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► **To cite this version:**

Sophie Henry, Guarnaccia Cinzia, Jean-François Verliac, Corinne Mazé, Laurence Masse, et al.. Do we really have to be afraid of a threat in order to act? The mediating role of fear in the persuasive effect of the vividness and framing of a message on personal motivation and the effectiveness of a diabetes screening program. 2023. hal-04351408

**HAL Id: hal-04351408**

**<https://univ-paris8.hal.science/hal-04351408>**

Preprint submitted on 18 Dec 2023

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This is a preprint. The paper is currently undergoing peer-review and is subject to change.

**Do we really have to be afraid of a threat in order to act?**

**The mediating role of fear in the persuasive effect of the vividness and framing of a message on personal motivation and the effectiveness of a diabetes screening program**

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## **Do we really have to be afraid of a threat in order to act?**

### **The mediating role of fear in the persuasive effect of the vividness and framing of a message on personal motivation and the effectiveness of a diabetes screening program**

#### **Abstract**

Being threatened causes fear but what role does it play in the cognitive processes involved in individuals accepting a healthcare approach? Our study predicts that a strong expression of fear by the vividness and framing of a message from a diabetes health campaign should threaten the subjects (threat severity, perceived vulnerability) and lead them to react emotionally, cognitively (recommendation efficacy related to the ability to adopt it) and conatively (intention to be screened for diabetes). The results show that fear due to the perceived threat mediates the persuasive effect of the vividness of the message on its efficacy, which itself mediates the effect of fear (and threat) on behavioural intention.

In this context, fear could not only be felt in the face of a strong threat but could also mobilise cognitive resources and personal motivation influencing decision-making.

**Key words:** fear, threat, vividness, framing, health communication

## **Do we really have to be afraid of a threat in order to act?**

### **The mediating role of fear in the persuasive effect of the vividness and framing of a message on personal motivation and the effectiveness of a diabetes screening program**

The World Health Organisation estimates that diabetes leads to 1.5 million deaths annually and forecasts that it will be the seventh cause of death in the world in 2030 (WHO, 2016). Moreover, diabetes affects 8.5% of the world's population and the number of people suffering from the disease quadrupled from 1980 to 2014 reaching 422 million (Mathers & Loncar, 2006). To this can be added 193 million people who are diabetic without knowing it (International Diabetes Federation, 2015). Yet, an early diagnosis would enable this chronic disease to be treated and its serious complications prevented.

In fact, waiting for the first signs to appear assumes that the disease is already present, with the risk of greater and more rapidly developing complications. One of these is the formation of ulcers on the diabetic foot, which can lead to amputation or death. It is estimated that 85% of diabetic foot amputations could be avoided by developing health education programs and encouraging screening (Dahiru et al., 2016; Konstantikaki, 2008; Singh et al., 2005).

Thus, the context of this study is to make "at risk" patients aware of diabetes screening with the aim of preventing the onset of the disease and delaying its adverse effects, its complications and an early death. More specifically, with this objective of encouraging screening, this research focuses on the type of health message that could be recommended for patients at risk to make them be screened, especially by measuring the effects of the vividness and framing of a message and of a persuasive image drawing on the fear of the consequences of having diabetes.

### **Fear appeal and models of personal motivation: threat, efficacy and persuasion**

Health campaigns encouraging protective behaviours or screening have often taken the literature on fear appeal as a frame of reference (Centers for Disease Control and Prevention,

2015; Xu et al., 2015). In fact, using fear to persuade people at risk to follow recommendations to avoid health injuries or complications has proved scientifically relevant (Boster & Mongeau, 1984; De Hoog et al., 2007; Dillard et al., 1996; Earl & Albarracin, 2007; Floyd et al., 2000; Girandola, 2000; Maddux & Rogers, 1983; Milne et al., 2000; Peters et al., 2013; Sutton, 1982; Tannenbaum et al., 2015; Witte & Allen, 2000). Fear is a negative emotion which, once activated and having raised the awareness of the target population, enables cognitive processes that favour an inclination to act and sometimes action itself (Maloney, Lapinski & Witte, 2011; Witte, 1992; Witte & Allen, 2000).

Reactions to fear depend mainly on the degree of this emotion caused by the content of the message (framing, vividness, etc.). Research results differ depending on whether a curvilinear (Hovland et al., 1953; Janis, 1967; Janis & Feshbach, 1953; McGuire, 1968, 1969) or a linear (e.g., Witte & Allen, 2000) model is used; for the former, weaker fear is more persuasive while the second model favours stronger fear. More precisely, they show that it is the most rather than the least vulnerable participants, those most set in their old habits and thus in their dependencies, who will adopt the least appropriate behaviours, all the more so if the threat is strong rather than weak (Gerrand, Gibbons & Bushman, 1996; Insko, Arkoff & Insko, 1965; Janis & Terwillinger, 1962; Leventhal & Watts, 1966). In their meta-analysis of fear appeal, Tannenbaum, Hepler, Zimmerman, Saul, Jacobs, Wilson and Albarracin (2015) concluded that a message using a high level of fear did not add a more significant persuasive effect than one with an average fear level but this, on the other hand, produced a more positive effect than one with a low level of fear.

The Parallel Response Model of Leventhal (1970, 1971), unlike the previous model, focuses more on cognitive responses in reaction to a fear message. To this end, it distinguishes the notions of fear and danger. More specifically, it differentiates the danger control process, which is manifested from a representation made by the participants of a threat, urging them to react

appropriately (Leventhal, Nerenz & Steele, 1984), from the fear control process which, being a subjective emotional process, leads the participants to reduce their level of fear felt by defence mechanisms (denial, avoidance, minimisation of the threat, increase in risk behaviours, etc.).

With the Protection Motivation Theory (PMT), Rogers (1983) specifies that individuals will intend to act and protect themselves depending on their assessment of the severity of the threat, the probability of the appearance of this threat and the efficacy of the recommendations made. The notion of perceived efficacy is important in the link between fear and action. It includes the appraisal that the person makes of the efficacy of the proposed recommendations as well as his/her ability to adopt them (Bandura, 1977; Beck, 1976; Beck & Frankel, 1981; Harris & Middleton, 1994; Prentice-Dunn & Rogers, 1986; Weinstein, 1993). Whether it be with the Health Belief Model (HBM; Becker, 1974; Marshall et al., 1977, 1978; Rosenstock, 1966, 1974), the stage model (Hoog et al., 2007), the Parallel Process Model (PPM; Leventhal, 1970), or the Extended Parallel Process Model (EPPM, Witte, 1992, 1998), the messages with fear appeal “*only work if they are supported by...strong efficacy messages*” (Witte & Allen, 2000, p. 606).

Witte (1992, 1998) used the concepts of fear and danger control in his Extended Parallel Process Model (EPPM) by detailing the link between the two, which was missing in the previous models. Thus, by assessing the link between the perceived efficacy (recommendation efficacy and self-efficacy) and the perceived threat (severity of the threat and vulnerability), protective behaviour can be more predicted. If this link favours the first factor (perceived efficacy), then the individual will be more inclined to adopt the recommendation than if it favours the second factor (perceived threat). This means that the individual must demonstrate confidence in his/her ability to adopt the proposed recommendations and therefore have control over the undesirable causes and events linked to the threat in order not to feel powerless or overwhelmed by the stress and the feeling of uncontrollability in the face of the threat. This

potential feeling of loss of control could otherwise lead to coping strategies, reactance effects, and reinforced prior attitudes, resulting in non-adherence to the message and the recommendations (Brehm, 1993; Maddux, 1995; Maddux & Meier, 1995; Mann, 1992; Nuissier, 1994; Riskind & Maddux, 1993; Rogers & Prentice-Dunn, 1997).

However, according to Peters, Ruiter & Kok (2013), despite the relevance of the EPPM model, which includes the link between four rather than two factors and is widely quoted elsewhere, only six studies have tested its effects. In our previous study (Guarnaccia & Henry, 2017) we envisaged not four but three factors, by showing the important and independent role, firstly, of the participants' perception of the severity of the threat, secondly, of the perception of their vulnerability and, thirdly, of the combined perception of the efficacy of the recommendation proposed and their self-efficacy.

In the context of a health campaign, the threat produced by fear appeal can be operationalised by the participants looking at a document containing an image and a message. We focus here on the combined persuasive effects of the framing of a message (Kahneman & Tversky, 1979, 1982, 1984) and the vividness of an image (Nisbett & Ross, 1980; Taylor & Thompson, 1982) on the factors developed by the EPPM model (Witte, 1992, 1998).

### **Persuasive effect of threat by the framing of a message**

The literature presents framing as the way in which a message encourages the targeted population to adopt a recommendation and, more specifically, depending on the positive or negative consequences of the adoption or omission of a behaviour (based on the Theory of Perspectives of Tversky & Kahneman, 1981, developed by Rothman & Salovey, 1997). Two different variables have been explored as moderators of framing effects: (1) the method of creating frames (goals or attributes) and (2) perceived risk (Ferguson & Gallagher, 2007; Levin et al., 1998; Rothman & Salovey, 1997).

This research focuses exclusively on the first modality. While the aim of framing can be to present a link between the behaviour and the goal of the realisation, the attribute stipulates the nature of the consequences or of the argument associated with the decision or the behaviour (Ferguson & Gallagher, 2007; Krishnamurthy, Carter & Blair, 2001). Thus, in order to convince women to have a mammogram, a message was designed with a framing with a gain objective (“If you have a mammogram, you will benefit from the best method of early detection of breast cancer”) or a loss objective (“If you don’t have a mammogram, you will fail to benefit from the best method of early detection of breast cancer”) (Rothman & Salovey, 1997). As for the attribute, it directs the nature of the argument positively “you have a 50% chance of obtaining a better result” or negatively “you’re giving up a 50% chance of obtaining a better result” (Krishnamurthy, Carter & Blair, 2001).

In an approach combining both, four messages were designed (Guarnaccia & Henry, 2017), one with a goal in terms of the gain or advantage from following the recommendation (“By being screened,...”) with the consequence of staying in good health (positive attribute, “... , I am acting for my health”) or not becoming ill or avoiding a disease or health complication (negative attribute, “... , I don’t take risks with my health”) and a message with a goal in terms of the loss or cost of not following the recommendation (for example “By not being screened,...”) with the consequence of either contracting a disease or health complication (negative attribute, “... , I take risks with my health”) or of not staying in good health (positive attribute, “... , I am not acting for my health”).

The crossing of these two factors provides an exhaustive account of the nature of framing, an interaction that we use in our study. However, the literature has more generally proposed framing in terms of gain and loss, assimilating the goal and the attribute and considering that the framing is either positive if the message presents a gain or benefit to the individual who follows it by emphasising the low risk or uncertainty involved, or negative if the message



presents a loss or cost if it is not followed by emphasising the risk involved (Latimer, Salovey & Rothman, 2007; Updegraff et al., 2015).

In addition, the Prospect Theory (Tversky & Kahneman, 1981) postulates a differentiated persuasive effect of framing and, more precisely, that positive framing is generally preferred to negative framing. The individual would thus be motivated by a choice of options to secure this gain, rather than a choice of options to avoid losing it. Contrary to this hypothesis, a great deal of research shows that negative framing underlining a loss is more effective in terms of persuasion than positive framing underlining a gain (Cox & Cox, 2001; Fischer, & Fishchoff, 1993; Krishnamurthy et al., 2001; Levin & Gaeth 1988; Linville, Levin, Schnittjer, & Thee, 1988; Meyerowitz & Chaiken, 1987; Rothman & Salovey, 1997; Rothman, Bartels, Wlaschin & Salovey, 2006; Rothman & Updegraff, 2010; Rothman, Wlaschin, Bartels, Latimer & Salovey, 2013; Smith & Petty, 1996; Tversky & Kahneman, 1991; Wilson, Kaplan & Schneiderman, 1987; Wilson, Purdon & Wallston, 1988).

These results should be considered in the context of a large number of moderators like the future consequences of prevention or screening, involvement, cognitive need, avoidance or approach motivation and the regulatory orientation of participants (Covey, 2014; O'Keefe & Jensen, 2006, 2007, 2009, 2010; Rothman, Bartels, Wlaschin & Salovey, 2006).

In their meta-analysis, Gallagher & Updegraff (2012) report a prevalence of positive framing in preventive messages and a prevalence of negative framing in screening messages, depending on certain contexts. In fact, Apanovitch et al. (2003) showed that a message encouraging HIV screening was more effective with negative than positive framing for people perceiving themselves as vulnerable and worried about the outcome, while if they said they were less vulnerable, the message was more effective with positive framing. Other studies have reported similar findings, whether it be for messages encouraging screening for colorectal cancer, breast cancer, HIV, glandular fever or excess cholesterol, negative framing is more determinant than

positive framing if the people concerned feel vulnerable (Ferrer, Klein, Zajac, Land, & Ling, 2012; Gallagher, Updegraff, Rothman & Sims, 2011; Hull, 2012; Lee & Aaker, 2004; Maheswaran et al., 1990).

In our study, we are specifically interested in the link between the framing of a message, the emotional state of an individual and their effect on persuasion. Authors such as Gerend & Maner (2011) have shown that the type of framing can have a different effect on the acceptance of the message and the consideration of the proposed recommendations depending on the fear or anger emotions felt by the recipients of the message.

The present research aims to show the effect of framing in particular on the intention to be screened. For this purpose, by retaining the four framing modalities in terms of attributes (positive vs. negative) and goals (gain vs. loss), we assume a gradation in the emotional and cognitive effects of framing. Thus, when the framing is in terms of loss, and especially if it is positive (“By not being screened, I am taking risks with my health”), the participants should experience more fear, estimating the threat to be more severe and having a greater intention to be screened, than if they are subjected to a message with a framing of gain, and especially if it is positive (“By being screened, I am acting for my health”).

### **Persuasive effect of threat by the vividness of an image**

In advertising or health campaigns, many studies have shown that the presence of an image embedded in a message facilitates the processing of all the information in the message. In fact, unlike non-vivid information, vivid information, and especially an image, is eye-catching, focuses the attention more (Diamond, 1968; Frey & Eagly, 1993; Kroeber-Riel, 1984; Twedt, 1952), increases the motivation to process a message (Frey & Eagly, 1993; Nisbett & Ross, 1980), requires more cognitive resources (Keller & Block, 1997), enables more cognitive development (Anderson & Bower 1972; Kisielius & Sternthal, 1984; 1986), produces more developed mental images facilitating the memorisation of this information as well as the

accompanying information (Bergfeld, Choate, & Kroll, 1982; Bower, 1970; Collyer, Jonides & Bevan, 1974; Lutz & Lutz, 1978; Nappe & Wollen, 1973; Paivio, 1969; Petrova & Cialdini, 2005; 2008; Smith & Shaffer, 2000) and has more impact on the attitude toward it and thus on persuasion (Collins, Taylor, Wood, & Thompson, 1988; Coyle & Thorson, 2001; Frey & Eagly, 1993; Herlocker, 1996; Mitchell, Olson, 1981; Taylor & Thompson, 1982).

Clearly, as vivid information is more easily recalled, available and retrieved later from the memory than non-vivid information, it will affect persuasion (Nisbett & Ross, 1980), “*Everyone knows that vividly presented information is impactful and persuasive*” (Taylor & Thompson, 1982, p. 45).

In health campaigns, vividness has often been operationalised by the presence (vs. the absence) of shocking and emotional image(s) with or without a textual message (Childers & Houston, 1984; Edell & Staelin, 1983) thus attracting attention and allowing the processing of the accompanying information. The higher emotional interest of vivid information results in its greater processing, encoding and availability.

Nevertheless, the opposite effects of vividness should not be ignored, such as being regarded as a source of entertainment, which can prevent the main processing of the persuasive message by the participants. They pay less attention to the arguments and recommendations proposed, which are harder to remember (Venkatesan & Haaland, 1968), and impact persuasion negatively (Collins, Taylor, Wood & Thompson, 1988; Frey & Eagly, 1993; Montazeri & McEwen, 1997; Sherer & Rogers, 1984; Smith & Shannon, 1997; Taylor & Thompson, 1982).

In their meta-analysis, Blondé and Girandola (2016) confirm that vivid (vs. non-vivid) information is likely to exert a beneficial influence on persuasion (i.e., attitude and behavioural intention), via a better recall in the memory and processing of the message. However, they also state that this will depend on the involvement of individuals in the vivid information that they consider relevant. This involvement focuses their attention on this information, so that they

develop appropriate cognitive responses, memorise the strong arguments and thus process the vivid information and its accompanying message (Guadagno, Rhoads & Sagarin, 2011). Therefore, vividness has a persuasive effect only if people can remember the information related to it (Bator & Cialdini, 2000; Guadagno, Rhoads, & Sagarin, 2011). Moreover, it will be effective in situations in which it generates positive thoughts in the participants. More specifically, positive vivid information will reinforce prior positive attitudes whereas negative vivid information will generate more negative attitudes (Blondé & Girandola, 2016; Petrova & Cialdini, 2008). In a health context, vividness with a negative valency could increase the threat and persuasion of the accompanying message.

### **Overview**

We hypothesized that the fear generated by a threat image would mediate the relationship between the threat exerted by a health message encouraging participants to be screened for diabetes and the factors of Witte's models (1992, 1998) reviewed by Guarnaccia & Henry (2017). Thus, when the threat exerted by a message (depending on its framing and the vividness of the associated image) encouraging screening is high, the participants, being more afraid, should consider that diabetes is more serious, feel more vulnerable but more capable of being screened, which they think will be effective, and thus have more intention of being screened than with a lesser threat.

Our research was aimed to test the theoretical model presented in Figure 1. Based on the elements of the literature described above, we have formulated the following hypotheses:

*H1 Faced with a message with a framing of loss (with a negative consequence), participants will be more afraid and more likely to intend to be screened than if they are subjected to a message with a framing of gain (with a positive consequence).*

*H2 Faced with a message with strong vividness, participants will be more afraid and more likely to intend to be screened than if they are subjected to a message with weaker vividness.*

*H3 There is an interaction effect between vividness and framing that increases the size of the effect of the threat on the intention to be screened.*

*H4 There is a mediation effect of the fear (fear + threat) caused by the message (manipulated depending on the vividness and framing variables) as well as of the perceived efficacy on the behavioural intention to be screened.*

## **Method**

### ***Sample***

Subjects were recruited by occupational health doctors during the annual medical check-up of employees. The sample consisted of 120 people, 56% women and 44% men, aged between 23 and 66 years ( $M = 41.69$ ,  $SD = 10.53$ ).

The inclusion criteria were: age > 30 years old and the presence of risk factors such as: overweight ( $BMI > 25$ ), high blood pressure, high cholesterol or family history of diabetes. Subjects with a previous diagnosis of diabetes or attending the medical examination for a pathological reason were excluded from the group.

### ***Procedure***

To design a 2 x 2 x 2 factorial project, eight groups were constructed (15 subjects were recruited for each group) by combining the three independent variables: vividness (high/low), framing goals (gain/loss) and framing attributes (positive/negative).

At the end of the routine annual medical check-up, participants were invited to take part by the physicians, who presented the study and the instructions: *“I am involved in a diabetes study and I would like to show you a flyer that we are preparing. Please would you look at it and read the text, and then I'll ask you to answer a questionnaire that aims to find out what you think of it”*. Those who agreed to participate, after being informed of the study's objectives, signed an informed consent. Participants were asked to look at the flyer and read the text before

completing a short anamnestic questionnaire containing socio-demographic information, information about their lifestyle (fruit and vegetable consumption, sports activities, smoking, alcohol consumption) and their health status (weight, height, hypertension, cholesterol, illnesses, family history) and the study measures.

Each of the eight flyers consisted of a text concerning the threat of being diabetic unknowingly (this part was identical for the eight flyers), a second part that operationalised the vividness of the threat with a strong violent image (a photo of a very damaged diabetic foot) or a less offensive image (a photo of a foot in the first stage of arteritis), a third part that made the recommendation, which operationalised the framing type (the objective and attribute of the recommendation) and the last part, which offered a screening solution (blood tests).

At the end of the questionnaire, participants were offered a debriefing with the physicians about the consequences of diabetes to avoid traumatic effects due to looking at the flyer, which was deliberately chosen to be strong and shocking for the purposes of our research.

### ***Measures***

*Risk Behaviour Diagnosis Scale* (RBD, Witte, Cameron, McKeon & Berkowitz, 1996) in the French version (Guarnaccia & Henry, 2017) was used to evaluate the impact of the fear message. The scale, according to the validation study, included 12 items in 3 subscales evaluated on a 7-point Likert scale (from 1 “strongly disagree” to 7 “strongly agree”). The major subscales evaluate *perceived threat* (including *perceived susceptibility* to the threat and *perceived severity* of the threat) and *perceived efficacy* of the recommendation message. This factor, in the new version tested by Guarnaccia & Henry (2017), includes self-efficacy and recommendation efficacy items. An example of an item is “*I am at risk of getting diabetes*”. The scale provides an individual score, which is calculated by subtracting the score on the threat component (Severity + Susceptibility) from the score on the efficacy component (Self-Efficacy + Recommendation Efficacy). When the perceived threat and the perceived efficacy are high,

people are motivated to control the danger by adhering to the recommended responses. When the perceived threat is high but the perceived efficacy is low, people are motivated to control their fear by rejecting the recommended responses through defensive avoidance or denial of the threat. Negative scores indicate that people are controlling their fear. In the current study, all scales demonstrated good internal consistency evaluated by Cronbach's  $\alpha$ : Perceived Threat  $\alpha = 0.56$ ; Overall Efficacy  $\alpha = 0.76$ .

*Perceived Fear Emotions Scale*: The RBD was completed by a six-item scale regularly used in the Anglo-Saxon and French literature (Gallopel, 2005; Laroche, Toffoli, Zhang & Pons, 2001) to evaluate fear emotions. The scale asks participants to evaluate, on a 7-point Likert scale (from "do not agree at all" to "strongly agree"), a prevention tool (in our case an information flyer about diabetes) based on a list of six adjectives related to the perception of a fear emotion: "frightened", "tense", "nervous", "anxious", "uncomfortable", "disgusted" (e.g. "While reading this poster, did you feel anxious?").

Most authors who have used this scale in previous research have reported satisfactory psychometric qualities, which was the case in our own study. The scale demonstrated good internal consistency of the items (Cronbach's  $\alpha = 0.87$ ) and the single factorial structure was confirmed by a Confirmatory Factor Analysis in line with the literature results.

The score of this scale was added to the RBD *perceived threat* score in order to create a unique variable to assess the perception of the fear severity and vulnerability. The unified fear + threat scale had good internal consistency indices (Cronbach's  $\alpha = 0.88$ ) and respected the factorial structure of the three original measures (three correlated factors, severity + vulnerability + perceived fear).

*Behavioural Intention* was measured by four items on a 7-point Likert scale, through direct questions to subjects about being screened or following the recommendations. This scale also demonstrated good internal consistency (Cronbach's  $\alpha = 0.71$ ).

## *Data analysis*

After verifying the univariate normality of the distributions using Skewness and Kurtosis indices, the Kurtosis multivariate Mardia coefficient was used to demonstrate the multivariate normality of the variables. Then, descriptive statistics and correlations between variables were calculated.

The first stage results (a 2 x 2 x 2 factorial design) were analysed by three ANOVAs to test the effects of vividness, framing goals and framing attributes on behavioural intention. In each ANOVA, the between-subjects factors were vividness (low or high), framing goals (loss or gain), and framing attributes (positive or negative), with two levels each. Interaction effects were also explored. Both multivariate and univariate results are presented in the tables.

At the second stage, in order to test our model, structural equation modelling (SEM) was used as implemented by AMOS 6.0 (Arbuckle, 2005). The SEM procedure was appropriate for testing the proposed theoretical model, containing both observed variables and unobserved constructs, because it enabled us to evaluate how well it explained or fitted the collected data (Bollen, 1989; Hoyle, 1995). A maximum likelihood method of estimation was adopted. The model fit was evaluated using four indices:

- The Carmines-McIver Index: This index is the ratio of  $\chi^2$  to the degree of freedom ( $\chi^2/df$ ). A result within the range of 2-3 indicates an acceptable fit (Carmines and McIver, 1981).
- The Comparative Fit Index (CFI): This index compares the fit of the proposed model to a baseline model. A result approaching 1.0 indicates a model with a better fit, with 0.90 representing the established threshold for a good fit (Bentler, 1990).
- The Root Mean Square Error of Approximation (RMSEA): This index shows how well the model compares to the population covariance matrix (Browne and Cudeck, 1993). These authors state that a good fit is indicated by an RMSEA value between 0.05 and 0.08.



- In addition, Bollen and Stine (1992) introduced another fit statistic to compare models based on their proposed bootstrapping procedures. The null hypothesis for their test is that the model fits the data, so a p-value higher than the significance level (say 5%) indicates a good model fit.

## Results

### *Descriptive analysis*

First, the normality was checked through the univariate indices of Skewness and Kurtosis with an acceptance threshold of  $\pm 1$ . No variables displayed violations of normality. The Kurtosis multivariate index of Mardia calculated on the 6 variables was equal to 42.44, just below the critical cut-off of 48. Zero-order correlations were calculated and *Table 1* shows the correlation matrix of all the dimensions of the model. The majority of the variables were statistically associated with each other. This first result seems to imply that these dimensions, although independent, could be considered components of the same domain. Next, variance inflation factor (VIF) indices were estimated to verify multicollinearity between the variables. The results showed a range of values between 1.13 and 1.44, indicating that there was no multicollinearity between variables.

*Table 1. Means, standard deviation and correlations of the fear model dimensions*

		<i>Mean</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<i>1</i>	Fear Experienced	3.23	1.48				
<i>2</i>	Perceived Threat	5.35	1.05	<b>.318**</b>			
<i>3</i>	Fear + Threat	8.57	2.07	<b>.877**</b>	<b>.734**</b>		
<i>4</i>	Overall Efficacy	10.89	2.00	<b>.204*</b>	<b>.235**</b>	<b>.265**</b>	
<i>5</i>	Behavioural Intention	4.52	1.47	<b>.294**</b>	.175	<b>.299**</b>	<b>.787**</b>

Note:  $N = 120$ , \* =  $p, 0.001$ .

### Analysis of variance (ANOVA)

Table 2 provides an overview of the ANOVA results to test the effects of vividness, framing goals and framing attributes on behavioural intention.

A significant main effect was observed with respect to vividness ( $F = 5.97$ ,  $p = .016$ , partial  $\eta^2 = .051$ ) and framing attributes ( $F = 4.60$ ,  $p = .034$ , partial  $\eta^2 = .040$ ), but not to framing goals ( $F = 1.73$ ,  $p = .191$ , partial  $\eta^2 = .015$ ). The results demonstrate that participants were more likely to implement preventive behaviours when exposed to a message with a high intensity threat (Behavioural intention  $M = 4.83$ ,  $SD = 1.46$ ) compared to those exposed to a low intensity stimulus (Behavioural intention  $M = 4.20$ ,  $SD = 1.41$ ). Moreover, they were more likely to implement preventive behaviours when exposed to a message with a positive attribute (Behavioural intention  $M = 4.79$ ,  $SD = 1.42$ ) compared to a negative one (Behavioural intention  $M = 4.24$ ,  $SD = 1.46$ ). This confirms our H1 partially and H2 totally but, contrary to our hypothesis H3, we detected no significant interaction effects between the 3 IVs.

Table 2. ANOVA results

	F	p	Partial $\eta^2$
Vividness	<b>5.979</b>	<b>.016</b>	<b>.051</b>
Framing Attributes	<b>4.609</b>	<b>.034</b>	<b>.040</b>
Framing Goals	1.733	.191	.015
Vividness * Framing Attributes	.031	.861	.000
Vividness * Framing Goals	1.944	.166	.017
Framing Attributes * Framing Goals	.290	.591	.003
Vividness * Framing Attributes * Framing Goals	2.608	.109	.023

Note: *R Squared* = .133 (*Adjusted R Squared* = .079)

### *Mediation model*

In order to confirm our hypothesis H4, an SEM with manifest variables was used. The model showed satisfactory fit indices that confirmed the good structure of the model (*Table 3*). As can be seen from the model (Figure 1), vividness (high or low) was positively associated with the perception of fear and threat ( $\gamma = 0.337$ ;  $p = 0.001$ ); on the contrary, there were no significant direct effects of framing goals (gain/loss) ( $\gamma = 0.151$ ;  $p = 0.07$ ) and framing attributes (positive/negative) ( $\gamma = 0.100$ ;  $p = 0.22$ ).

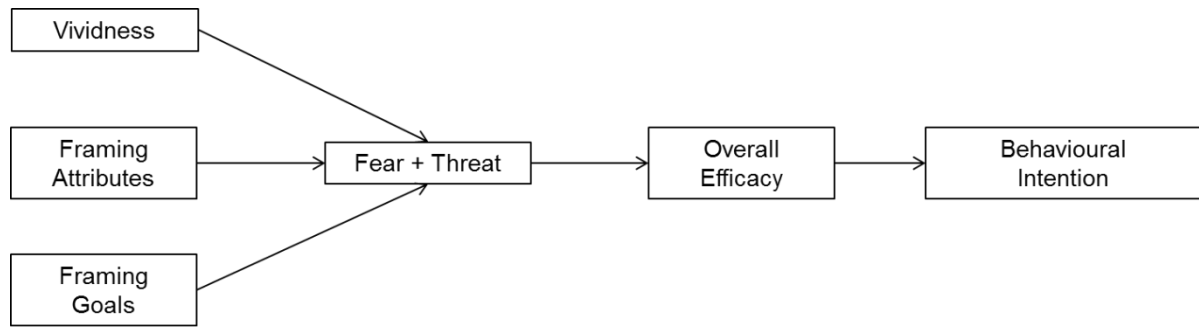
Our results also showed that the perception of fear and threat was positively associated with overall efficacy (self-efficacy and effectiveness of the recommendations) ( $\gamma = 0.265$ ;  $p = 0.003$ ). Finally, the overall efficacy was positively associated with behavioural intention ( $\gamma = 0.787$ ;  $p = 0.001$ ).

*Table 3. Goodness-of-fit indices of the motivational model*

<b>Model</b>	<b><math>\chi^2</math></b>	<b>Df</b>	<b><math>\chi^2/df</math></b>	<b>CFI</b>	<b>RMSEA</b>	<b>LO</b>	<b>HI</b>
	11.866	10	1.187	0.987	0.04	0	0.111

Note: LO = Lower RMSEA; HI = Higher RMSEA

*Figure 1. Hypothesised model*



As shown in *Table 4*, the results of indirect effects revealed that the relationship between vividness (high/low) and overall efficacy was completely mediated by the perception of fear and threat while the relationship between framing goals (gain/loss) and overall efficacy was completely mediated by the perception of fear and threat. We also showed that the overall efficacy completely mediated the relationship between the perception of fear and threat and behavioural intention. The 95% confidence interval bootstrap estimate for the indirect effect of these variables did not include zero, suggesting a significant total mediation effect.

*Table 4. Mediation model: indirect effects*

	<i>Product of Coefficients</i>			<i>Bootstrapping Bias Corrected 95% CI</i>	
	Estimate	SE	p	Lower limit	Upper limit
Vividness on Overall Efficacy	<b>0.400</b>	<b>0.192</b>	<b>0.002</b>	<b>0.100</b>	<b>0.846</b>
Framing Attributes on Overall Efficacy	0.106	0.111	0.187	- 0.042	0.405
Framing Goals on Overall Efficacy	<b>- 0.106</b>	<b>0.109</b>	<b>0.046</b>	<b>- 0.431</b>	<b>-0.002</b>
Vividness on Behavioural Intention	<b>0.230</b>	<b>0.113</b>	<b>0.002</b>	<b>0.056</b>	<b>0.492</b>
Framing Attributes on Behavioural Intention	0.061	0.064	0.181	- 0.024	0.237
Framing Goals on Behavioural Intention	<b>-0.092</b>	<b>0.064</b>	<b>0.046</b>	<b>- 0.253</b>	<b>-0.001</b>

Note: N= 120; Unstandardised values are presented; Bootstrap sample size = 5000; CI = Confidence interval.

Figure 2. Results for the hypothesised model



## Discussion

The aim of the current study was to verify the persuasive impact of a health message in the field of diabetes and, in particular, to improve the characteristics of the messages that could be recommended to patients at risk of developing diabetes to persuade them to be screened. Among the factors identified in the literature, our objective was to explore the ability of the vividness and framing of a persuasive message and image to generate a fear of the consequences of having diabetes and, as a result, encourage the person to be screened.

Our results show a significant impact of vividness (high) and positive framing (in terms of gain) compared to low vividness and negative framing (in terms of loss).

We also wanted to investigate the mediating role of Witte's model factors (1992, 1998) in the relationship between the perception of a threat message and the intention to be screened. In

the health campaign field, the threat could be operationalised by the combined effect of framing and vividness.

As expected, we found that the perception of fear and threat mediates the relationship between the vividness of the threat and the overall efficacy (composed by self-efficacy and the effectiveness of the recommendations).

Another goal of our study was to consider efficacy perception (self-efficacy and recommendation efficacy) as a mediating variable in the relationship between fear/threat perception and the outcome of the decision to engage in health prevention. As predicted, we showed that the overall efficacy mediates the relationship between the fear/threat perception connected with health and the behavioural intention to be screened.

These findings confirm our H4 and offer an opportunity for some interesting reflections about the role of vividness and framing in the field of health persuasive messages.

However, one of the results concerning the framing effect goes against the hypothesis. It is interesting to observe that, on one hand, there is no interaction effect but a simple effect of the framing (gain/loss) and vividness variables and, on the other hand, the framing effect no longer appears in the mediation model we tested. At first sight, it seems that the effect of vividness masks that of framing, being a powerful and more determinant effect. However, other interpretations are possible; we will come back to this.

In addition, the greater effect of positive than of negative framing is interesting to analyse. Contrary to the literature, in a screening context, negative framing should have had more, or at least as much, impact as positive framing whereas positive framing is usually the most persuasive in a prevention context (Ferrer, Klein, Zajac, Land, & Ling, 2012; Gallagher & Updegraff, 2012; Hull, 2012; Rothman, Wlaschin, Bartels, Latimer & Salovey, 2013).

The explanation could be that the participants did not see the context of the diabetes screening as an end in itself, leaving them faced with a possible treatment if the result was

negative, but more as a way of staying in good health if the result was positive or of avoiding health complications if it was negative, and thus in a broadly preventive perspective. Continuing this line of thought, the literature concerning the regulatory framing of the message suggests that screening could be seen by participants more as a means of promoting a health ideal for themselves (Higgins, 1997, 2000). In fact, emphasising a regulatory promotion or prevention objective in the message affects the persuasive effect of framing; positive framing has more influence in a promotional perspective and negative framing has more influence in a preventive one (Bosone, Martinez, & Kalampalikis, 2015; Cesario, Higgins, & Scholer, 2008). According to this literature, the results of our study show that the participants were more sensitive to positive message framing when it promoted an ideal state of health than to a framing of loss more focused on prevention, to avoid a possible deterioration in their health (Bosone, Martinez, & Kalampalikis, 2015; Cesario, Grant, & Higgins, 2004; Lee & Aaker, 2004; Spiegel, Grant-Pillow, & Higgins, 2004).

What is surprising then is that, because of the non-interaction between our factors, the strategies of the participants differed in their processing: on one hand, by the strongly negative model activated by the image with a view to avoiding the complication of diabetes illustrated by aggravated gangrene, seen as harmful to oneself; on the other hand, by the positive model activated by the framing with a view to staying in good health, seen as an ideal for oneself. Thus, two contradictory models were activated by the two sources of influence, vividness and framing; one aimed at preventing serious complications due to the illness and the other aimed at promoting an ideal for oneself, that of staying in good health, by the same means of being screened.

In addition, the fact that the effect of the image vividness prevailed over that of the message framing could be due to the activation of fear as a mediating negative emotion, which caused the participants to feel threatened by realising the seriousness of the disease and their

vulnerability, but also their ability to undergo screening, deemed effective in avoiding the complication of diabetic foot.

Fear as a negative emotion is congruent with a preventive strategy aimed at protecting oneself from serious complications by being screened but is not congruent with a promotion strategy for oneself.

So why did the participants not favour the negatively framed message activating an emotion corresponding to the intense fear felt by processing the most shocking image? One might have supposed that the fear engendered by the most shocking image was exacerbated by the emotion felt by the loss suggested by the negative framing. One possible interpretation is that an emotion other than fear, and even positive, could have been favoured in the differentiated processing of the framing, expressed in the participant by the benefit of what would be good to achieve for oneself.

We could thus assume that activating two types of seemingly incompatible processing was more beneficial in this context, with one compensating the other. In fact, the two types of emotions activated by vividness and framing, while incongruent, could have acted in a complementary way; feeling fear raised awareness of the threat, triggering the related cognitive processes in the participants and, at the same time, feeling a positive emotion enabled them to envisage and find a solution to the threat.

This is a research perspective that would be interesting to consider in the future, by suggesting mixed motivational strategies incorporating a compensation model and not only those exclusively positive or negative incorporating a congruent model.

In the classic model of fear appeal, the emotions measured are those assumed to have been aroused in this context and therefore negative. It does not consider the positive emotions that could also be activated, notably by the positive framing of a message. To this end, it would be interesting to extend the measurement of emotions to positive valences, which may or may not



be congruent with the regulatory orientation of the framing of the message and the image, depending on the individual strategies of promotion or prevention favoured by participants.

### ***Limitations***

Although this study provides evidence for the mediating role of threat and efficacy in the relationship between threat perception and the intention to follow prevention for one's own health, some limitations should be noted. The most obvious are the sample size and its demographic characteristics. The results need to be interpreted with caution, and no causal inferences should be made. Therefore, future research should test the model using a more representative sample. A second limitation concerns the cross-sectional design of the current study. Although the path diagram, according to Witte's theory (REF), provides some information about the possible direction of relationships, a cross-sectional design does not allow firm conclusions to be drawn regarding the causal order of variables. The effect direction has not yet been estimated. Therefore, future research should focus on developing a longitudinal model to verify the directionality of the effects.

### ***Theoretical and practical implications***

This article makes several important theoretical contributions. First, the results are consistent with the literature concerning the effect of the vividness and framing of a persuasive message in encouraging preventive health behaviour, in a context of fear appeal (Blondé & Girandola, 2016; Gallagher & Updegraff, 2012; Tannenbaum et al., 2015; Witte & Allen, 2000). Moreover, they confirm the interest of Witte's model reorganised in three factors in this context (Guarnaccia & Henry, 2017).

More precisely, the present research confirms the prevalence of fear and threat emotions as mediators of the persuasive effect of the vividness of the message on self-efficacy faced with a recommendation deemed effective. Moreover, this efficacy is itself a mediator of the link between the threat and behavioural intention. These results enrich our understanding not only

of the links between our factors and the reactions of the participants but also of the intermediate and successive processes of an emotional, cognitive and conative nature.

Moreover, the framing effect, without an interaction with vividness, leads us to believe that two different ways of processing the message and the image, assumed complementary, occurred after activating different emotions; a possibly more positive emotion (not measured here) caused by the positive framing compensating the stronger fear and threat caused by the greater vividness.

We could thus put forward the idea that even if the framing effect was masked by that of vividness, it contributed indirectly to influencing the danger/fear control relationship and increasing the response efficacy and the behavioural intention of participants.

It would be interesting to pursue this research by exploring the link between the activation of emotions, the regulatory orientation due to the context and the underlying processes of decision-making in health in order to understand those that activate the most appropriate and persuasive models.

In any case, in the context of a diabetes screening campaign, the results of our study show the efficacy of a mixed strategy besides the threat from fear in warning about the serious risks of health complications and, in parallel, the valorisation of a behaviour promoting an ideal of health for oneself. In the wider perspective of developing persuasive communication as part of a health promotion campaign, the right motivational model to encourage decision-making could be found between threatening and rewarding identity strategies.

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