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To cite this article: Barbara Colombo, Benjamin Aurelio, H. James Wallace & Jessica L. Heath (2022): Exploring Patients' Trust from a New Perspective. A Text-Analysis Study, Health Communication, DOI: [10.1080/10410236.2022.2131973](https://doi.org/10.1080/10410236.2022.2131973)

To link to this article: <https://doi.org/10.1080/10410236.2022.2131973>



Published online: 10 Oct 2022.



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## Exploring Patients' Trust from a New Perspective. A Text-Analysis Study

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### ABSTRACT

The concept of trust has been extensively studied within the field of medicine. Yet, a list of factors that clearly influence patients' trust is still under debate. Moreover, the methodological approaches found in literature have been reported to be lacking in their assessments and measurements of trust relationships in the medical field although trust between a patient and medical provider has been proven to increase adherence and improve health outcomes. Hence, adding data to this debate and exploring a reliable method to explore the construct of trust is relevant. This study collects new evidence of the most salient indicators of patient trust by using a narrative approach and highlighting the potential of this method in collecting indicators that could be used to build training that aims to increase patients' trust. We used the Linguistic Inquiry and Word Count software for text analysis to examine the spontaneous narrations of episodes of trust and distrust within the doctor-patient relationship with a sample of 82 adult patients. Results demonstrate the role of the emotional aspects of the doctor-patient relationship. Data highlights the importance of doctors' benevolence toward patients, and positive emotions seem to be deeply connected with any experience of trust, which leads patients to feel more secure. Methods are presented to use these insights to construct mechanisms that establish medical trust and allow providers to implement effective interventions.

### Introduction

#### *The relevance of medical trust*

Trust is reported to be a key factor in promoting doctor-patient cooperation and increasing patients' adherence and satisfaction (Chandra et al., 2018; Petracci et al., 2017; Rolfe et al., 2014). Specifically, trust has been reported to increase patients' willingness to follow prescriptions that treat chronic conditions (e.g., Haywood et al., 2014; Pellowski et al., 2017). Trust has also been proven to be a valid predictor of adherence in ethnic minorities (Hall and Heath, 2020) and children (Rotenberg & Petrocchi, 2018). This study aims to add to the existing knowledge by addressing some limitations found in existing studies. To be more specific, the study uses a text-basis analysis to collect ecological data based on patients' spontaneous narrations and use this information to study cognitive, emotional, and social aspects connected to medical trust. Our results could be used to build more reliable interventions.

#### *From trust to adherence*

While adherence may be difficult to increase when addressed directly (Conn et al., 2016), trust is an active and dynamic construct (Chandra et al., 2018) that evolves in response to feelings, actions, or life-related situations (Ye et al., 2020). Thus, we assume that it is possible to use the positive role and dynamic characteristics of medical trust to improve the relationship between doctors and patients, thus increasing levels of adherence. To achieve this goal, the first step is to

identify specific antecedents of trust that, if lacking, could be enhanced by a targeted intervention.

#### *The antecedents of trust*

Several researchers have focused on identifying reliable indicators or antecedents of trust. In a recent paper, Krot and Rudawska (2016) categorized the factors that appear to be connected to doctor-patient trust into three dimensions: benevolence, competence, and integrity. When focusing on benevolence, several studies have reported the importance of emotional interaction between doctor and patient, such as the physician demonstrating early interest in the patient, being sensitive, and taking time with the patient (Wu et al., 2019). These emotional aspects are significant, especially when patients are asked to comment on their perception of their doctors (Mechanic and Meyer, 2000).

Accordingly, a factor analysis aimed at defining the variables that most influence trust (Gopichandran & Chetlapalli, 2013) reveals factors that primarily belong to benevolence: the patient's level of comfort when interacting with the physician, the doctor's personal involvement, and the doctor's cultural competence when interacting with different patients. Other studies have defined the details of this benevolence, identifying specific variables such as the physician's ability to understand a patient's individual experience as well as compassion, empathy, advocacy, honesty, and respect toward the patient (Keating et al., 2004; Mechanic & Meyer, 2000). Additionally, the doctor's appropriate communication skills have also been reported

to increase trust (Gopichandran & Chetlapalli, 2015; Petrocchi et al., 2019), especially when the doctor's communication style can be described as affectionate (Hesse and Rauscher, 2018).

Competence and integrity function less clearly than previously thought in defining the amount of trust that a patient places in a physician. For example, a structural equation model analysis of the factors that contribute to defining medical trust reveals that competence and perceived integrity are not major factors within the model (Gopichandran & Chetlapalli, 2015). Competence is commonly connected to expertise: studies that report a role of expertise define it as perceived expertise (Wu et al., 2019). Patients seem to not only rely on available information to assess their doctors' competence but also routinely test their doctors against their own knowledge and expectations (Mechanic & Meyer, 2000). Integrity has not been reported as a factor in other recent studies, although it has been mentioned as a characteristic associated with clinician humility, which has also been found to affect patients' trust in doctors by predicting not only patients' level of trust but also their level of satisfaction and self-reported health (Huynh & Dicke-Bohmann, 2020).

### **Methodological challenges and resources**

These studies have contributed to clarifying the antecedents of trust, but further investigation is still needed because trust in medicine is a multidimensional construct that has been operationalized in many ways. Some findings have focused on doctors' professional performance (Thom et al., 2004) and others on the importance of emotional aspects, including compassion, empathic and open communication, and emotional intelligence (Montague, 2010; Weng et al., 2008). An additional challenge in researching and operationalizing this construct is that literature suggests that trust relationships within the medical field are typically not negotiated explicitly, meaning that trust is not usually part of an open conversation between a doctor and patient; rather, it tends to be built directly through action and indirectly through communication style. Consequently, identifying the implications of a mandate of trust is more difficult (Murray & McCrone, 2015), and traditional self-reported scales or observational grids may not be sufficiently precise because they rely on explicitly open and aware aspects. Accordingly, Rolfe et al., (2014) highlight the lack of sensitivity in the commonly used trust-measuring instruments, which often focus on a few selected correlates of trust and do not include attention to patients' individual perspectives. Furthermore, these instruments are not designed to consider the fact that trust evolves within the doctor-patient relationship and thus cannot be detected by a self-reported scale without a longitudinal study. Another possible issue with the existing measures is an undetected ceiling effect that is caused by the generally high trust in doctors, especially when this trust is measured as a static rather than dynamic construct.

These limitations can be addressed by exploring trust through a text-analysis approach, which offers two advantages: (1) it relies on the value of narrative medicine in collecting ecological data, and (2) it offers the possibility of studying cognitive, emotional, and social aspects connected to medical trust.

Narrative medicine is based on the assumption that personal stories offer a better understanding of patients' experiences; analyzing these narratives provides important insights into how patients interpret and understand their clinical experiences (Charon et al., 2016; Kvåle et al., 2020). In this study, we analyze patients' narrations as a form of narrative inquiry (Bleakley, 2005). This approach is attracting increased attention because it allows the clinical researcher to focus on affective, relational, and ethical aspects of the patients' experience (Bleakley, 2005), which are relevant in assessing how patients see and develop trust within their relationships with doctors. Narrative medicine is based on the use and study of language, which is the simplest and most common tool for converting internal thoughts and emotions into a form that others can understand. Words and language, from this perspective, are a source of information for researchers and psychologists that provide an ecological approach to explore and understand individuals' cognitive processes and feelings (Jackson et al., 2021; Tausczik and Pennebaker, 2009). Specifically, text analysis has been successfully used in several studies that have focused on social relationships (Collisson et al., 2018; Vaughn et al., 2019), emotion regulation (Kopcsó & Láng, 2017; Niven et al., 2015; Nook et al., 2017), and cognitive processes (Hsu et al., 2014; Konopasky et al., 2020; Olson et al., 2018)—the same aspects that are the main focus of this study.

In our study, we used the Linguistic Inquiry and Word Count (Pennebaker, 2015; Pennebaker et al., 2015) software to conduct our text analysis. This software organizes the words in a text into predefined categories. It has been used by researchers in different fields of psychology, as reported by ad hoc reviews, and has been validated by more than 100 studies (Pennebaker, 2011; Tausczik & Pennebaker, 2009). LIWC has also been proven reliable to analyze text related to health psychology by identifying (with scores similar to those of human coders) emotional expressions that could predict the likelihood of patients' visits to health centers (Pennebaker & Francis, 1996); furthermore, it has been used recently to study COVID-related emotional outcomes (Barrett, 2020; Ashokkumar & Pennebaker, 2021).

### **Aims**

Starting with the evidence reported in existing literature, we designed and conducted an extensive interview-based study that aimed to analyze patients' narratives in instances when they felt that a trust relationship was established and developed with their medical provider. Additionally, patients recalled instances when such trust was not established.

Our primary objective was to test whether the factors commonly highlighted in relevant literature (i.e., benevolence – including empathy, communication, time; competence and expertise, and humility) emerged from our participants' narratives as well. Additionally, we aimed to explore how emotional speech is utilized when patients discuss experiences of trust versus distrust and which other language-based indicators characterized or distinguished trustful and distrustful scenarios.

From these aims, we derived the following research questions: is it possible to use a narrative-based approach with

a population of adult individuals to identify specific antecedents of trust that match those reported in the literature? Furthermore, will this ecological approach allow researchers to collect more detailed information about the specific elements that characterize this type of trust?

As mentioned previously, the methodological approaches found in literature are lacking in their assessments and measurements of trust relationships in the medical field. With our narrative approach, we yield new evidence of the most salient indicators of patient trust and highlight the potential of this methodology in collecting indicators that could be used to create training that aims to increase patients' trust.

## Methods

Ethical approval for this study was granted by Champlain College's IRB.

Participants were recruited by word of mouth as well as by sharing information about the study on social media. Once a person expressed interest in the study, we contacted them to explain the aim of the study and check eligibility criteria (no diagnosis of chronic illness or neurodegenerative disease, self-assessed health graded as good or average, and contact with medical providers at least twice in the preceding six months). If people matched the criteria, then we sent a consent form and scheduled a time for the interview.

We conducted 82 structured interviews. The interviews lasted between 320 and 623.40 seconds (Mean = 445.67; SD = 108.79) - between 5.3 and 10.4 minutes.

Our sample was slightly imbalanced in gender (females = 59.8%); participants' ages ranged from 20 to 68 years (Mean = 45; SD = 13.49; IQR = 30–55). All participants identified as White or Caucasian. Participants involved in this study reported visiting a physician between two and six times during the previous 12 months, with a mode of four visits.

Participants, after signing a consent form, were asked to describe in their own words a situation in which they realized that sufficient trust had been established between themselves and a medical provider as well as an instance in which they felt that trust had not been established. To allow participants to express their personal beliefs about trust, we did not provide a specific definition of trust. None of the participants expressed doubts or any form of uncertainty regarding the scenarios that we asked them to discuss. The order of the questions (trust vs. distrust) was counterbalanced to avoid an order effect. Participants were informed that they were not required to disclose any information, personal or otherwise, that would reveal their identity and that any identifying information (names, hospitals' names, etc.) would be redacted from the interview transcript. Additionally, participants were aware that, at any point, they could request that any part of the transcript be deleted prior to analysis (although none of the participants asked for this). At the end of the interview, age and gender of each interviewee were recorded and matched with the participant's code, which we used to title the audio recording in a way that maintained confidentiality.

After transcribing the interviews<sup>1</sup>, we used the LIWC (Pennebaker et al., 2015) software for text analysis. This

**Table 1.** LIWC categories used in this study. Adapted from (Pennebaker et al., 2015).

Category	Examples
<i>Summary Language Variables</i>	
Analytical Thinking	/
Clout	/
Emotional tone	/
<i>Linguistic dimensions</i>	
Personal pronouns	I, them, her
1 <sup>st</sup> person singular	I, me, mine
3 <sup>rd</sup> person singular	she, her, him
<i>Psychological processes</i>	
Affective processes	Happy, cried
Positive emotion	Love, nice, sweet
Negative emotion	Hurt, ugly, nasty
Social processes	Mate, talk, daughter, buddy
Cognitive processes	Cause, know, ought
<i>Biological processes</i>	
Health	Eat, blood, pain
Health	Clinic, flu, pill
<i>Time orientation</i>	
Past focus	Ago, did, talked
Present Focus	Today, is, now
Future Focus	May, will, soon

software sequentially analyzes textual content by matching each word with a reference dictionary (organized by specific categories, such as emotions, cognitive processes, health concerns, use of personal pronouns, etc.). When a match is found, the appropriate category (or categories – the same words can be included in more than one category) score within the dictionary is accrued, generating a score for each variable to be considered in the analysis. The values returned by the software represent the mean percentages of the words in the examined text that fall into the target category. For example, a mean score of 4.26 for positive emotions means that 4.26% of the words used by the participant were connected to positive emotions (see Table 1 for examples).

For our analyses, we used the LIWC standard dictionary, which includes almost 6,400 words and their stems. We selected a considerable number of LIWC categories (see below) in addition to the summary variables, all of which are connected to aspects from our literature review that we expected would reflect variables that were relevant to our investigation of trust.

### *Linguistic dimensions*

Evidence in the literature stresses the importance of the doctor-patient relationship being personal; the focus is on both patient and doctor (Gopichandran & Chetlapalli, 2013).

### *Psychological processes*

This dimension should highlight aspects associated with benevolence and the affective communication that has often been reported as an antecedent of trust (Keating et al., 2004; Mechanic & Meyer, 2000; Hesse & Rauscher, 2018).

### *Biological processes*

Since our interviews focus on medical trust, exploring how (and how much) patients discuss health- and body-related issues seems relevant.

### Time orientation

As we discussed previously, the trust between doctors and patients is negotiated over time. Moreover, the doctor's competence (another antecedent of trust reported in the literature) is tested over time (Mechanic & Meyer, 2000). Consequently, exploring how patients use time when they discuss time is interesting at an exploratory level.

Table 1 offers an overview of the factors and categories included.

We also built a custom dictionary (regarding medical trust) by referring to the findings reported in the literature and discussed in this study's introduction.

To build our dictionary, we followed the main steps used to build the LIWC dictionary:

- (1) Word collection. We generated a list of words, starting with those used in self-reported surveys and in interview extracts that we read for our literature review. Words were provisionally organized into the main categories that we derived from the literature: benevolence, empathy, communication, time, expertise, and humility.
- (2) Judges' ratings. After the first version of the list for each category was created, a team of three judges examined each word, assigning a goodness-of-fit rating for each category. We required all judges to agree on whether each word should be included. Any disagreement was discussed case by case, and only upon resolution would the word be included; if judges could not agree, then the word was removed from the list.
- (3) Base rate analysis. The initial version of the dictionary was built based on the judges' ratings, and then we performed a preliminary analysis to check the frequency with which these words were used in our interviews. Words that did not occur at least once in more than three interviews were omitted from the final version of the dictionary. After Step 3, the category *humility* was removed from the dictionary because none of the words belonging to this category were used sufficiently.

The structure of our dictionary is reported in Table 2.

### Results

With SPSS version 26, we conducted GLM repeated measures ANOVAs, using trust (narrations of trust vs. narrations of distrust) as a within-subject factor, gender as a between-subject factor, and different language categories as dependent variables.

Descriptive statistics for the analyzed transcripts reveal that the mean number of words was 511.88 (SD = 159.39), with a minimum of 410 words and a maximum of 828 words. Our

**Table 2.** Categories and examples for the "Trust in medicine" LIWC dictionary.

Category	Examples
Benevolence	Warm, respect, sincere
Communication	Listen, explain, question
Empathy	Feel, sincere, comfortable
Time	Time, patient, rush
Expertise	Expert, knowledge, confident

minimum word count was well above the common exclusion criteria of 100 words (Brandt & Herzberg, 2020).

### Summary of language use

Significant differences emerged between the way language was used when describing trusting relationships versus distrusting relationships, and these differences were significant in all categories (see Table 3). Additionally, for all categories (analytical thinking [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 21.19 vs. 15.35], clout [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 52.03 vs. 35.56] and emotional tone [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 68.67 vs. 50.07]), the mean scores were higher when participants discussed a situation in which trust was established. No significant interaction between gender and trust conditions emerged.

### Linguistic dimensions

Some significant differences emerged in the use of our target language categories: individuals used pronouns differently when talking about trust or distrust. More personal pronouns [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 16.55 vs. 15.50] and first-person pronouns [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 4.69 vs. 2.54] were employed when talking about trust, and more third-person pronouns were used when discussing distrust [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 8.94 vs. 9.69]. Detailed results, including the main effects, are reported in Table 4.

### Psychological processes

Following the categories in the LIWC software, we focused on affective processes, positive emotions, negative emotions, social processes, and cognitive processes. Mean scores, standard deviations, and main effects are reported in Table 5. Individuals used more words connected to affective processes [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 5.52 vs. 4.56], social processes [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 13.17 vs. 10.45], and positive emotions [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 4.26 vs. 2.97] when discussing trust-based relationships. More words related to negative emotions [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 1.17 vs. 1.52] and cognitive processes [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 14.47 vs. 16.28] were used when talking about situations in which trust was not established.

### Biological processes and health

Mean scores and standard deviations in the text analysis as related to biological processes [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 3.47 vs. 2.82] and health [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 2.96 vs. 2.18] are reported in Table 6 with the main effects. For both categories, participants scored higher when discussing established trust.

### Time orientation

When exploring patients' time orientation in their speech, we analyzed the three main time directions: past, present, and future. Descriptive statistics and the main effect from the repeated measures ANOVAs are reported in Table 7. When discussing situations in which trust was established, participants generally focused on the present [ $\text{Mean}_{(\text{trust}/\text{no trust})}$ : 10.71



**Table 3.** Mean scores, standard deviations and main effects for summary language use categories.

Category	Mean (SD)	Main Effects
<i>Analytical Thinking</i>		$F_{1,80} = 14.52, p < .0001; \eta^2 = .15$
Trust – total	21.19 (17.68)	
Female	18.63 (17.19)	
Male	24.99 (17.99)	
No trust – Total	15.35 (15.14)	
Female	15.14 (16.43)	
Male	15.66 (13.25)	
<i>Clout</i>		$F_{1,80} = 19.15, p < .0001; \eta^2 = .19$
Trust – total	52.03 (23.45)	
Female	47.15 (22.88)	Between subject effect (gender)
Male	59.28 (22.71)	$F_{1,80} = 16.61, p < .0001; \eta^2 = .17$
No trust – Total	35.56 (24.02)	
Female	28.69 (18.51)	
Male	45.76 (27.69)	
<i>Emotional tone</i>		$F_{1,80} = 16.50, p < .0001; \eta^2 = .17$
Trust – total	68.67 (31.93)	
Female	69.49 (35.17)	
Male	67.46 (26.90)	
No trust – Total	50.07 (29.56)	
Female	49.43 (31.25)	
Male	51.02 (27.29)	

**Table 4.** Mean scores, standard deviations and main effects for linguistic dimensions categories.

Category	Mean (SD)	Main Effects
<i>Personal pronouns</i>		$F_{1,80} = 4.88, p = .03; \eta^2 = .05$
Trust – total	16.55 (4.17)	
Female	16.37 (4.34)	
Male	16.81 (3.97)	
No trust – Total	15.50 (4.13)	
Female	16.16 (4.37)	
Male	14.52 (3.61)	
<i>1<sup>st</sup> person singular</i>		$F_{1,80} = .09, p = .33; \eta^2 = .01$
Trust – total	8.94 (2.28)	
Female	9.43 (2.27)	Between subject effect (gender)
Male	8.22 (2.12)	$F_{1,80} = 16.61, p < .0001; \eta^2 = .17$
No trust – Total	9.69 (4.66)	
Female	11.00 (4.74)	
Male	7.75 (3.86)	
<i>3<sup>rd</sup> person</i>		$F_{1,80} = 22.69, p < .0001; \eta^2 = .22$
Trust – total	4.69 (3.54)	
Female	4.47 (3.01)	
Male	5.01 (4.25)	
No trust – Total	2.54 (2.34)	
Female	2.68 (2.28)	
Male	2.31 (2.44)	

vs. 10.25]. When discussing lack of trust, they tended to focus on the past [ $\text{Mean}_{(\text{trust/no trust})} 7.66$  vs. 9.73] or on the future [ $\text{Mean}_{(\text{trust/no trust})} .83$  vs. 1.06].

### The new dictionary: Medical trust

Our final analyses used the dictionary that we built based on the theoretical models in the literature and applied to our interviews; results, including main effects, interaction effects, and descriptive statistics, are reported in Table 8. Our participants used more words connected to the categories that we identified as associated with trust (i.e., benevolence [ $\text{Mean}_{(\text{trust/no trust})} 1.88$  vs. 1.15], communication [ $\text{Mean}_{(\text{trust/no trust})} .39$  vs. .36], empathy [ $\text{Mean}_{(\text{trust/no trust})} .81$  vs. .57], time [ $\text{Mean}_{(\text{trust/no trust})} .59$  vs. .57], and expertise [ $\text{Mean}_{(\text{trust/no trust})} .42$  vs. .31]) when narrating their trust-based experiences.

## Discussion

This study analyzes the spontaneous narrations of episodes of trust and distrust within the doctor-patient relationship. The narrations were obtained by interviewing 82 adults.

Our primary objectives were to test models that report antecedents of trust by using an approach that allows a more in-depth analysis than self-reported measures and to identify language-based indicators that highlight variables that are crucial in establishing and defining trust within a medical relationship. Ultimately, this could be used to build interventions that improve the level and quality of trust within clinical settings. This is particularly relevant within the context of medical trust because, as reported in the literature, this type of trust is not negotiated explicitly (Murray & McCrone, 2015). Hence, language indicators become fundamental not only to better understand the mechanisms behind medical trust but also to act on these mechanisms to improve trust.

**Table 5.** Mean scores, standard deviations and main effects for psychological processes categories.

Category	Mean (SD)	Main Effects
<i>Affective processes</i>		$F_{1,80} = 9.12, p = .003; \eta^2 = .10$
Trust – total	5.52 (2.26)	
Female	5.94 (2.53)	Between subject effect (gender)
Male	4.90 (1.62)	$F_{1,80} = 9.04, p = .004; \eta^2 = .10$
No trust – Total	4.56 (1.93)	
Female	4.95 (1.93)	
Male	3.98 (1.80)	
<i>Positive emotions</i>		$F_{1,80} = 15.22, p < .0001; \eta^2 = .16$
Trust – total	4.26 (2.34)	
Female	4.51 (2.59)	
Male	3.91 (1.90)	
No trust – Total	2.97 (2.00)	
Female	3.15 (2.12)	
Male	2.71 (1.81)	
<i>Negative emotions</i>		$F_{1,80} = 3.50, p = .065; \eta^2 = .04$
Trust – total	1.17 (1.36)	
Female	1.32 (1.57)	Between subject effect (gender)
Male	.95 (.93)	$F_{1,80} = 4.53, p = .04; \eta^2 = .05$
No trust – Total	1.52 (1.16)	
Female	1.75 (1.32)	
Male	1.18 (.79)	
<i>Social processes</i>		$F_{1,80} = 17.79, p < .0001; \eta^2 = .18$
Trust – total	13.17 (5.00)	
Female	12.73 (5.16)	Between subject effect (gender)
Male	13.82 (4.77)	$F_{1,80} = 4.28, p = .04; \eta^2 = .05$
No trust – Total	10.45 (3.71)	
Female	9.63 (3.87)	
Male	11.66 (3.13)	
<i>Cognitive processes</i>		$F_{1,80} = 6.34, p = .01; \eta^2 = .07$
Trust – total	14.47 (4.07)	
Female	14.85 (4.32)	
Male	13.90 (3.65)	
No trust – Total	16.28 (6.47)	
Female	17.06 (7.50)	
Male	15.13 (4.40)	

**Table 6.** Mean scores, standard deviations and main effects for biological processes and health categories.

Category	Mean (SD)	Main Effects
<i>Biological processes</i>		$F_{1,80} = 6.29, p = .01; \eta^2 = .07$
Trust – total	3.47 (1.94)	
Female	3.52 (2.14)	
Male	3.40 (1.64)	
No trust – Total	2.82 (1.65)	
Female	2.76 (1.45)	
Male	2.91 (1.94)	
<i>Health</i>		$F_{1,80} = 10.75, p < .002; \eta^2 = .12$
Trust – total	2.96 (1.72)	
Female	2.98 (1.82)	
Male	2.92 (1.58)	
No trust – Total	2.18 (1.52)	
Female	2.06 (1.30)	
Male	2.36 (1.80)	

### Analytical thinking

We started by focusing on the LIWC summary variables, which utilize combinations of words, function words, and total word count to highlight underlying general processes (Pennebaker et al., 2015). All the categories illustrated significant differences between the trusting and distrusting scenarios. We then performed specific analyses, focusing on word categories: linguistic dimensions, psychological processes, biological processes and health, and time orientation.

The first summary variable was linked to analytical thinking, and it was mainly derived from the use of function words: discourses that return a high score in this category highlight a speaker who is using a more logical and complex approach in their discussion of the topic (Boyd & Pennebaker, 2015; Pennebaker et al., 2014). Our data demonstrates increased use of analytical thinking in the trust scenarios, which underscores the tendency to be more articulate when discussing examples of relationships with considerable medical trust. Supporting evidence can be derived from the results obtained by analyzing the use of language to refer to cognitive processes

**Table 7.** Mean scores, standard deviations and main effects for time orientation categories.

Category	Mean (SD)	Main Effects
<i>Focus past</i>		
Trust – total	7.66 (3.76)	$F_{1,80} = 13.56, p < .0001; \eta^2 = .14$
Female	7.36 (4.04)	
Male	8.11 (3.30)	
No trust – Total	9.73 (4.16)	
Female	9.49 (3.99)	
Male	10.10 (4.45)	
<i>Focus present</i>		
Trust – total	10.71 (4.66)	$F_{1,80} = .62, p = .43; \eta^2 = .01$
Female	11.11 (4.89)	
Male	10.11 (4.30)	
No trust – Total	10.25 (5.50)	
Female	10.79 (6.05)	
Male	10.25 (5.50)	
<i>Focus future</i>		
Trust – total	.83 (.95)	$F_{1,80} = 3.15, p = .08; \eta^2 = .04$
Female	.98 (1.05)	
Male	.60 (.73)	
No trust – Total	1.06 (1.04)	
Female	.99 (1.04)	
Male	1.15 (1.06)	

**Table 8.** Mean scores, standard deviations, main effects, and interaction effects for medical trust categories.

Category	Mean (SD)	Main and Interaction Effects
<i>Benevolence</i>		
Trust – total	1.88 (1.69)	$F_{1,80} = 10.24, p = .002; \eta^2 = .11$
Female	2.12 (1.86)	
Male	1.52 (1.37)	
No trust – Total	1.15 (1.28)	
Female	1.25 (1.86)	
Male	1.01 (1.03)	
<i>Communication</i>		
Trust – total	.39 (.59)	$F_{1,80} = .54, p = .46; \eta^2 = .01$ Between subject effect (gender) $F_{1,80} = 6.67, p = .01; \eta^2 = .08$
Female	.42 (.59)	
Male	.34 (.61)	
No trust – Total	.36 (.61)	
Female	.53 (.73)	
Male	.10 (.18)	
<i>Empathy</i>		
Trust – total	.81 (.97)	$F_{1,80} = 2.79, p = .09; \eta^2 = .03$
Female	.85 (1.05)	
Male	.76 (.85)	
No trust – Total	.57 (1.03)	
Female	.70 (1.20)	
Male	.37 (.66)	
<i>Time</i>		
Trust – total	.59 (.68)	$F_{1,80} = .06, p = .81; \eta^2 = .001$
Female	.66 (.74)	
Male	.49 (.58)	
No trust – Total	.57 (.62)	
Female	.62 (.63)	
Male	.49 (.60)	
<i>Expertise</i>		
Trust – total	.42 (.68)	$F_{1,80} = .55, p = .46; \eta^2 = .01$ Interaction effect (trust x gender) $F_{1,80} = 6.95, p = .01; \eta^2 = .08$
Female	.47 (.76)	
Male	.35 (.56)	
No trust – Total	.31 (.48)	
Female	.17 (.31)	
Male	.52 (.59)	

and time orientation. For these categories, we found that when discussing lack of trust, individuals generally use more words connected to cognitive processes, which can be understood as an increased effort to explain and elaborate the experience. Consequently, the narration offered is less elaborate but more

cognitively dense, hence the lower score in the overall analytical thinking category and the higher score in the cognitive processes category. The literature also supports the notion that individuals use more cognitive-process words when they are attempting to understand a concept (Pennebaker, 2011).



### **Time orientation**

Discussing a lack of trust was characterized by a significantly higher focus on the past, although no differences emerged when examining the focus on the present or the future. This considerable use of cognitive words and their match with a time orientation in the past suggests that people, when pondering a situation in which trust was not established, feel the need to use appraisal mechanisms to explain the scenario. This interpretation is supported by previous studies (Alparone et al., 2015; Boals & Klein, 2005), which have revealed that, when remembering negative experiences, individuals tend to use more words that are suggestive of cognitive mechanisms if they are simultaneously undergoing a process of emotional reappraisal. The focus on the past, which may have been induced by the need for reappraisal (as suggested by the cited studies), provides a psychological explanation regarding the association between a lack of trust in a medical setting and the lack of adherence or follow-up appointments with medical providers (Chandra et al., 2018; Petracci et al., 2017; Rolfe et al., 2014). If the patient cannot escape from the past, then the patient may also avoid follow-up actions. This data further suggests ideas for building interventions that aim to restore or improve trust in medical providers: using narrative medicine to enable patients to focus on the present and the future as well as on potential changes and improvements rather than remaining fixed on the negative aspects of the past may contribute to increasing trust and lead patients to higher adherence.

### **Clout**

Next, we examine clout (a category that reflects social roles and dynamics associated with status, power, dominance, and prestige). For this summary category, LIWC considers the specific use of function words (i.e., pronouns) and the total word count (Kacewicz et al., 2013). In our data, the score for clout was higher when participants discussed trust, which may reflect an increased sense of control and self-importance that participants perceive in trust-based relationships with their physicians. These results can be connected to and are supported by the linguistic dimension data. For example, researchers have reported that people with elevated social status who feel in control in social situations tend to use *I* words less than people who have a lower social status (Kacewicz et al., 2013). In our data, people used fewer *I* words when discussing trust than when talking about lack of trust, which suggests that when remembering or discussing a medical trust situation, individuals express a lower need for support (Vaughn, 2018), possibly because they feel more secure when remembering episodes in which trust was established. This assumes that patients discussed their own sense of control, while the data could also be understood to mean that the patients discussed the doctors' control, which also may have induced a sense of trust and security (trusting that the doctors are in control and know what they are doing). The reading that refers to a focus on the patient's personal sense of control is supported by the fact that our participants referred more frequently to social processes when discussing experiences in which trust was established than in other scenarios. This suggests a sense of control in the social situation. Moreover, researchers have also reported that words regarding social processes are more common when people describe duties that they

are confident they can personally perform than in other scenarios (Vaughn, 2018). This provides some evidence for the reports in the literature regarding a positive correlation between higher doctor-patient trust and higher adherence (Chandra et al., 2018; Petracci et al., 2017).

### **Emotional factors**

Here we focus on the overall emotional tone of the participants' narrations. LIWC computes the score for emotional tone by combining words related to emotional language (both positive and negative emotions) and merging this with the number of pronouns, verbs, negations, and relativity words. In our interviews, the score for emotional tone was higher when participants were discussing trusted settings than when discussing distrusted settings. These elevated scores have been reported to be connected to a more positive affect (Cohn et al., 2004), and this is confirmed in our data. When examining the use of specific emotion words, we noted that people used significantly more words linked to positive emotions when relating episodes of trust. Similarly, words about positive emotions have also been reported to be more commonly used when people are hopeful about the future (Vaughn, 2018). This is an interesting correlation, since hope has been reported as a potential therapeutic tool (Werner & Steihaug, 2017) and it has been proven to reduce anxiety by moderating activity in the orbitofrontal cortex (Wang et al., 2017). Since we did not focus explicitly on hope in this study, this aspect is a promising lead for future investigations.

### **Health**

We now move to categories that are more directly related to the medical field. Our participants used more words related to biological processes overall, and specifically to health, when discussing trust than in other scenarios. This information, which relates to our finding that people used fewer first-person and more third-person pronouns when discussing trust than in other scenarios, suggests that a trust environment enables the patient to focus on the health issues involved in the medical relationship and to do so with a positive attitude as well as optimism regarding the steps necessary to adhere to healthy behavior. This data provides indirect support as to the efficacy of using narrative medicine to improve not only patients' well-being but also quality of care and health outcomes (Charon et al., 2016; Iannello et al., 2018), which adds another factor to this equation. Narration is more likely to be effective if it is based on a trust relationship between the patient and their medical provider (Riva et al., 2014).

### **The new dictionary: Medical trust**

When using the LIWC dictionary derived from the models reported in the literature, the factor that emerged as significant from our analysis is benevolence, which people tend to refer to more often when talking about trust than in other scenarios. This confirms the meta-analytic evidence discussed in the introduction (Gopichandran & Chetlapalli, 2013). Expertise

alone was not a significant factor; however, an interaction effect emerged between talking about expertise and gender: self-identified females referred more often to expertise when discussing trust, and self-identified males mentioned expertise more frequently when referring to situations in which trust was not established. This is a notable finding, especially because some studies report no gender differences in medical trust (Tanco et al., 2016). Yet, neurological evidence supports gender differences in trust, with men tending to trust more than women (Wu et al., 2020). Our data is insufficient to explain this result in greater depth, but a possible speculative reading is that when men see their trust broken, they seek additional external factors to justify or explain how this happened. This reading can be partially supported by other findings that support the fact that men in emotionally challenging situations tend to use external attribution more than women (Schmitt & Branscombe, 2002).

Finally, scholars continue to debate the foundations of medical trust. Is medical trust based on the physician's performance (Thom et al., 2004), or are the emotional aspects of the relationship key (Montague, 2010)? Our data seems to support the latter. The results discussed herein highlight the importance of doctors' benevolence toward patients; however, positive emotions seem to be deeply connected with any experience of trust and lead patients to feel more secure.

## Conclusions

The present study aimed to utilize interviews to collect evidence related to trust in medical settings, with the ultimate goal of collecting useful indications to design optimal interventions that increase medical trust and adherence.

An initial notable outcome is that our data supports benevolence as the key factor characterizing doctor-patient interactions in which trust is established. Our cumulative data from the emotional variables considered in our text analysis also confirms the association between situations in which trust was present and positive emotions. These two findings combined support the importance of the emotional aspects of the relationship between medical providers and patients.

Another important piece of information comes from the insights that we derived from the LIWC dictionaries, which enabled us to validate models in the existing literature and provided new insights that could be used to build interventions that are designed to increase patients' trust. Our data suggests that patients find it more difficult to understand situations in which trust is not established. This keeps them connected to the past when the negative experience occurred, attempting to apply appraisal mechanisms that may be ineffective due to lack of hope or, more generally, positive emotions. When trust is established, however, patients possess a higher sense of control, confidence, and hope.

## Future interventions

We believe that most of the findings that emerged from our study could be used to build ad hoc interventions to increase medical trust and, indirectly, to improve adherence. These interventions could employ a narrative

medicine approach, which is based on spontaneous narration and guided feedback to allow patients to elaborate negative experiences and enable them to change the temporal focus from the past to the present and future while adding elements of hope, which may increase adherence and decrease anxiety. This process could be supported by training patients to use appraisal techniques if and when they report a poor emotional connection with a medical provider. This point is particularly notable since existing literature (Dunbar-Jacob, 2007) demonstrates that many approaches that have been proven to support behavioral changes in patients and increase adherence are associated with several of the key points that emerge from this study. For example, attachment theory-based interventions focus on the relationship between doctors and patients (Ciechanowski et al., 2001), while other interventions value the role of social support (including the support provided by a satisfying relationship with a medical provider (DiMatteo, 2004), good communication (Rauscher et al., 2020), and a positive emotional tone within the doctor-patient relationship (Espinosa & Kadić-Maglajlić, 2019). Our study suggests that these aspects could be integrated in a combined intervention based on a narrative approach. This intervention, which should be evaluated in future studies, should combine a reading key to allow physicians and patients to jointly reflect on the patient experience by highlighting key indicators of positive emotional tone and employing metacognitive reflection or indirect focus on the past rather than the present. Furthermore, this type of intervention should provide a guide that teaches reappraisal techniques to be used by the patient as needed. Since the indicators of positive emotional tone can be extracted by LIWC, this activity could be easily integrated in the patient portal to require less time from the physicians.

## Limitations and future directions

The study is not exempt from limitations. We focused only on patients, and we did not include a sample of doctors in this study, so the findings should be cautiously generalized only to patients. Moreover, we did not focus on specific patient populations in which trust could be connected to other factors that are associated with their specific conditions. Future studies should address these points. Additionally, all of our patients identified as White or Caucasian; since race has been reported to affect trust within medical settings (Stepanikova et al., 2006), this variable should be addressed in future studies.

This study makes a significant contribution to the field because it uses ecological data from patients' spontaneous narrations and derives information in the same indirect way that is used to establish medical trust, which, as we discussed, cannot be negotiated explicitly. This provides reliable insights into the actual mechanism that establishes medical trust from the patients' side. Moreover, creating training based on elements that are frequently included in real-life, implicit negotiations of trust would likely lead to more effective interventions.

## Note

1. Excerpts from transcripts are available from the corresponding author.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

The author(s) reported there is no funding associated with the work featured in this article.

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