

INTRODUCTION

- Lung cancer (LC) is the second most commonly diagnosed cancer and is the leading cause of cancer deaths in the United States.¹
- Negative perceptions of LC are shaped by the association between the disease and smoking history, the perception of the disease as selfinflicted, its high death rate, and the type of death.²
- Even nonsmoking patients share the burden of this stigma.
- Compared with breast cancer (BC) control groups, stage IV non-small cell LC patients had higher perceived cancer-related stigma.²
- Such feelings could impair self-advocacy and other adaptive behaviors, and improvement in patient–physician communications is warranted.³
- Factors that reduce the effectiveness of the patient in adapting to disease and factors that hamper care provided by the physician could play causal roles in maintaining or promoting disparities in perception.
- This online study focused on the perception of LC as a stigmatized disease from the perspectives of patients, caregivers, healthcare professionals, and the general public.
- The study measured explicit, conscious attitudes, and used the Implicit Association Test (IAT) to assess implicit, unconscious attitudes about LC relative to BC.

METHODS

Procedure

- A total of 1778 participants completed at least 1 measure in the online study, which was hosted on thelungcancerproject.org.
- At the outset of the study, participants provided demographic information: sex, age, ethnicity, income, education, occupation, healthcare specialization, status as a cancer patient, type of cancer diagnosis, status as a caregiver for cancer patients, and geographic location.
- Next, participants were administered explicit and implicit measures, in random sequence.
- Explicit measures included an assessment of cancer knowledge and 2 forms of explicit attitudes regarding cancer.
- Implicit measures included an attitude IAT used to measure subconscious biases.

Explicit knowledge

- Participants rated their knowledge about cancer as very, somewhat, or not at all knowledgeable).
- In addition, they indicated the degree of their agreement with statements regarding cancer (eg, "cancer is always fatal," "cancer is contagious," "LC is always caused by smoking," "cancer medicines can help people live longer," and "early diagnosis can help people live longer").
- Assessments were made on a 6-point scale that represented strong, *moderate*, or *slight* levels of agreement or disagreement.
- Disagreement with the first 3 items and agreement with the final 2 items were taken to indicate more knowledge.
- The "self-knowledge" measurement was based on rating a single item, whereas the "item knowledge" measurement was based on the average rating across 5 items.

Explicit Attitudes

- The attitude items were grouped into 2 sets:
- The first set used a *descriptive* frame that examined the feelings experienced by people with LC (eg, "people with LC are ashamed about their disease")
- The second set adopted a *normative* frame (eg, "in my opinion, people with BC <u>ought</u> to be ashamed about their disease").
- Each normative assertion was prefaced with "in my opinion" and provided normative force using the verb "ought."
- The descriptive and normative items covered the topics of shame, embarrassment, personal behavior as a cause of disease, disease prognosis The strength of the IAT was assessed by a *D* score, which indicated the as terminal within a few years, and hope regarding the future. strength of bias against LC relative to BC.
- Each item was phrased in regard to either BC or LC.
- Thus, 10 items assessed descriptive and normative attitudes toward LC, and a similar set of items provided parallel measures for BC.
- Endorsement of a normative item indicated overtly stigmatized attitudes.
- The distinction between descriptive and normative attitudes is reflective of the "is-ought" problem in metaethics, as articulated by the philosopher David Hume.⁴

Implicit Association Test

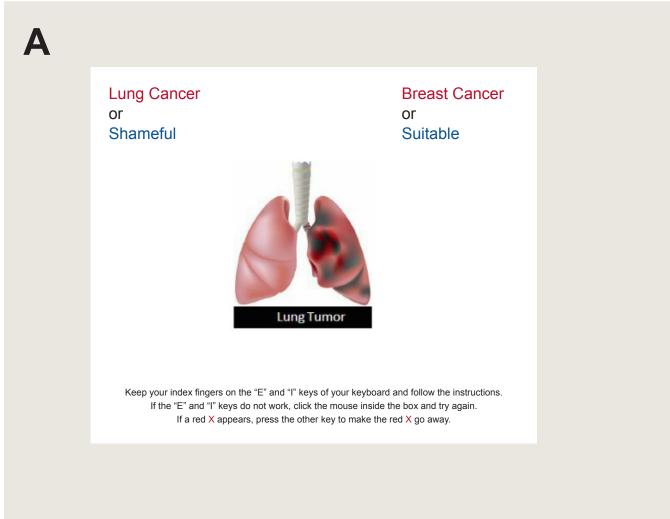
- The IAT measured the association between concepts using reaction time.⁵
- In the IAT, participants were instructed to press 1 of 2 keys to classify images and words that belong to different categories.
- Word concepts used are listed in Table 1.

 Table 1. Words Used for IAT Attribute Pairs

Good Words	Bad Words	Hope Words	Despair Words	Suitable Words	Shameful Words		
Wonderful	Dreadful	Confident	Cursed	Appropriate	Disgraceful		
Good	Bad	Норе	Despair	Suitable	Shameful		
Excellent	Awful	Cheerful	Dejected	Good	Bad		
Great	Terrible	Optimistic	Pessimistic	Acceptable	Embarrassing		

- For example, suppose that images of *LC* and a *shameful* word are mapped to the same response key as shown in Figure 1.
- LC and shame are concepts that are associated in semantic memory; responses are fast and accurate because these concepts activate each other in memory and are both associated with the same response. In this condition, BC and suitable also share the same response.

Figure 1. Example IAT Images for (A) LC and (B) BC



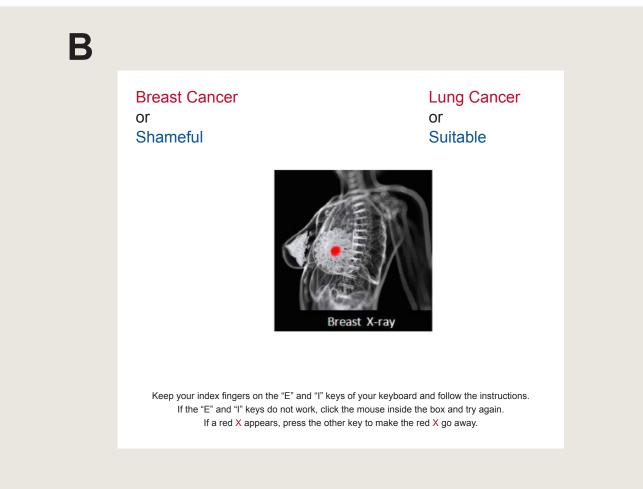
The Assessment of Explicit and Implicit Attitudes Toward Lung Cancer, Relative to Breast Cancer

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• Responses to each item were on the 6-point agree/disagree scale (Figure 2).

- Conversely, in a second configuration, the mappings are switched. Here, LC and suitable share the same response (as do BC and shameful). Unlike the previous condition, the concepts that share the same response are not as strongly associated and cause responses, on average, to be be slower.



- In this case, responses are slow and errors are greater because the 2 concepts do not facilitate each other in semantic memory.
- The IAT measure is derived by comparing reaction times across different configurations.
- The IAT uses 2 pairs of concepts; within each pair, the concepts are contrasted with each other.
- This makes the IAT a relative measure.
- In the present study, LC is contrasted with BC.
- The IAT is an indirect measure, because participants are asked to respond to items on screen according to fixed rules of classification.

Implicit Attitudes

- Each participant received 1 of 3 attitude IATs.
- The 3 attitude IATs respectively used good vs bad, hope vs despair, and suitable vs shameful as attributes.

The attitude IATs measured similar, attitudinal constructs: Are participants faster when LC and bad/despair/shameful shared the same key compared with when LC and good/hope/suitable had a common response?

• If this result emerged, it would suggest that implicit attitudes toward LC were (relatively) negative, while those associated with BC were (relatively) positive.

RESULTS

Group Comparisons

- In reporting differences across groups, the comparisons were across the subgroups within each demographic variable.
- Thus, females were contrasted with males, healthcare professionals with those who were not, patients with nonpatients, caregivers with noncaregivers, higher income with lower income, higher education with lower education, younger with older, and white with nonwhite.

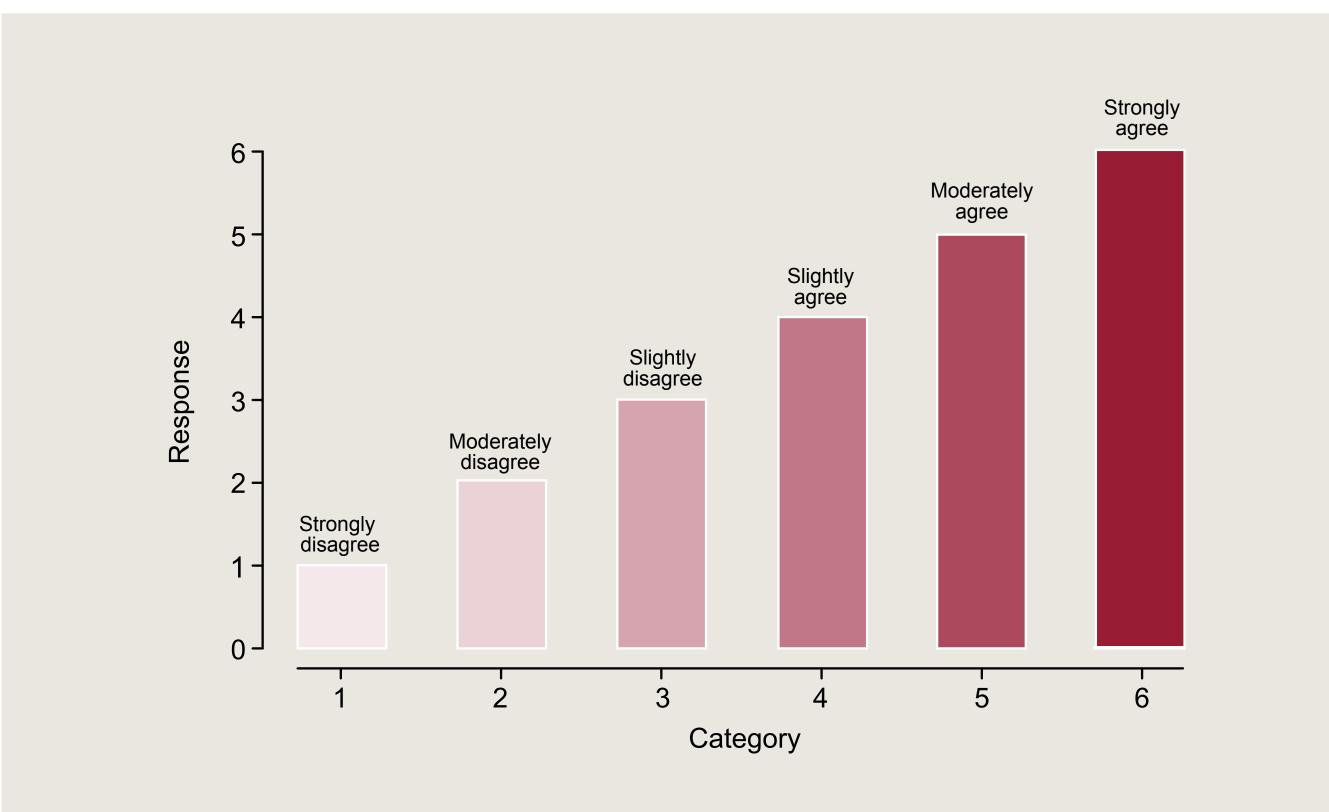
Explicit Knowledge

- On "self-knowledge," 302 participants were "very knowledgeable," 1104 participants were "somewhat knowledgeable," and 234 participants were "not at all knowledgeable" about cancer.
- The "item knowledge" median was 23 out of a maximum of 30.
- Healthcare professionals, cancer patients, cancer caregivers, higher income level, higher education level, and younger participants reported higher self-knowledge.
- Patients, whites, and higher income participants scored higher on item knowledge, but, unlike self-knowledge, no differences were observed across levels of gender, age, profession, and caregiving experience.

Explicit Descriptive Attitudes

- An example of the 6-point scale for measuring explicit attitudes is shown in Figure 2.
- Descriptive attitudes toward LC were more negative (3.5) than toward BC (2.49) (Table 2; Figure 3).
- Cohen's *d*=0.93; t_{1624} = 37.4; *P* <.0001.
- The midpoint of the scale was 3.5, and the mean absolute ratings were neutral to positive.

Figure 2. Example of 6-Point Scale for Explicit Attitudes

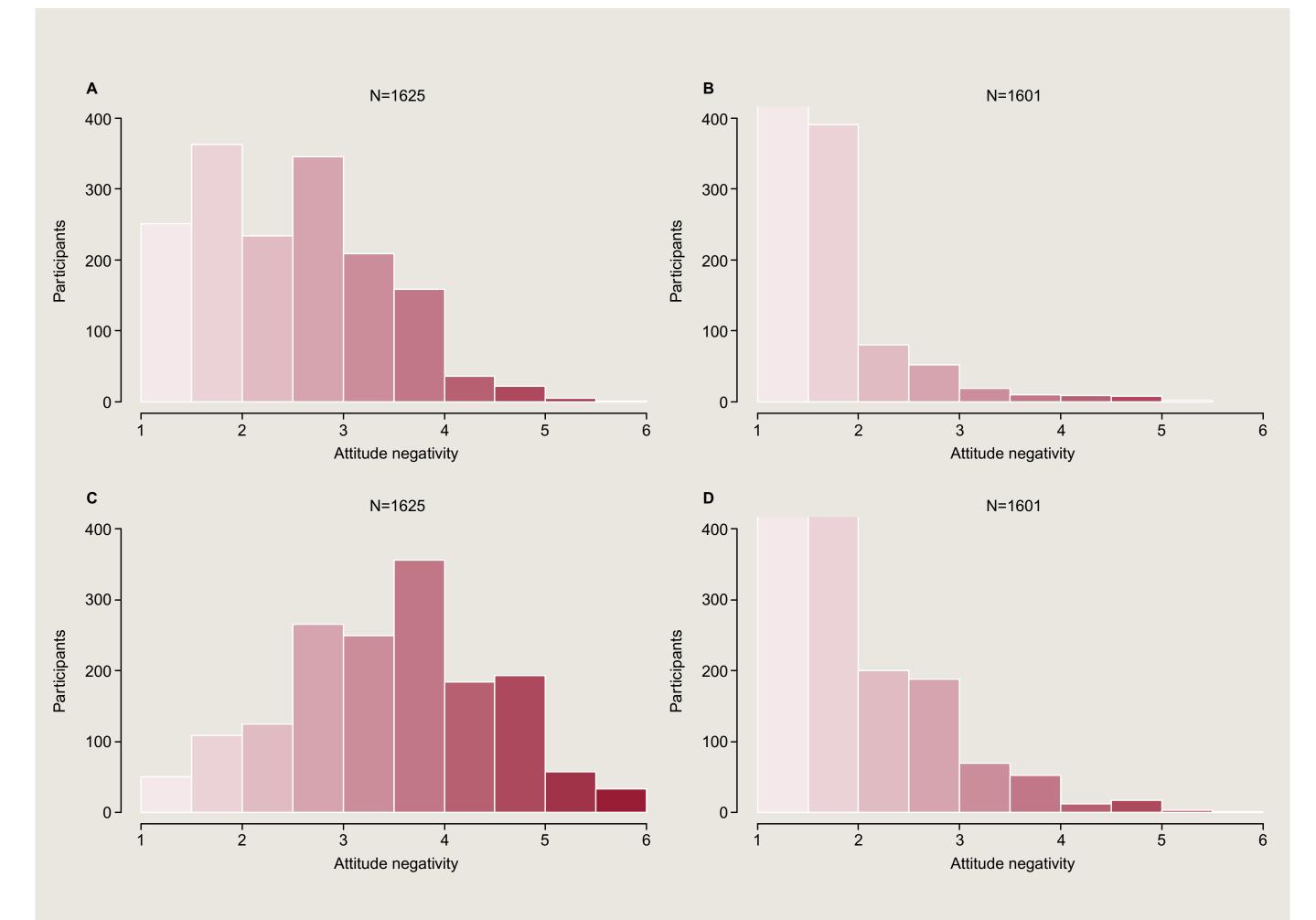


- Patients, caregivers, healthcare professionals, whites, those with higher income, and those with higher education level expressed stronger negative descriptive attitudes toward LC, relative to BC.
- On average, members of these groups viewed the plight of LC patients more negatively than did their respective counterparts.

Table 2. Explicit Negative Attitudes Toward LC vs BC

	All N=1178	Caregivers n=677	Patients n=243	HCPs n=142	General Public n=864	
Descriptive attitudes						
Mean; LC – BC rating ^a	1.00	1.19	1.29	1.47	0.83	
(P value)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	
LC bias, %	70	75	81	88	74	
BC bias, %	8	7	7	5	8	
No bias, %	22	18	12	7	18	
Normative attitudes						
Mean; LC – BC rating ^a	0.44	0.47	0.50	0.53	0.42	
(P value)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	
LC bias, %	56	59	64	65	56	
BC bias, %	3	3	2	3	3	
No bias, %	4	38	34	32	41	
^a Mean difference between rating of LC and BC on a 6-point scale. BC, breast cancer; HCP, healthcare provider; LC, lung cancer.						





Explicit Normative Attitudes

- While most participants expressed positive normative attitudes toward patients, these normative attitudes toward LC were less positive (1.93) than toward BC (1.49) (see Table 2, Figure 3)
- Cohen's *d*=0.71; *t*₁₆₀₀=28.2; *P* <.0001.
- Unlike descriptive attitudes, the above trend in normative attitudes did not vary across demographic groups, with 1 notable exception.
- Males expressed less-positive normative attitudes toward LC compared with females (Cohen's d=0.19; $t_{1567}=3.67$; P < .001).

Knowledge and Explicit Attitudes

- Increased knowledge about cancer according to both knowledge measures was associated with greater relative negative descriptive attitudes toward LC.
- Those who knew more about the disease tended to describe the condition of LC patients more negatively.

Implicit Attitudes

- IATs determined which of the 2 cancer types was more strongly associated with negative valence and which was more associated with positive valence.
- In each of the 3 IATs, on average, participants were faster to respond when LC and the negative word concept (*bad/despair/shameful*) shared a response (here, BC and good/hope/suitable shared a response) than vice versa.
- Specifically, the mean response times in the LC/negative conditions were 1011, 1053, and 1107 ms.
- The response times were significantly longer in the LC/positive conditions at 1195 ms, 1256, and 1266 ms, respectively.
- While these mean differences were less than a fifth of a second, these were large effects in the domain of response latency measurement.
- The mean D scores for good/bad (0.43), hope/despair (0.45), and suitable/shameful (0.35) were all significant, with strong effect sizes (Cohen's *d*=0.95, 0.98, and 0.7, respectively) (Table 3, Figure 4)
- Relative to BC, LC had strong, negative implicit associations.
- The strength of implicit attitudes did not differ across demographic groups, with 1 notable exception.

 Table 3. Mean IAT D Score of Implicit Negative Attitudes of LC vs BC

	All N=1178	Caregive n=677
Bad attitudes Mean IAT score (<i>P</i> value) LC bias, % BC bias, % No bias, %	0.43 (<.0001) 74 10 16	0.43 (<.0001 73 12 15
Despair attitudes Mean IAT score (<i>P</i> value) LC bias, % BC bias, % No bias, %	0.46 (<.0001) 75 9 16	0.43 (<.0001 73 10 17
Shame attitudes Mean IAT score (<i>P</i> value) LC bias, % BC bias, % No bias, %	0.35 (<.0001) 67 17 16	0.32 (<.0001 65 18 17

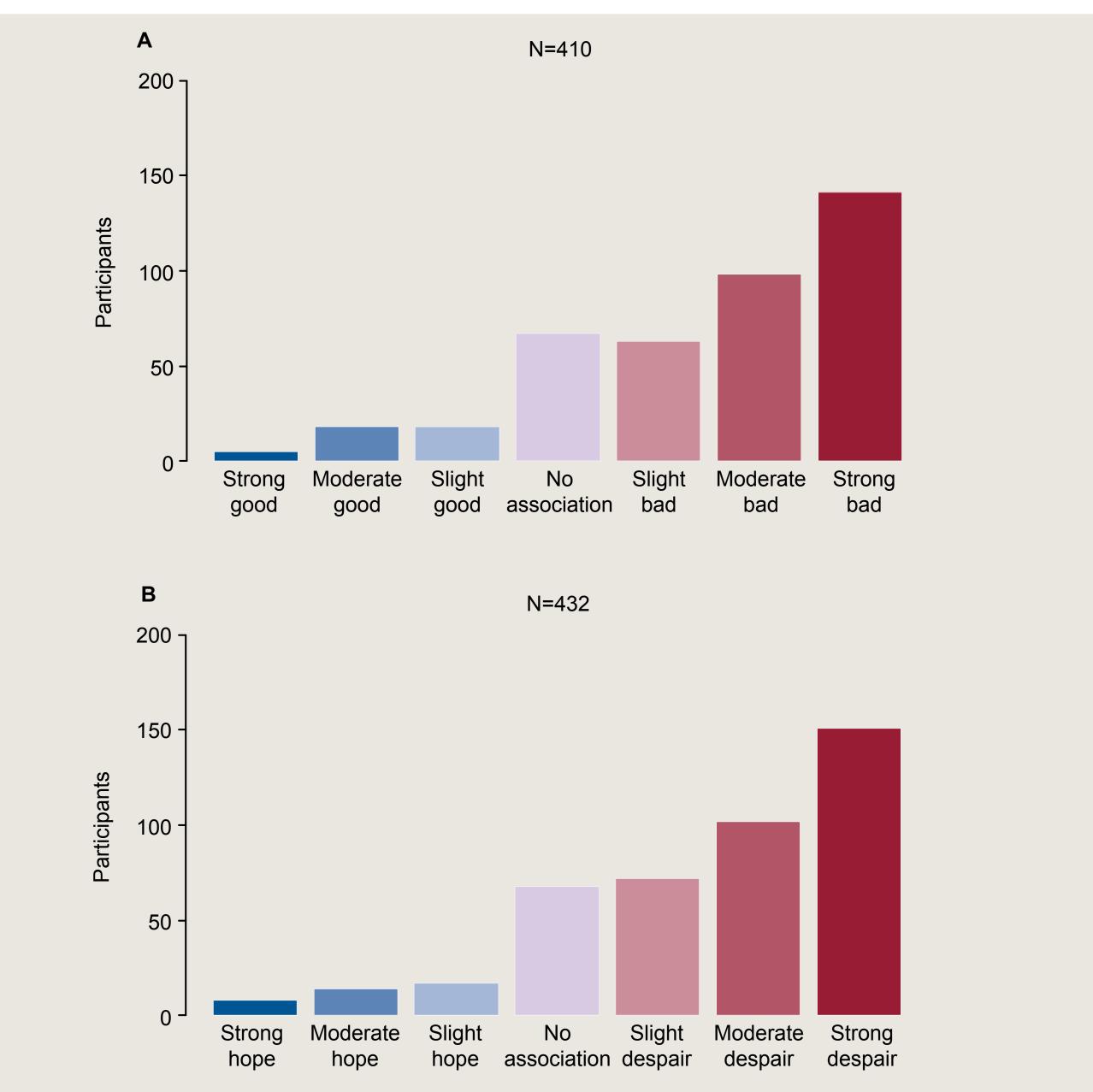
BC, breast cancer; HCP, healthcare provider; IAT, implicit association test; LC, lung cancer.



General HCPs ers Patients Public n=142 n=864 n=243 0.33 0.33 0.44 01) (<.0001) (<.0001) (<.0001) 0.54 0.44 0.47 (<.0001) (<.0001) 0.52 0.41 (<.0001) (<.0001)

- Similar to what was observed with explicit normative attitudes, females had much stronger negative implicit attitudes about LC (0.47) than did males (0.31).
- Cohen's *d*=0.32, *t*₁₂₆₂=5.71; *P* <.001.
- Individual D score >0.65 = strong bias; 0.35 to 0.65 = moderate bias; 0.15 to 0.35 = slight bias; -0.15 to +0.15 = no bias, and <-0.15 indicated bias
- against BC.
- Mean D score >0.4 implies that a majority of participants have individual scores that are either moderate or strong.

Figure 4. Number of Participants With Implicit Associations Toward LC: (A) LC and Good/Bad, (B) LC and Hope/Despair



Correlational Trends

- Implicit attitudes were uncorrelated with self-knowledge, item knowledge, and descriptive explicit attitudes.
- Implicit attitudes correlated weakly with normative explicit attitudes at *r*=.069 (*P*=.015).

CONCLUSIONS

- Strong evidence of lung cancer stigma was evident, as determined by both explicit and implicit measures.
- The variation of these measures across demographic groups and their change over time may provide insights into the structure and function of these associations
- Further research is needed to investigate whether implicit attitudes and explicit attitudes have an effect on care.

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