further contribute to the understanding of the results of this study.

¹⁴ The real comment referred to a large Israeli chain store selling home and electrical appliances.

indicated the impact of the attempt of rectifying any damage done by the negative comment.

Study 3

Participants

We recruited 1284 participants during February 2020 to fill out questionnaires. We used a poll-company to send the participants the questionnaire.

Procedure and design

We allocated the participants randomly to one of 12 (2X2X3) conditions in our factorial design experiment: a service or product;¹⁵ the amount of negative information (1 negative comment/5 negative comments); and the source of the dismissal of the information (3 sources: a friend, a newspaper article, the same source that gave them the original information).

Initially, all of the participants received the same basic information: the price of the service or product: 1100 NIS (about \$315). The participants were presented with one negative comment—a real comment from the Internet¹⁶—supposedly regarding the product or service, or with five negative comments (four more negative comments in addition to the same negative comment), depending on their condition.¹⁷ Then they were asked how much they were willing to pay for the product or service, in light of the information they received. Finally, the participants were informed that the information (the negative comment) was actually false and were asked once again to decide how much they would be willing to pay in light of the recent information. This information

came from one of three sources depending on the condition to which the participants were allocated: the original source of the negative comment/s, a friend, or a newspaper article.¹⁸

Measuring the change between the first response and the 1100 NIS indicated the impact of the negative comment (the “Damage”). Measuring the change between the second response and the 1100 NIS indicated the remaining damage done by the negative comment after its negation.

Results

Results of study 1

The participants graded the credible source of information significantly higher than the less credible source of information regarding both the positive and negative information ($F = 44.0$, sig. = 0.000). Therefore, we concluded that the participants could accurately assess the credibility of the sources.

Table 1 summarizes the results of the 2X2 factorial design. It lists the means and standard deviations of the differences in the participants’ decisions regarding the reward levels¹⁹ in each condition, after receiving the information (i.e., the difference between the second measurement—*after* receiving the information and the first measurement—*before* receiving the information). As the table indicates, on average, the participants who received positive information increased their investment level compared to their base investment. In contrast, on average, the participants who received negative information reduced their investment level compared to their base investment.

Analyzing these results using an ANOVA and Tukey post-hoc tests indicated a significance

¹⁵ Based on the findings of Study 2, we chose the tablet as the product and the garage car treatment as the service because their cost was similar.

¹⁶ The same comment as in Study 2.

¹⁷ In light of previous literature (Rozin and Royzman 2001) and the greater influence of negative information than positive information (see also the results of study 1), as well as studies that discuss correlations between the credibility and the persuasiveness of the sources of information (see above and also Sharifi, 2018), we presume that more negative information will be perceived as more credible and persuasive than less negative information and eventually cause more damage. Nevertheless, the literature regarding this subject is scarce. We hope to contribute on this point to the existing literature.

¹⁸ We determined the independent variables closely to study 1’s variables, with respective further variations to this study’s purposes. In addition to the source already used in study 1, we added the sources “friend” and “newspaper” as sources of possible amendment to the damage done by the original information. Since former literature did not distinguish between sources of information in this context, the choice of these sources is exploratory and was made as to be most applicable and close to real life situations. Further research should include other sources of information.

¹⁹ We decided to analyze the reward levels rather than the amounts of investment because of the non even differences of the amounts of investments in the levels of the rewards.

Table 1 Means and standard deviations of the reward levels after the participants received the information

	Positive information ^b	Negative information ^a
Credible	MEAN = 0.71 (SD = 2.296) N = 187	MEAN = - 1.54 (SD = 3.771) N = 195
Less credible	MEAN = 0.76 (SD = 2.934) N = 195	MEAN = - 1.97 (SD = 3.865) N = 191

^aResults of the control group for the negative information condition (without the credibility factor): Mean = - 1.57 (SD = 3.095)

^bResults of the control group for the positive information condition (without the credibility factor): Mean = 0.87 (SD = 1.63)

difference between the positive and negative information conditions ($F = 30.034$, sig. = 0.000) but not within the positive and negative information conditions themselves. In other words, the participants made practically the same decision whether the source of information was reliable or less reliable.²⁰

Further measurement revealed that the absolute differences in the negative information conditions were significantly larger than in the positive information conditions ($F = 6.744$, sig. = 0.000). This result accords with previous literature, emphasizing the weight of negative information versus positive information.

The two-way ANOVA revealed a significant main effect of negative and positive information ($F = 110.48$, sig. = 0.000) but no other significant effects or interactions were found. This result emphasizes the similar reaction of the participants to information regardless of the credibility of the source (Fig. 2).

We also asked the participants to decide which reward level they would choose if the original information they received in this questionnaire were negated. We did so to create an optimal scenario that would eradicate the effects of the information the participants received earlier regardless of whether it was positive or negative.²¹

²⁰ No significant differences were found between the control groups and their respective conditions.

As expected, the participants who originally received the positive information reacted to the negation of the information as if they had received negative information and on average, they reduced their investment level. In contrast, the participants who originally received the negative information reacted as if they had received positive information and on average, increased their investment level. The reaction of the participants whose negative information was negated by a credible source was significant at $p < 0.1$. All other reactions were significant at $p < 0.001$. Table 2 summarizes these results.

As before, these results indicate a significant difference between the negative and positive information conditions ($F = 38.274$, sig. = 0.000) but not within the negative and positive information conditions themselves. Thus, we concluded that the participants made practically the same decisions whether the source of information was reliable or less reliable (Fig. 3).²²

We repeated the measurement with the most extreme values of the credibility variables in each of the negative and positive conditions ($n = 380$). In other words, we examined the investment decisions of the participants who rated the credibility of the information as most credible and least credible in each of the conditions. The results of this measurement again supported our conclusion that there were no significant differences between the credible and less credible conditions, regardless of whether the information was positive or negative. In addition, there were significant differences between the two conditions when the information was negated.

Study 1 yielded several other findings. First, the participants graded the credible source of information significantly higher than the less credible source of information even in a second measurement after the information had been negated ($F = 21.723$, sig. = 0.000). As Fig. 4 illustrates, Tukey post-hoc tests indicated no significance difference between the negative-credible and positive-credible information conditions and between the negative-less credible and positive-less credible information conditions.

²¹ The purpose of this question was to simulate the possible effect of negating the impact of negative information, thus exploring the possibility of rectifying the damage.

²² No significant differences were found between the control groups and their respective conditions.

Fig. 2 Description of main effects and interactions: credibility and negative- and positive information

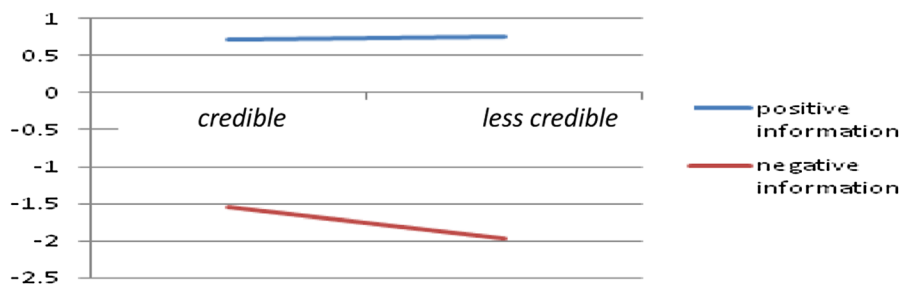


Table 2 Means and standard deviations of the reward levels after the participants had their original information negated

	Positive information ^b	Negative information ^a
Credible	MEAN = - 1.59 (SD = 2.929)	MEAN = 0.38 (SD = 2.759)
Less credible	MEAN = - 1.94 (SD = 3.340)	MEAN = 1.24 (SD = 3.106)

^aResults of the control group for the negative information term (without the credibility factor): Mean = 1.44 (SD = 3.397)

^bResults of the control group for the positive information term (without the credibility factor): Mean = - 1.78 (SD = 3.286)

Therefore, we concluded that the participants continued to accurately assess the differences in the credibility of the two sources.

Second, there was a drop in the measured credibility of the source of information between the first measurement (after receiving the information) and the second measurement (after the negation of the information). This drop reflects the reaction of the participants to the completely changed information transmitted to them by the source of the information.

Third, there was a very weak positive correlation ($R = 0.13^{23}$) between the credibility of the source and the information (positive/negative) in the first measurement. No correlation was found between the credibility of the source and the information in the second measurement ($R = 0.001^{24},^{25}$).

²³ sig. = 0.000.

²⁴ sig. = 0.985.

²⁵ This result very weakly if at all supports previous literature indicating that negative information weakens the credibility of the information source and positive information increases it (Klebb and Unger 1983; Savolainen 2011; Hildenbrand et al. 2015).

Since the significance between the credible and less credible sources of information was maintained in both measurements of the credibility, we concluded several points for Study 1.

First, the participants reacted similarly to positive and negative information from credible and less credible sources of information, although they distinguished between the credible and less credible sources. Second, in accordance with previous literature, negative information had a strong effect and it was indicated in our results twice: In the first measurement (the reaction in face of the negative information was stronger than in the positive information conditions) and in the second measurement (the reaction of the participants whose positive information was negated offset their original reaction to the positive information, ultimately bringing them to an even lower point than where they started). Third, the damage inflicted by the negative information was rectified, up to a point.

Results of studies 2 and 3

The results presented in Table 3 summarize the means and standard deviations of the differences in the participants' decisions regarding the prices they would be willing to pay in Study 2, after receiving the negative information and after its negation.

The Damage and %Damage in both Studies 2 and 3 were measured as follows:

The price after receiving negative information

$$- \text{The base price} = \text{Damage}$$

$$\% \text{Damage} = (\text{Damage} / \text{base price}) \times 100.$$

We made a similar calculation for the Damage and %Damage after the negation of the information.

The results in Table 3 indicate a potential damage of 34%-48% to the prices of the products and services.

Fig. 3 Description of main effects and interactions: credibility and negative and positive information after the information was negated

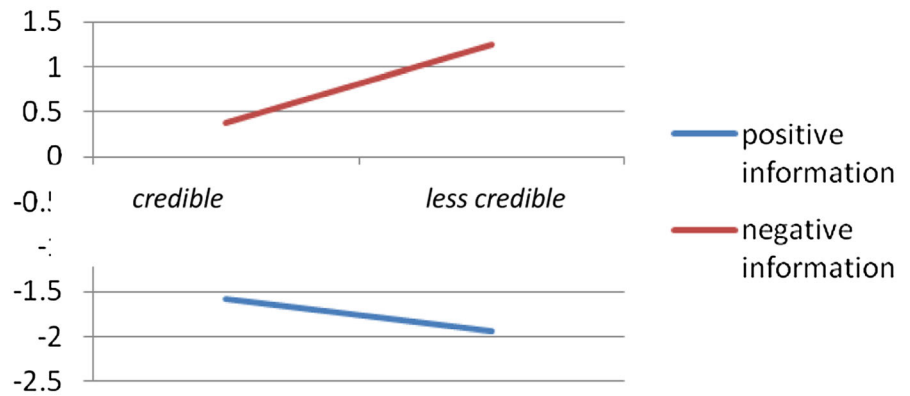


Fig. 4 Credibility of the source of information measurements

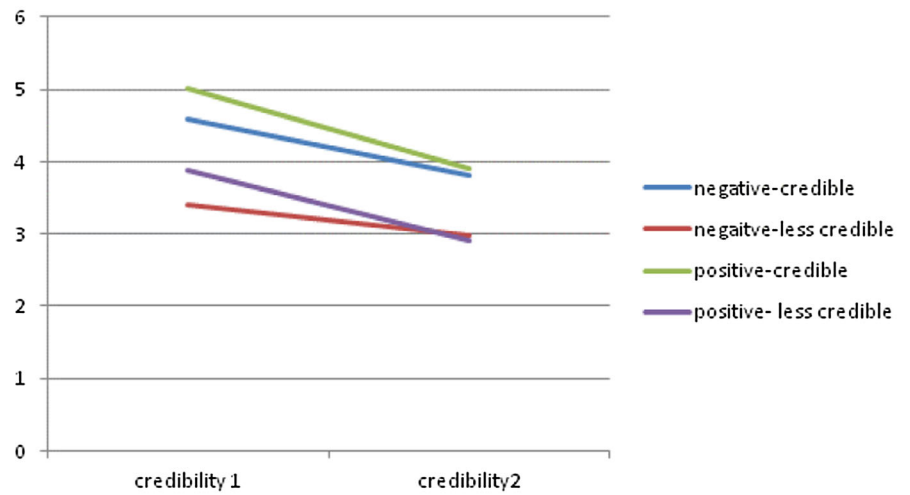


Table 3 Means and standard deviations of the prices after the participants received the negative information and after receiving the negation of that information

	Avg. base price (NIS)	% of damage (from original price, after negative information)	% of damage (from original price, after negation of information)
Tablet (product) (n = 256)	MEAN = 1212.71NIS (SD = 815.41)	- 46% (SD = 38.71)	- 15% (SD = 27.9)
Living room lamp (product) (n = 270)	MEAN = 505.19NIS (SD = 461.76)	- 40% (SD = 38.8)	- 12% (SD = 30.1)
Restaurant meal (service) (n = 273)	MEAN = 175.38NIS (SD = 133.75)	- 34% (SD = 39.56)	- 6% (SD = 33.4)
Garage car treatment (service) (n = 265)	MEAN = 1087.03NIS (SD = 936.68)	- 48% (SD = 40.2)	- 18% (SD = 31.8)

An attempt to fix the damage by negating the information was only partly successful. The products and services still had 6%-18% damage to their prices.

In order to analyze whether and to what extent the size of the damage could be explained by the independent variables,²⁶ we tested the variables in a multivariate linear model with Damage as the dependent variable. The model was significant ($F = 10.893$, $p < 0.001$). We repeated the linear model analysis with the Damage after negation as the dependent variable. This model was also significant ($F = 10.614$, $p < 0.001$). The results of the linear regression analysis are presented in Table 4.

The results indicate a significant positive correlation between the original price (base price) of the products and services and the damage caused by the negative information. In other words, the higher the base price of the product or service, the more damage was caused to it and the more damage remained to it even after negating the information.²⁷ One explanation for this result might be the greater sensitivity to the negative information because the potential customers intended to spend more on these products and services. This result is also visible in Fig. 5, as the more expensive products and services show a greater decline in price than the cheaper products and services after the negative information was received.

In light of these findings and in order to improve and further explore the nuances of the analysis, we decided to repeat the experiment in a third study, creating a new variable for the damage that would be independent of the original price. Hence, all of the participants were given information regarding the price (i.e., this time a fixed price—1100 NIS²⁸) and were asked only to state the price they would be willing to pay after receiving the negative information. The dependent variable of the damage was calculated as before (the difference between the price after the negative information and the base price: 1100NIS). For this experiment we used only one product (the

tablet) and one service (the garage car treatment), which were estimated in Study 2 to be in approximately the same price range (see Table 3 above—the differences between the results presented for the tablet and garage car treatment were not significant, as is also visible in Fig. 5).

Table 5 presents the results of the linear regression analysis of Study 3.

Both analysis models were significant ($F = 32.229$, $p < 0.001$ and $F = 12.595$, $p < 0.001$, respectively).

The results indicate a positive impact of the number of negative comments on the extent of the damage. This result is consistent in both regressions. The results also indicate that women were more sensitive to the negative comments, a result that accords with previous findings regarding gender differences in negativity bias²⁹ (Syrjanen and Wien 2013). Finally, the damage was more extensive when the negative comments were about a service.³⁰ Finally, the number of children the recipient had affected the extent of the damage.

Based on these findings, we can draw several conclusions from Studies 2 and 3. First, consistent with Study 1, negative information causes measurable economic damage to businesses that are the targets of these negative comments. The damage can be repaired, up to a point. The results are also in accordance with previous literature (Qahri-Saremi and Montazemi 2020).

Second, the quantity of negative information seems to be relevant, with more negative comments inflicting greater damage. Third, services seem to be more sensitive to negative information and to suffer greater damage as a result than products. This conclusion should be explored further and validated in future research with a variety of products and services. Fourth, the source of negating the information had no significant effect on the outcome, meaning that, it does not matter how the information is negated—the damage remains the same.

²⁶ The independent variables were the conditions of the studies and few demographic variables.

²⁷ This result is obvious from the significant positive base price variable and the significant negative Restaurant variable (the cheapest product). Thus, there was a positive correlation between the size of the damage and the original price of the product or service.

²⁸ Approximately \$370.

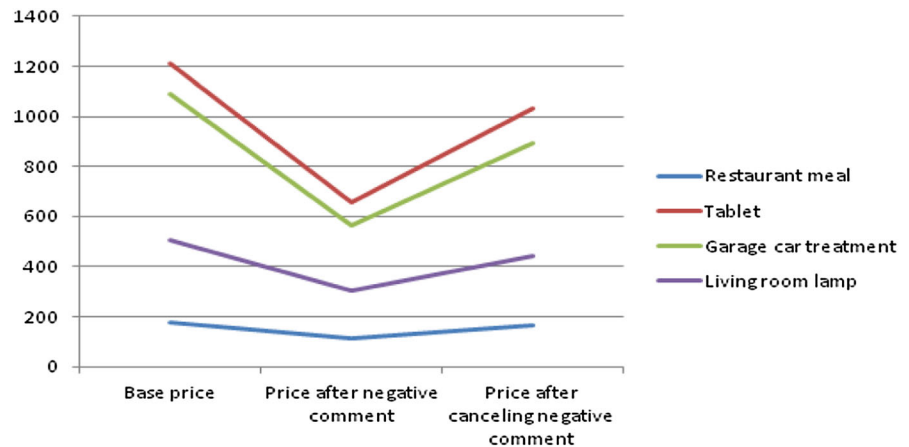
²⁹ Although the literature on this matter is not consistent.

³⁰ This result should be examined further in future research because we used only one product and one service.

Table 4 Linear regression analysis results of Study 2

	Damage	Damage after negation
Income	− 0.096**	− 0.071*
Base price	0.101**	0.103**
Restaurant (1 = restaurant, 0 = other)	− 0.079*	− 0.094**
Constant	40.653	0.124***
<i>N</i>	982	944
<i>R</i> squared	0.032	0.033

* < 0.05; ** < 0.01;
*** < 0.001

Fig. 5 Difference in prices after negative comments and after negating the negative comments in all conditions of Study 2**Table 5** Linear regression analysis results—Study 3

	Damage	Damage after the negation
Children	0.117**	
Women	0.070*	
Product.Service (Service = 1)	0.059*	
Messages	0.259***	0.102**
Constant	39.***312	0.262***
<i>N</i>	1198	1198
<i>R</i> squared	0.097	0.010

* < 0.05; ** < 0.01;
*** < 0.001

Discussion

The increase in communication technologies has also increased the ability of people to send and receive information (Westerman et al. 2014). This obliges us to consider our reactions to the information received from different sources of information.

Why do we act according to information, although we know the source of the information is not necessarily credible? The answer to this question needs further research. However, we now have a better understanding regarding the existence of this

behavior, the damage it causes and fortunately, the opportunity to rectify this damage, at least in part.

According to our study, people are capable of recognizing a reliable from an unreliable source of information. In light of this finding, we expected to find that they would assess the credibility of the source of information and act only upon reliable information in a rational way.

Our findings imply that this is not the case at all. Our participants' decision-making process was affected almost evenly by all sources of information. The participants acted upon all of the information given to them regardless of its source.

Unfortunately, this behavior also causes serious damage. This damage was obvious in both settings explored in our work.

A customer is free to post a negative review about a service or product regardless of whether such a criticism is warranted. As a result, the review can damage the business' reputation and scare other potential customers away. On social media this negative information can go viral almost effortlessly, in many cases without any supervision or sufficient regulations regarding the content of the post. Previous studies have already indicated that negative information has enormous power and its effects are almost impossible to repair.

Our study confirms that this negative information is significant and can inflict damage that can hurt the price of a product or service up to 70%.³¹ Our findings also indicate that in more than 20% of cases consumers will decide not to buy from this business at all.

With regard to our earlier example, imagine that the customer and the business' owner come to an understanding and the customer wants to post an apology for the negative review. Is the damage already caused repairable?

According to our findings the answer is not entirely, and in some cases, not at all. Even if the customer retracts the statement, the negative information will still impact the customers and the damage will remain (in our study up to 18%). We also determined that the source of negating the negative information is not significantly important.

The question we earlier asked—why we act according to information we receive whether it is positive or negative and whether it comes from a reliable or less reliable source—is still unknown. One possible explanation is that we are inundated with an enormous amount of information from many sources, making it very difficult to screen all of it. Therefore, we act on all of it. Previous literature briefly discussed the flood of information that forces consumers to abandon rational decision making (Schulz 2014). Future research should investigate whether this amount of information has also affected our decision-making process, especially regarding negative information. In addition, future studies could focus on

unreliable sources of information and the possible negative signals they might conceal.

Finally, our findings may help decision makers establish suitable practical solutions to deal with the damage that negative information inflicts on businesses and people's wellbeing.

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Declaration

Conflict of interest The authors have no conflicts of interest to declare that are relevant to the content of this paper.

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³¹ This result reflects the condition in Study 3 regarding a large number of messages (Avg. percentage for service and product altogether).

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