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An Expanded Analysis of Which Features Convey Empathy to Patients in Scientific Writing

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INTRODUCTION

- Empathy in health care interactions is associated with improved patient satisfaction and clinical outcomes, yet few studies have examined the role of empathy in written scientific communication[1,2]
- In a pilot study involving patients, patient advocates, and medical writers, participants highlighted empathy as an important dimension of scientific writing[3,4]
- Most empathy research in health care focuses on interpersonal interactions[2], and despite empathy's recognized value, there is no standardized metric to assess empathy in written scientific or health-related communication
- Building on insights from the pilot study and a targeted literature review[5], we identified 40 writing features that may contribute to the perception of empathy in written scientific communication

OBJECTIVE

In this expanded analysis, we aimed to examine which of the identified writing features are most influential to the perception of empathy in scientific/health-related writing, with a goal of informing the development of an empathy metric for use in written scientific communicationβ

METHODS

- Participants completed an online survey, during which they:
  - Defined empathy in scientific writing and rated its importance
  - Evaluated the 40 writing features for their contribution to empathy using a 5-point verbal descriptor scale from "Strongly decreases empathy" (1) to "Strongly increases empathy" (5)
  - Ranked writing samples representing varying levels of empathy and technicality by preference
- All participants provided informed consent
- Partial survey responses and responses suspected to be bot entries (identified by duplicate IP addresses and implausibly short completion time) were excluded
- Two independent reviewers performed a thematic analysis of participants' open-text definitions of empathy, identifying key themes that emerged across responses
  - All definitions were provided to a large language model (GPT-5) to generate a single consolidated definition reflecting the identified themes
  - The same 2 reviewers independently evaluated the consolidated definition for consistency with the previously identified themes, and any disagreements were resolved by discussion and consensus
- Weighted mean and corresponding standard deviation (SD) values were calculated for each of the 40 features under evaluation, as well as preferences reported for each writing sample

RESULTS

Survey participants

- Overall, 109 participants identifying as patients (51.9%), caregivers (21.3%), family members of individuals with chronic illness (25.9%), or patient advocates (19.4%) completed the survey (**Table 1**)
- Participants most commonly reported consuming scientific reading material in the form of articles from health-related news websites or magazines (57.8%) and information from health care providers (47.7%)

Table 1: Participant demographics

Characteristic	Participants, n (%)
Age category (n = 108)	
18–29 years	21 (19.4)
30–39 years	16 (14.8)
40–49 years	19 (17.6)
50–59 years	23 (21.3)
>60 years	29 (26.9)
Gender identity (n = 109)	
Male	58 (53.2)
Female	51 (46.8)
Education (n = 109)	
High school or less	26 (23.9)
Some college, but no degree	20 (18.3)
Associates degree	12 (11.0)
Bachelor's degree	27 (24.8)
Graduate / professional degree	24 (22.0)
Status with regard to illness[a] (n = 108)	
Patient	56 (51.9)
Family member of someone with a chronic illness	28 (25.9)
Caregiver	23 (21.3)
Patient advocate	21 (19.4)
None of the above	20 (18.5)
Other[b]	3 (2.8)
Therapeutic area (n = 109)	
Autoimmune disease	19 (17.4)
Mental health disorder	19 (17.4)
Cancer/oncology	17 (15.6)
Cardiovascular disease	8 (7.3)
Dermatologic diseases	7 (6.4)
Gastrointestinal diseases	7 (6.4)
Other[c]	6 (5.5)
Not applicable	6 (5.5)
Infectious disease	5 (4.6)
Respiratory disease	5 (4.6)
Metabolic/endocrine disease	4 (3.7)
Neurologic disease	3 (2.8)
Kidney disease	2 (1.8)
Musculoskeletal disorders	1 (0.9)
Rare disease	0
Timeframe of dealing with indicated therapeutic area (n = 109)	
Newly diagnosed (<6 months)	14 (12.8)
Chronic (≥6 months)	76 (69.7)
Other[d]	8 (7.3)
Not applicable	11 (10.1)
Reading activity for scientific or health-related information (n = 109)	
Daily	19 (17.4)
Weekly	40 (36.7)
Monthly	34 (31.2)
Rarely	11 (10.1)
Never	5 (4.6)

[a]Participants could select all that applied. [b]Other status with regard to illness included "permanently disabled" and "physician." [c]Other therapeutic areas included brain/nerve damage, sleep apnea, and vitamin D deficiency. [d]Other timeframes included "in remission" and "had in past."

Figure 1: Themes, frequencies, and example responses regarding the definition of empathy in the context of scientific writing

Empathy definition:

Empathy in scientific or health-related writing is the practice of understanding the reader's emotional and experiential perspective. It involves communicating complex information with clarity, respect, and compassion to ensure the content is supportive and resonant rather than just factual.

Kindness and compassion (49.5%) [a]	Recognition / acknowledgement of patient experiences (40.4%)	Text accessibility (plain language, clarity, no jargon) (17.4%)	Actionability (6.4%)	Inclusion (3.7%)
▪ "Empathy in scientific or health writing means showing care and understanding for the reader's feelings while clearly sharing facts" ▪ "Having compassion for others"	▪ "The ability to understand where a patient is coming from and writing to that " ▪ "The ability to identify with someone who is experiencing the same condition…"	▪ "Caring about the patient and discussing treatment in plain language" ▪ "A more easy to understand summary of things with good sources"	▪ "…delivery of information with options to support your needs" ▪ "…important to stress where to find the best care for all circumstances and classes"	▪ "Acknowledging multiple life experiences as valid" ▪ "Increase in awareness and diversity and inclusion"

Notes: [a] Frequency mentioned (n = 109); responses may have been assigned to multiple themes if applicable.

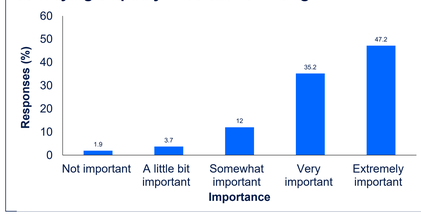
Definition of empathy

- Participant definitions of empathy were categorized across 5 key themes, with kindness and compassion (49.5%) and recognition or acknowledgement of patient experience (40.4%) being the most frequently mentioned themes (**Figure 1**)
- A consolidated definition of empathy based on participant descriptions is shown in **Figure 1**

Importance of empathy

- Most participants (89/108 [82.4%]) considered the perception of empathy as "Very important" or "Extremely important" in scientific writing (**Figure 2**)

Figure 2: Participant evaluation of the importance of conveying empathy in scientific writing



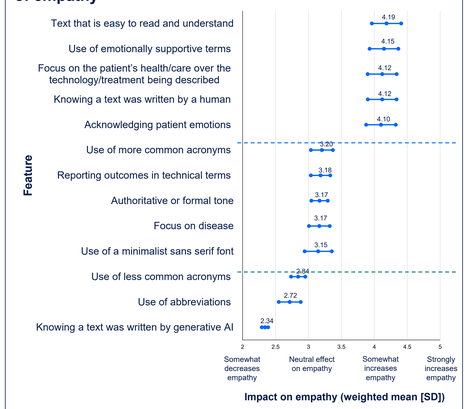
Key features of empathy in scientific writing

- The top 5 features participants identified as enhancing empathy (weighted mean [SD]: >4.1 [0.2]) were: text that is easy to read and understand; use of emotionally supportive terms; focus on patient health/care over the treatment being described; knowing text was written by a human; and acknowledging patient emotions (**Figure 3**)

Writing preferences

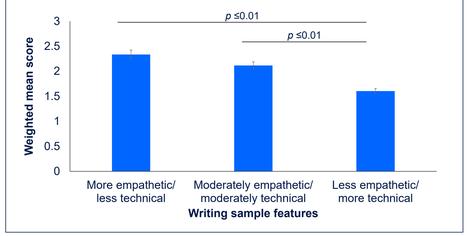
- Participants significantly preferred more empathetic/ less technical ($p \leq 0.01$) or moderately empathetic/ moderately technical ($p \leq 0.01$) scientific writing samples to those that were less empathetic/more technical (**Figure 4**)

Figure 3: Impact of selected features on the perception of empathy



These are the highest rated features, those deemed to have a relatively neutral effect on empathy, and those lowest ranked are shown. A full summary of features are reported in the companion poster.[5]
AI, artificial intelligence; SD, standard deviation.

Figure 4: Preference for writing samples based on level of empathy and technicality



KEY TAKEAWAYS

- Participants in this study reaffirmed the importance of empathy in scientific writing and expressed a preference for writing that is either more empathetic or balances empathy with technical rigor
- Although empathy is multidimensional, participants' definitions clustered into 5 key themes that informed a consolidated definition of empathy in the context of scientific writing
- The features identified through this research will inform a framework for evaluating empathy in scientific writing

CONCLUSIONS

- Our results highlight the importance of empathy in scientific writing, characterized by text readability/clarity, acknowledgment of lived experiences, and compassion toward those affected
- Identification of these features will inform ongoing efforts to create an empathy metric for scientific writing, with the goal of promoting patient engagement and trust in health communication
- Participants reported preference for writing with more empathy or balanced empathy/technicality over less empathetic/more technical writing

REFERENCES

1. Moudatsou et al. . 2020; 8:26. **2.** Vieten et al. PLoS One. 2024; 19:e0297099. **3.** Gauthier et al. 2025. ISMPP 21st Annual Meeting. Washington, DC, USA. Poster 46. **4.** Gauthier et al. 2025. ISPOR US 2025: Montreal, QC, Canada. Poster 239. **5.** Watts et al. 2026. ISMPP 22nd Annual Meeting. Washington, DC, USA. Poster 60.

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DISCLOSURES

MG, BF, and LW are employees of Lumanity Communications Inc. SD is an employee of Lumanity Ltd.

An electronic version of the poster can be viewed by scanning the QR code.

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