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Development of the Medical Maximizer-Minimizer Scale

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Objective: Medical over- and underutilization are central problems that stand in the way of delivering optimal health care. As a result, one important question is how people decide to take action, versus not, when it comes to their health. The present article proposes and validates a new measure that captures the extent to which individuals are "medical maximizers" who are predisposed to seek health care even for minor problems, versus "medical minimizers" who prefer to avoid medical intervention unless it is necessary. ***Method:*** Studies 1–3 recruited participants using Amazon's Mechanical Turk. Study 1 conducted exploratory factor analysis (EFA) to identify items relevant to the proposed construct. In Study 2 confirmatory factor analysis (CFA) was conducted on the identified items, as well as tests of internal, discriminant, and convergent validity. Study 3 examined test–retest reliability of the scale. Study 4 validated the scale in a non-Internet sample. ***Results:*** EFA identified 10 items consistent with the proposed construct, and subsequent CFA showed that the 10 items were best understood with a bifactor model that assessed a single underlying construct consistent with medical maximizing–minimizing, with 3 of the 10 items cross-loading on another independent factor. The scale was distinct from hypochondriasis, distrust in medicine, health care access, and health status, and predicted self-reported health care utilization and a variety of treatment preferences. ***Conclusions:*** Individuals have general preferences to maximize versus minimize their use of health care, and these preferences are predictive of health care utilization and treatment preferences across a range of health care contexts.

Keywords: overutilization, overtreatment, medical decision making, patient preferences

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The past 150 years has seen unprecedented scientific advances in health care that have unquestionably contributed to increased longevity and quality of life (Frieden, 2015). In many first world countries, people have access to life-saving medicine to treat illnesses that previously would have killed or disabled affected individuals. Nonetheless, empirical research has revealed that

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many widely used tests and treatments have limited value in terms of saving lives or improving quality of life. For example, of the 35 articles published in the New England Journal of Medicine in 2009 that tested a standard medical practice, only 16 affirmed the practice, and another 16 contradicted it (the rest were inconclusive; Prasad, Cifu, & Ioannidis, 2012). In 2012, the United States Preventative Services Task Force (USPSTF) gave prostate-specific antigen (PSA) screening for prostate cancer a 'D' rating, indicating that the test should not be used for routine screening because it may do more harm than good (Moyer, 2012). Further, the Choosing Wisely initiative has compiled a long list of tests and treatments that "should be questioned by doctors and patients," drawing from a variety of medical specialties (Cassel & Guest, 2012).

Hence, there is growing recognition that medical interventions are not always helpful, and can sometimes be harmful (Emanuel & Fuchs, 2008; Prasad & Cifu, 2015). It follows that just because we *can* do something about a real or perceived health problem does not always mean that we *should* do something (Fisher & Welch, 1999). As a result, a critical question is how people decide to take action and do something, versus not, when it comes to their health.

In a recent book, *Your Medical Mind*, authors Groopman and Hartzband (2011) proposed—on the basis of medical case studies—that there is a core individual difference that is key to understanding individuals' approach to medicine: In particular, they proposed that some people are *medical maximizers* who prefer active and aggressive medical treatments and being proactive about their health. Maximizers like doing things that may positively affect their health, such as taking prescription medicines and getting optional medical procedures. If there is a medical intervention that can be had, a medical maximizer will want to do it. By contrast, *medical minimizers* were defined as individuals who prefer to do as little as possible when it comes to medicine and their health. If given the option, they would prefer to not take drugs or get tests. They are not necessarily distrustful of doctors or health care, but instead prefer to "watch and wait" until it is clear that medical intervention is necessary. The idea that people differ in their general approach to health care appears to have broad cultural resonance. For example, in an article about the controversial 2009 USPSTF mammography recommendation, a New York Times journalist wrote ". . . the response to the new guidelines had less to do with medicine than with a general approach to health care—and indeed life itself" (Steinhauer, 2009).

Furthermore, the general idea that people have a bias toward either action or inaction is familiar to the psychological literature (e.g., Kahneman & Miller, 1986). Considerable research has explored omission and commission biases, and this literature has shown that people may often have a preference for inaction because bad outcomes are more regrettable when they result from doing something versus doing nothing (Baron & Ritov, 1994, 2004). However, people do not always show preferences for inaction, and sometimes they show preferences for action instead (Fagerlin, Zikmund-Fisher, & Ubel, 2005; Patt & Zeckhauser, 2000). To date, much of the health-related research on preferences for action versus inaction pertains to vaccination decisions (Asch et al., 1994; DiBonaventura & Chapman, 2008; Ritov & Baron, 1990). The present research explored the possibility that people possess general inclinations toward active versus passive approaches to health care use. Hence, although the larger psychological literature may speak indirectly to medical "minimizing" versus "maximizing," there have been no systematic explorations of preferences for action or inaction when it comes to one's health.

If individuals have general orientations toward wanting more versus less health care, then identifying this orientation might reveal meaningful patterns of utilization across medical contexts. For example, people who are medical maximizers may be prone to health care overutilization, which is, by some estimates, the most important contributor to high health care costs in the United States (Emanuel & Fuchs, 2008). Maximizers may frequently seek medical care, sometimes at significant personal and financial costs, and with little gain in terms of health outcomes. Moreover, identifying medical minimizers may help to predict who is likely to underutilize medical resources. This is an equally important problem (DiMatteo, 2004), because minimizers may be less likely to adhere to beneficial treatment regimens or schedule follow up appointments for important tests. Indeed, being extreme on either end of this preference dimension may have important health implications.

Identifying individuals who have general maximizing versus minimizing tendencies could also be important for patient-provider communication. Shared decision making between physicians and patients might be facilitated if physicians know something about their patients' expectations and preferences for more versus less intervention. When physicians and their patients share the same orientation, this might enhance communication quality and patient satisfaction. Furthermore, identifying these more general preferences could be instrumental in achieving high-quality communication about complex issues like overdiagnosis and overtreatment.

Although intuitively compelling, the proposed maximizer–minimizer orientation has never been empirically assessed. As a result, it is not currently known whether medical maximizing versus minimizing exists as a preference dimension that is consistent with the a priori definitions described earlier. Moreover, there is no validated scale to measure this construct, nor have there been any empirical tests to determine whether this hypothesized preference predicts health care utilization above and beyond other variables that might drive health care seeking and avoidance, such as hypochondria, distrust in medicine, health status, and health care access. Hence, our purpose was to provide an empirical examination of this proposed individual difference.

Study 1

In Study 1, survey items were developed that were intended to assess medical maximizing–minimizing. Exploratory factor analysis (EFA) was conducted on these items to determine whether the proposed maximizer–minimizer dimension would emerge as a coherent factor, and identified potential scale items based on those analyses.

Method

Participants. Participants were 606 American adults who were recruited to participate in a survey on Amazon's Mechanical Turk (Mturk) in exchange for $1.00 payment. Sample demographics are displayed in Table 1. Participants were primarily White and were more educated than a representative American sample. Although questions about the quality of Mturk participants have recently been raised (Paolacci & Chandler, 2014), these concerns are primarily because of the nonnaiveté of participants for standard

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psychological manipulations, which was of less concern for the present research. Furthermore, Mturk has advantages over other convenience samples, such as college undergraduates, because Mturk participants represent a wide range of ages, education levels, and locations within the United States (Buhrmester, Kwang, & Gosling, 2011).

Design and procedure. Item generation involved an iterative process that began with the first author generating an initial list of potential items relevant to the a priori definition of the maximizing–minimizing construct. Members of the research group then added more items and scrutinized all items for conceptual clarity (e.g., avoiding double-barreled items) and literacy level. This process was then repeated, with the first author editing and adding more items and the research group reviewing, editing, and adding more items. Items that were anticipated to be directly related to the maximizer–minimizer dimension pertained to actively seeking health care, going to the doctor, and preferring to watch and wait. The research group followed Clark and Watson's (1995) prescription that item generation should "err on the side of over-inclusiveness" (p. 311) by including items that might ultimately prove to be tangential to the core construct. For example, some items involved the sentiment that doctors do harm, which was not part of the a priori definition, but could prove to be inextricably related to desiring more versus less health care. The final item set included 27 questions. For each question, participants were instructed to "please rate how much you personally agree or disagree with each statement" and answered each question on a 7-point scale labeled *strongly disagree*, *disagree*, *somewhat disagree*, *neither agree nor disagree*, *somewhat agree*, *agree*, and *strongly agree*. Participants also reported demographics including age, gender, race and education.

Results

The 27 questions were first examined individually to ensure that each showed sufficient variability for inclusion in an EFA (Clark & Watson, 1995). The items had means ranging from 2.54 to 5.83 (scale = 1–7), *SD*s ranging from 1.27 to 1.99, and the range for all items was 6. EFA was conducted to determine whether the proposed dimension would emerge as a factor from the 27 item set. The EFA was estimated using Maximum Likelihood (ML), and a subsequent Promax rotation and Kaiser Normalization with 25 iterations was used to determine the factor structure of the items.[1] Because the items were generated to be potentially overly inclusive, the EFA was not restricted to a one- or two-factor solution and instead retained factors on the basis of the scree plot elbow and total variance explained. The scree plot elbow suggested a four factor solution, which explained 51.05% of the variance. Adding a fifth factor increased the explained variance by less than 5% and reduced conceptual clarity among the factor item loadings. Table 2 displays the item loadings for the four factors. The four factor EFA was also fit to two randomly constructed sample halves to examine factor structure consistency, and the factor structure was virtually unchanged in both halves as compared with the sample as a whole.

Items that loaded on the first factor were consistent with the a priori definition of medical maximizing–minimizing, and reflected seeking active medical treatment versus watchful waiting options. Six items reflected maximizing preferences and one item loaded on Factor 1 negatively, reflecting minimizing. The three items that loaded highly on Factor 4 were also consistent with the a priori definition of maximizing–minimizing. However, these items appeared to reflect more abstract or perhaps extreme attitudes (Smith & McCarthy, 1995) related to aggressively fighting illness at all costs. The correlation between Factors 1 and 4 was .45, suggesting that these factors reflected related constructs.

Factors 2 and 3 were also scrutinized with regard to their relatedness to the a priori definition of medical maximizing–minimizing. Factor 3 showed low correlations with both Factors 1 (r = .28) and 4 (r = .10), and items that loaded highly on this factor involved the belief that medical treatments do harm. This belief was not explicitly part of our a priori definition of maximizing–minimizing, and in fact was somewhat inconsistent with it (i.e., minimizers were not predicted to be distrustful of doctors and medicine). As a result, it was concluded that this factor reflected overinclusiveness in item generation.

Factor 2 presented a more difficult judgment. It was correlated with Factor 1 (r = .40) but not Factor 4 (r = .05). At first Factor 2 appeared to consist of "minimizer" items; however, Factor 1 included one "minimizer" item (*My preference is to wait and see if the problem gets better on its own . . .*). Further, all items loading on Factor 2 shared the word "medicine." It was ultimately concluded that the most accurate interpretation of Factor 2 was that it reflected avoidance of medications, which was a more specific preference than what the maximizer–minimizer dimension was intended to capture.

A second EFA was conducted that included the 10 items that loaded on Factors 1 and 4 (the factors most directly related to the a priori definition of medical maximizers vs. minimizers). The right side of Table 2 shows the resultant factor loadings. These two factors were correlated (r = .47) and together explained 57.61% of the variance among the 10 items. These 10 items were retained for CFA in Study 2. The Flesch-Kincaid reading grade level of these 10 items was 7.4.

Discussion

EFA revealed two correlated latent variables that were consistent with the a priori definition of medical maximizing–minimizing. Items loading highly on these two factors were retained for CFA and tests of convergent and discriminant validity in Study 2.

Study 2

A second sample was collected for the purpose of performing CFA on the 10 items that were retained in Study 1. This second study also served to further test the convergent and discriminant validity of the items. One question is whether these items assess a construct that is distinct from hypochondria or distrust in medicine, and so a measure

[1] According to Fabrigar, Wegener, MacCallum and Strahan (1999), ML is recommended over Principal Axis Factoring (PAF) when the data do not violate the multivariate normality assumption. In practice, Fabrigar et al. (1999) recommend a univariate test of skewness and kurtosis. The absolute values of the skewness for each variable were less than 1.09, and it is recommended to proceed with ML as long as none of the skewnesses exceed 2.0. The analogous threshold for kurtosis is 7, and all of the variables had kurtosis of less than 4.03. Therefore, the choice of ML EFA (rather than PAF) was consistent with the Fabrigar et al. (1999) recommendations in this case.

Table 1
Participant Characteristics From Studies 1–4

Characteristic	Study 1	Study 2	Study 3	Study 4
Participant age range	18–80	18–75	18–68	18–89
Participant mean age (*SD*)	33.52 (11.86)	37.3 (13.06)	32.49 (10.77)	51.15 (16.20)
Gender				
Men	32.8% (249)	42.8% (253)	50.5% (220)	100%
Women	52.6% (399)	56.9% (336)	48.4% (211)	0%
Not reported	14.6% (111)	.2% (1)	1.1% (5)	0%
Race				
White American	69.6% (528)	83.1% (491)	81.9% (357)	89.6% (679)
Black American	6.2% (47)	5.9% (35)	4.1% (18)	4.8% (37)
American Indian or Alaska Native	.8% (6)	5.9% (4)	.2% (1)	2.0% (15)
Asian or Asian American	4.6% (35)	5.9% (35)	9.2% (40)	1.8% (14)
Native Hawaiian or Other Pacific Islander	.1% (1)	0% (0)	.5% (2)	1.4% (11)
Other/mixed race	4.0% (30)	3.7% (22)	4.1% (18)	3.4% (26)
Not reported	14.8% (112)	.3% (2)	0%	1.4% (11)
Education				
Less than high school	1.0% (8)	1.4% (8)	.2% (1)	1.0% (8)
High school only	7.9% (60)	9.0% (53)	10.1% (44)	13.4% (103)
Some college/trade school	27.3% (207)	28.8% (170)	27.8% (163)	29.0% (223)
Bachelor's/Associate's degree	37.9% (288)	34.9% (206)	53.0% (231)	36.2% (265)
Master's degree or more	11.0% (84)	16.3% (96)	8.7% (38)	21.1% (162)
Not reported	14.8% (112)	.3% (2)	.2% (1)	1.0% (8)

of hypochondriasis (Longley, Watson, & Noyes, 2005) and belief in medicine (Horne, Weinman, & Hankins, 1999) were included to establish discriminant validity. It was hypothesized that these measures would be related to, but not completely redundant with, the factors identified in Study 1. Participants also reported their health care access and health status to test the possibility that participants' preferences for more versus less health care is related to their ability to get care, or to their objective need for care. To examine convergent validity, participants reported their health care utilization and responded to a number of hypothetical health decision scenarios.

Method

In total, 609 participants located in the United States were recruited using Murk and were paid $1.00 in exchange for their participation. There were 18 participants who had incomplete data,

Table 2
Study 1 Exploratory Factor Analysis Results: Factor Loadings for the Four Retained Factors

Question items	EFA results: All items				EFA results: 10 retained items	
	1	2	3	4	1	2
1. It is important to treat disease even when it does not make a difference in survival	−.02	−.08	−.02	.82	.34	.82
2. It is important to treat a disease even when it does not make a difference in quality of life	.00	−.13	.06	.94	.39	.91
3. Doing everything to fight illness is always the right choice	.36	.21	−.06	.47	.44	.65
4. When it comes to health care, the only responsible thing to do is to actively seek medical care	.64	.16	−.17	.09	.63	.46
5. If I have a health issue, my preference is to wait and see if the problem gets better on its own before going to the doctor	−.48	.24	.00	.06	−.52	.19
6. If I feel unhealthy, the first thing that I do is to go to the doctor and get a prescription	.70	−.23	.20	−.06	.69	.29
7. I often suggest that friends and family see their doctor	.55	−.07	−.05	−.05	.56	.23
8. When it comes to health care, watching and waiting is never an acceptable option	.69	.21	.03	.04	.60	.39
9. If I have a medical problem, my preference is to go straight to a doctor and ask his or her opinion	.79	−.01	−.05	−.10	.79	.32
10. When it comes to medical treatment, more is usually better	.52	−.07	.06	.07	.57	.35
I have to feel extremely sick to want to take medicine	−.38	.50	−.04	.07		
I try to avoid medicine and doctors whenever I can	−.13	.59	.20	−.02		
I only take medicines when I absolutely have to	.10	.86	−.09	−.05		
When it comes to medicine, less is usually better	−.06	.47	.18	−.08		
Medical treatments often harm the people they are trying to help	.03	.00	.82	−.02		
I avoid medical doctors at all costs	−.06	.25	.50	.03		
Medical treatments often do more harm than good	−.03	−.06	.92	.06		
Doctors usually underestimate the harm that their medicines and treatments cause	.06	.15	.61	−.01		

Note. Only items that loaded highly on one or more of the four factors are displayed. High factor loadings (≥.45) appear in grey for ease of interpretation. Questions retained for final medical maximizer scale are numbered. Exploratory factor analysis (EFA) for 10 retained items appears in two right-most columns.

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and these participants were excluded from CFA for a total sample of 591. Participants responded to the 10 items retained from Study 1. Next, they answered questions about health care utilization (e.g., *How many medicines do you currently take daily?*). Then participants responded to the health care access items from the National Health Interview survey (Pleis, Lucas, & Ward, 2009; Appendix B; e.g., *Have you delayed getting care because you couldn't get through on the telephone?*). The National Health Interview Survey included five questions relevant to delaying care for various reasons (e.g., not being able to get through on the telephone) and seven questions related to not being able to afford care. These items were answered using a "Yes," "No," and "I don't know" response. "I don't know" and "No" responses were coded as '0,' and "Yes" as '1.' Participants also indicated whether they had health insurance.

Next, participants completed the Short Form 12 Item Survey (SF-12 Version 1; questions used the 4 week stem; Ware, Kosinski, & Keller, 1996), followed by the Multidimensional Inventory of Hypochondriacal Traits (MIHT; Longley et al., 2005), and the Beliefs About Medicine Questionnaire—General (BMQ; Horne et al., 1999). The MIHT has four dimensions: (a) a Cognitive scale that assesses "the tendency to believe that one is ill despite contrary evidence" (Longley, Watson, & Noyes, 2005 p. 6; α = .95), (b) a Behavioral scale that assesses the tendency to seek social support (α = .88), (c) a Perceptual scale that assesses the tendency to focus on bodily sensations (α = .87), and (d) an Affective scale that assesses the tendency to worry excessively about one's health (α = .88). The BMQ measure included two subscales: General-Harm (beliefs that medicines are harmful, α = .81) and General-Overuse (belief that doctors overuse medicines, α = .78).

Finally, participants responded to four medical decision scenarios that were related to getting more versus less health care: (a) Surgery versus physical therapy for low back pain, (b) Surgery versus watchful waiting for cancer (Fagerlin et al., 2005), (c) Experimental treatment for terminal illness, and (d) Chemotherapy versus palliative care for terminal cancer. They also completed the Subjective Numeracy Scale (Fagerlin et al., 2007) and demographics (age, race, ethnicity, education, and whether they work in a medical field or not).

Results

Confirmatory Factor Analysis. CFA was conducted using SPSS AMOS software (Cary, NC) for the 10 items that were retained in Study 1. A model with two correlated latent variables (one including 7 items and the other including 3) explained 60.78% of the variance in responses and showed adequate fit, $\chi^2(34)$ = 150.77, root mean square error of approximation (RMSEA) = .076 (90% confidence interval [CI] = .064–.089), comparative fit index (CFI) = .951, Standardized root mean square residual (RMR) = .051, goodness of fit index (GFI) = .953, normed fit index (NFI) = .939. Correlations among the 10 items and factor loadings for the two-factor model are displayed in Table 3. The two latent variables significantly predicted responses for each of their respective items (all critical ratios > .12, all p < .001), and the latent variables were correlated, r = .60.

Although a two-factor solution was suggested by EFA and appeared to fit the data adequately in CFA, a one-factor solution

Table 3

Correlations Among the 10 Maximizer–Minimizer Items From Study 2, and Standardized Regression Weights From CFA in Which All 10 Items Load on Factor 1 and Three Items Cross-Load on Factor 2 (Factor Variances Both Equal 1)

Maximizer-minimizer scale questions	1	2	3	4	5	6	7	8	9	10	Regression weights (*SE*) Factor 1	Regression weights (*SE*) Factor 2
1. It is important to treat disease even when it does not make a difference in survival	1	.68	.43	.37	.13	.30	.19	.35	.33	.36	.72 (.06)	1.09 (.08)
2. It is important to treat a disease even when it does not make a difference in quality of life		1	.47	.43	.17	.37	.28	.42	.37	.44	.85 (.06)	1.12 (.08)
3. Doing everything to fight illness is always the right choice			1	.36	.12	.30	.23	.41	.29	.34	.68 (.06)	.57 (.06)
4. When it comes to health care, the only responsible thing to do is to actively seek medical care				1	.33	.48	.48	.52	.60	.51	1.12 (.05)	
5. If I have a health issue, my preference is to wait and see if the problem gets better on its own before going to the doctor					1	.43	.30	.46	.50	.31	.80 (.05)	
6. If I feel unhealthy, the first thing that I do is to go to the doctor and get a prescription						1	.42	.54	.63	.57	1.11 (.05)	
7. I often suggest that friends and family see their doctor							1	.43	.46	.37	.97 (.06)	
8. When it comes to health care, watching and waiting is never an acceptable option								1	.57	.47	1.22 (.06)	
9. If I have a medical problem, my preference is to go straight to a doctor and ask his or her opinion									1	.56	1.39 (.06)	
10. When it comes to medical treatment, more is usually better										1	1.05 (.05)	

Note. Item 5 was reverse coded before analyses. CFA = confirmatory factor analysis. All correlations were statistically significant, all $p \leq$ .003. All regression weights were significant, all p < .001.

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was suggested by the latent variable correlation and the cross-factor correlations observed in Table 3. A single-factor model was tested that included all 10 items, but this model showed poor fit (e.g., $\chi^2(35) = 483.30$, RMSEA = .141). Notably, residuals were highly correlated among the three items previously composing the three item factor, and allowing these residuals to correlate improved the model fit considerably (e.g., RMSEA = .075).

Together, these observations—improved fit when allowing the errors from the three items to correlate as well as strong cross-factor item correlations—suggested a bifactor model (Reise, Moore, & Haviland, 2010), in which the three items in question assess two latent variable constructs, one related to medical maximizing–minimizing, as well as another independent latent variable. A bifactor model was tested in which all 10 items loaded on a single factor, and items 1–3 (see Table 3) also cross-loaded on another independent factor. This model showed adequate fit, $\chi^2(32) = 138.33$, RMSEA = .075 (90% CI = .062–.088), CFI = .956, Standardized RMR = .045, GFI = .955, NFI = .944. The χ^2 for this model, $\chi^2(32) = 138.33$ was improved over the single factor model, $\chi^2(35) = 483.30$ and the two factor model, $\chi^2(34) = 150.77$. In our view, this model makes the best sense of the data by accounting for the item and factor correlations observed in the two-factor model. Study 3 further tested this model in an independent sample.

The bifactor model suggests that to assess medical maximizing–minimizing using these 10 items it is necessary to derive a factor score. However, for practical reasons researchers would likely prefer a scale that allows them to use a simpler average score as a predictor. For this reason, tests of convergent and discriminant validity are reported that use a maximizer–minimizer factor score as well as the mean of the 10 items. This allowed a determination of whether these two item-scoring procedures result in similar conclusions, or not.

Properties of scale and associations with demographic variables. A maximizer–minimizer factor score was computed using the data imputation function in AMOS. A mean score was computed by averaging the 10 maximizer–minimizer items. Cronbach's α reliability for the 10 items was good ($\alpha = .87$) and the mean scores were approximately normally distributed, $M = 3.73$, $SD = 1.09$, Median = 3.70, skewness = .27, kurtosis = .00, range = 1–7. For both the mean and factor scores, higher scores indicated more maximizing preferences.

Simple correlations were calculated between the mean and factor scores and demographic variables: age, race, gender, education, subjective numeracy, and whether the participant worked in a medical field (see Table 4). Maximizing was associated with being younger, non-White, less educated, and less numerate. The factor score and mean score produced effects in the same direction, and the only observed difference in statistical significance was for education level, where the correlation with mean score was significant but the factor score correlation was not.[2]

Discriminant validity: Relationship between medical maximizing and hypochondria. It could be the case that medical maximizers are hypochondriacs who are highly anxious about their health and seek medical attention frequently as a result. To determine whether this was the case, the relationship between the two maximizer–minimizer scores and the MIHT was examined. Table 4 shows that maximizing was most strongly positively related to Behavioral and Affective hypochondriasis, and was less strongly related to the Cognitive and Perceptual dimensions. The factor score and mean score produced results that were extremely similar in size and direction, although Perceptual hypochondriasis was significantly associated with the mean score but not the factor score. The size of these correlations indicated that maximizing–minimizing is related to, but distinct from, hypochondria.

Discriminant validity: Relationship between medical maximizing and distrust. Next the correlation between the maximizer–minimizer scores and the BMQ-General subscales were assessed (see Table 4). In the BMQ, higher numbers indicate less trust in medicine. The only significant association to emerge was that medical maximizers were less likely to believe that doctors overuse medicines. There was no association with the belief that medicines are harmful, which is also consistent with the Study 1 EFA which showed that harm-relevant items loaded on a separate factor.

Discriminant validity: Relationship between medical maximizing and health care access. In general the correlations with the maximizer–minimizer scores and health care access items were negligible, with the exception of a small positive association between maximizing and feeling like one has to wait too long to see a doctor (see Table 4). There were also consistently positive but mostly nonsignificant associations between the maximizer–minimizer scores and not being able to afford care. In all cases the factor score and mean score produced correlations similar in direction and size.

The small size of these correlations indicated that maximizing–minimizing preferences are mostly independent of health care access. It should be noted that one possible reason for the small observed correlations is that there was little variability in access to health care; for example, 85% of the sample had health insurance. However, correlations between the scale and health care access were very low even for items where the response distribution was more even (e.g., for the composite measure displayed in Table 4).

Discriminant validity: Relationship between medical maximizing and health status. The usual scoring system for these questions creates a health status score that is relative to other people in one's age group, but the present analyses were concerned with testing the possibility that health care maximizing is related to being sick, regardless of health status relative to age. Correlations were computed between the maximizer–minimizer scores and each individual SF12 item (see Table 4). Participants higher in maximizing were more likely to be limited in activities like moving furniture, and reported more pain and health problems that limit work. Again, the factor score and mean score produced similar conclusions. Furthermore, all of these correlations were small, suggesting that medical maximizing is mostly independent of being physically ill, although the size of these correlations was restricted by the fact that the sample included mostly healthy adults.

[2] We also examined associations between healthcare utilization and the second factor in the bifactor model. The strongest correlation between this factor and any outcome measure was with participant education level, $r = -.18$, $p < .001$. There was only one significant association among the 15 utilization measures, and no correlations with any of the four treatment preferences. It was very weakly but significantly correlated with six outcomes reported in Table 4, but there was no discernable pattern to these associations.

Table 4
Correlations Between Maximizing–Minimizing (Factor Score and Average of the 10 Items) and Demographic Variables, Hypochondriasis (MIHT), Trust in Healthcare (BMQ), Healthcare Access, and Health Status (SF-12)

Measured variables	Factor score	Mean score	Measurement scale	Outcome measure descriptive statistics: Mean (*SD*)
Demographics				
Participant age	−.11**	−.10*	Numerical entry	See Table 1
Gender (female = 1, male = 0)	−.06	−.05	0 = male, 1 = female	See Table 1
Race (White = 1, non-White = 0)	−.20***	−.20***	0 = non-White, 1 = White	See Table 1
Education level	−.06	−.10**	1–10, 1 = none, 10 = doctoral/professional degree	See Table 1
Subjective numeracy (1–6 scale)	−.09*	−.09*	1–6, not at all–always	4.48 (.99)
Work in medical field (0 = no, 1 = yes)	.04	−.03	0 = no, 1 = yes	.09 (.28)
MIHT				
MIHT Cognitive	.11**	.09*	1–5, definitely false–definitely true	2.85 (1.66)
MIHT Behavioral	.26***	.26***		3.16 (.88)
MIHT Perceptual	.04	.09*		4.02 (.63)
MIHT Affective	.26***	.26***		2.68 (.94)
BMQ				
BMQ General-Harm	.00	.01	1–5, strongly disagree–strongly agree	2.29 (.82)
BMQ General-Overuse	−.15***	−.11**		3.11 (.87)
Healthcare Access				
Have you delayed care for any of the following reasons . . .				
Can't get through on the telephone	.05	.05	0 = no, 1 = yes	.12 (.32)
Can't get appointment soon enough	.05	.05	0 = no, 1 = yes	.29 (.45)
Once you get there, you have to wait too long to see the doctor	.14***	.14***	0 = no, 1 = yes	.12 (.32)
Clinic isn't open when you could get there	.02	.01	0 = no, 1 = yes	.12 (.32)
Didn't have transportation	.02	.02	0 = no, 1 = yes	.07 (.26)
"Delay care" summation score (sum of above 5 questions)	.09*	.08*	0–5, sum of above 5 questions	.73 (1.10)
In the past 12 months, did you need any of the following but didn't get it because you couldn't afford it?				
Prescription medicines	.06	.06	0 = no, 1 = yes	.20 (.39)
Mental health care	.02	.02	0 = no, 1 = yes	.15 (.36)
Dental care	.04	.06	0 = no, 1 = yes	.41 (.49)
Eyeglasses	.04	.06	0 = no, 1 = yes	.28 (.45)
See a specialist	.08*	.10*	0 = no, 1 = yes	.17 (.37)
Follow-up care	.08	.09*	0 = no, 1 = yes	.13 (.33)
Regular health check up	.01	.05	0 = no, 1 = yes	.17 (.37)
"Can't afford care" summation score (sum of above 7 questions)	.07	.09*	0–7, sum of above 7 questions	1.49 (1.87)
If you get sick or have an accident, how worried are you that you will not be able to pay your medical bills	−.04	.03	1–3, not at all worried–very worried	1.93 (.76)
Health insurance				
How difficult is it for you to find health insurance that you can afford?	.03	.02	1–3, very difficult–not at all difficult	2.20 (.80)
How difficult is it to find insurance with the type of coverage that you need?	.02	.02	1–3, very difficult–not at all difficult	2.27 (.75)
Do you have health insurance?	.08*	.06	0 = no, 1 = yes	.85 (.35)
Healthcare status				
SF-12 items				
General rating of health	.04	−.03	1–5, poor–excellent	3.42 (.91)
Health limits activities like moving table	.14**	.12**	1–3, not limited at all–limited a lot	1.23 (.51)
Health limits climbing stairs	.14***	.13**	1–3, not limited at all–limited a lot	1.30 (.58)
Physical health caused you to accomplish less	.06	.04	0 = no, 1 = yes	.23 (.42)
Physical health limited work	.08*	.05	0 = no, 1 = yes	.19 (.39)
Emotional problems caused you to accomplish less	.07	.06	0 = no, 1 = yes	.32 (.46)
Emotional problems caused you to work less carefully	.04	.02	0 = no, 1 = yes	.27 (.44)
Pain interfered with normal work	.10**	.09*	1–5, not at all–extremely	1.70 (.95)
In past 4 weeks felt calm	.00	.02	1–6, all the time–none of the time	3.94 (1.28)
In past 4 weeks had energy	.03	.05	1–6, all the time–none of the time	3.51 (1.32)
In past 4 weeks felt down/blue	−.04	−.04	1–6, all the time–none of the time	4.47 (1.36)
In past 4 weeks physical or emotional problems interfered with social activities	−.05	−.04	1–6, all the time–none of the time	4.82 (1.47)

Note. MIHT = Multidimensional Inventory of Hypochondriacal Traits; BMQ = Beliefs About Medicine Questionnaire; SF-12 = Short Form 12 Item Survey.

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Convergent validity. Next, the associations between maximizer–minimizer scores and self-reported health care utilization and hypothetical health decisions were tested. Here, the maximizer–minimizer scores should be predictive of health care utilization and preferences for more versus less care. The factor score and mean score were analyzed in separate regressions and appear side-by-side in Table 5 for comparison. All regression models also included the MIHT, the BMQ, health care access summation scores (delay and cannot afford care), and all SF-12 items. The regression type used matched the outcome variable scale (Table 5, middle-right column). For all count variables, negative binomial regressions were used with an estimated dispersion parameter to correct for overdispersion.

Table 5 shows that maximizing was positively associated with 11 out of 15 assessments of health care utilization, including the number of prescription medications taken daily, number of visits to the doctor, psychiatrist, acupuncturist, and naturalist healer, number of hospital stays in the past 10 years, number of blood draws in the past year, flu vaccination, among other outcomes. The factor score and mean score produced results that were similar in direction, size, and statistical significance. Three outcomes were not associated with either score, including number of surgeries, scans, and visits to a chiropractor. Medication refusal was significantly negatively associated with the mean score but not the factor score. The factor score was negatively associated with taking over-the-counter pain killers, but readers should interpret this association with caution because the zero-order correlation was not significant, $r = -.04$, $p = .30$.

Next the hypothetical decision scenarios were examined (see Table 5). Both the factor and mean scores indicated that maximizers were more likely than minimizers to prefer surgery over physical therapy for back pain, surgery over watchful waiting for cancer, and preference for continued chemotherapy for cancer over palliative care. Of interest to the authors, neither the mean nor factor score predicted preferences for experimental treatment for a terminal illness.

Discussion

CFA indicated that the 10 items identified in Study 1 were best understood by a model in which all 10 items loaded on a single factor and three of the items cross-loaded on another independent factor. Both a maximizer–minimizer factor score and a mean score were used in tests of convergent and discriminant validity, and the two scoring approaches showed remarkably similar results. Maximizers were more likely to report behavioral and affective hypochondria, but these associations were not strong enough to suggest that these measures assessed the same construct. Minimizers were more likely to believe that doctors overuse medicine, but were no more or less likely to believe that doctors do harm. Maximizing–minimizing was only weakly correlated with health care access and health status. Finally, maximizers were more likely than minimizers to utilize health care in a variety of different ways (e.g., going to the doctor, taking medicines, hospital stays, or blood draws) and showed significantly stronger preferences for more invasive and active medical treatments (surgery and chemotherapy vs. watchful waiting, physical therapy and palliative care). Hence, these items—scored using either the factor score or mean score—showed good convergent and discriminant validity.

Study 3

The purpose of Study 3 was to estimate the test–retest reliability for the maximizer–minimizer scale, and compare this to test–retest reliability for another established scale. In Study 3 the two scoring methods—using a factor score versus the mean of the 10 items—produced the same conclusions. For the sake of brevity only results for the factor score are reported.

Participants and Design

Participants were recruited online using Mturk and were paid \$0.20 to complete the Time 1 survey and \$1.00 to complete Time 2. At Time 1, 500 participants completed the 10 maximizer–minimizer items, the four subscales of the MIHT, and demographic questions. Participants provided their email address, which was used to contact them 1 week later with instructions and a password allowing them to take the Time 2 survey. The Time 2 survey was completed 7–15 days after Time 1. In total, 436 participants completed Time 2, an 87.2% response rate. Demographics are displayed in Table 1.

Results and Discussion

A bifactor model was tested in which all 10 items loaded on a single factor, and three of these items loaded on another independent factor. This model showed adequate fit at Time 1 ($\chi^2(32) = 154.98$, RMSEA = .094 (.079–.109), CFI = .912, Standardized RMR = .049, GFI = .931, NFI = .910), and at Time 2, $\chi^2(32) = 116.32$, RMSEA = .078 (.063–.093), CFI = .955, Standardized RMR = .045, GFI = .945, NFI = .939.

The 10 items showed good internal consistency reliability at Time 1 ($\alpha = .86$) and at Time 2 ($\alpha = .87$). Critically, test–retest reliability for the factor score across Time 1 and Time 2 was also good, intraclass correlation coefficient (ICC) = .89, CI = .87–.91. For comparison, test–retest reliability for the MIHT subscales were as follows: MIHT-Cognitive ICC = .93, CI = .88–.92, MIHT-Behavioral ICC = .88, CI = .86–.91, MIHT-Perceptual ICC = .87, CI = .84–.89, and MIHT-Affective ICC = .91, CI = .89–.93. As in Study 2, the maximizer–minimizer scale was moderately correlated with the MIHT-Behavioral and Affective scales (*r*s = .29, .25, *p*s $< .001$) and more weakly correlated with the Cognitive and Perceptual measures (*r*s = .15, .14, *p*s $\leq .003$; reported correlations are for Time 1 data). Together these data indicate that the maximizer–minimizer scale has test–retest reliability that is comparable to a scale that assesses a related, but not entirely overlapping, construct.

Study 4

The purpose of Study 4 was to further examine the maximizer–minimizer scale in a different population and non-Internet sample. This report used data that were collected as part of a larger study on communicating about overdiagnosis and overtreatment in cancer screening. Participants were adult men who were asked to respond to two hypothetical decision scenarios pertaining to PSA screening for prostate cancer and MRI for uncomplicated headaches, both of which have been counter-recommended by the USPSTF and Choosing Wisely, respectively. At the end of the survey, participants also completed the maximizer–minimizer

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Table 5
Regression Results Using the Maximizer-Minimizer Factor Score and Mean Score (in Separate Regressions) to Predict Healthcare Utilization and Treatment Preferences

Utilization and treatment preference outcomes	Factor score	Mean score	Variable type and measurement scale	Outcome measure descriptive statistics: Mean (*SD*)
Self-reported healthcare utilization				
How many medicines do you take daily?	$.12^{***}$ (.03) DP = .009	$.11^{***}$ (.02) DP = .008	Negative binomial regression, count variable (0, 1, 2, 3 . . . 10, more than 10)	1.26 (1.74)
How many times have you been to a doctor in the past year for reasons other than a regular check-up?	$.10^{**}$ (.03) DP = .101	$.08^{**}$ (.03) DP = .101	Negative binomial regression, count variable (0, 1, 2, 3 . . . 10, more than 10)	1.64 (2.31)
In the past 10 years, how many separate times have you had an overnight stay in a hospital?	$.13^{***}$ (.03) DP = .000	$.11^{***}$ (.03) DP = .000	Negative binomial regression, count variable (0, 1, 2, 3 . . . 10, more than 10)	.74 (1.43)
How many times in the past 10 years have you had an X-ray, Cat scan, or MRI?	.01 (.03) DP = .135	.01 (.03) DP = .135	Negative binomial regression, count variable (0, 1, 2, 3 . . . 10, more than 10)	2.06 (2.57)
How many times in your life have you had surgery to address a medical problem	.02 (.03) DP = .010	.01 (.02) DP = .011	Negative binomial regression, count variable (0, 1, 2, 3 . . . 10, more than 10)	1.45 (1.76)
Typically, how often do you visit a medical doctor (for reasons other than mental health)?	$.39^{***}$ (.08)	$.39^{***}$ (.08)	Ordinal logistic regression, ordinal variable (1–5, never–always)	2.86 (1.15)
Do you go to the doctor for a regular yearly check-up even if you are not sick?	$.47^{***}$ (.08)	$.43^{***}$ (.07)	Ordinal logistic regression, ordinal variable (1–5, never–always)	2.83 (1.36)
Do you go to the doctor for reasons that you consider to be relatively minor?	$.72^{***}$ (.09)	$.64^{***}$ (.08)	Ordinal logistic regression, ordinal variable (1–5, never–always)	1.77 (.83)
How often do you get the flu vaccine?	$.31^{***}$ (.08)	$.29^{***}$ (.08)	Ordinal logistic regression, ordinal variable (1–5, never–always)	2.49 (1.53)
Have you ever refused to take a medicine prescribed by a doctor?	−.14 (.08)	$-.22^{**}$ (.08)	Ordinal logistic regression, ordinal variable (1–5, never–always)	2.00 (.97)
How many times in the past year have you had your blood drawn for medical tests?	$.38^{***}$ (.08)	$.35^{***}$ (.08)	Ordinal logistic regression, ordinal variable (1–7: zero, once, 2–5 times, 6–10 times . . . more times than I can count)	1.90 (1.00)
Typically, how often do you visit a psychiatrist or psychologist?	$.32^{***}$ (.10)	$.26^{**}$ (.10)	Ordinal logistic regression, ordinal variable (1–7, never–more than once per week)	1.66 (1.27)
How often do you visit the chiropractor?	.16 (.11)	.18 (.11)	Ordinal logistic regression, ordinal variable (1–7, never–more than once per week)	1.38 (.96)
How often do you visit an acupuncturist?	$.54^{**}$ (.20)	$.52^{**}$ (.20)	Ordinal logistic regression, ordinal variable (1–7, never–more than once per week)	1.17 (.73)
How often do you visit a naturalist doctor or healer?	$.38^{*}$ (.16)	$.34^{*}$ (.16)	Ordinal logistic regression, ordinal variable (1–7, never–more than once per week)	1.22 (.82)
How often do you take over-the-counter pain relievers like Aspirin or Tylenol?	$-.17^{*}$ $(.07)^{\dagger}$	−.12 (.07)	Ordinal logistic regression, ordinal variable (1–7 never–every day)	3.33 (1.61)
Treatment decision scenarios				
Preference for surgery over physical therapy for back pain: Equal effectiveness, PT takes longer, surgery has risk of serious complications, including death	$.30^{*}$ (.12)	$.31^{*}$ (.12)	Logistic regression, binary variable (0 = choose PT, 1 = choose surgery	.16 (.37)
Preference for cancer treatment: Surgery with 10% of death vs. watchful waiting with 5% chance of death	$.48^{***}$ (.09)	$.46^{***}$ (.09)	Logistic regression, binary variable (0 = choose watchful waiting, 1 = choose surgery	.57 (.49)
Preference for continued chemotherapy over palliative care for terminal cancer	$.46^{***}$ (.11)	$.47^{***}$ (.11)	Logistic regression, binary variable (0 = choose palliative care, 1 = choose chemotherapy)	.22 (.41)
Preference for trying experimental treatment for terminal (unspecified) disease: Treatment may extend life or may cause more pain and earlier death	.00 (.09)	.02 (.08)	Logistic regression, binary variable (0 = no treatment, 1 = get experimental treatment)	.51 (.50)

Note. Regression coefficients are reported (*SE*s). Type of regression was dictated by the type of variable (middle-right column). All regressions included the following covariates: The MIHT, the BMQ, healthcare access summation scores (delay and can't afford care), and all SF-12 items. For negative binomial regression analyses the dispersion parameter was estimated using SPSS (Cary, NC). The estimated parameter is reported above; smaller numbers indicate a larger deviation from the Poisson distribution (i.e., more correction). MIHT = Multidimensional Inventory of Hypochondriacal Traits; BMQ = Beliefs About Medicine Questionnaire; SF-12 = Short Form 12 Item Survey.
† Not a significant zero-order correlation. * $p < .05$. ** $p < .01$. *** $p < .001$.

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items. The aim was to (a) test model fit in a different sample and survey method, and (b) further examine the extent to which the scale predicts health care preferences. It was predicted that participants relatively high in medical maximizing would be more likely to choose to get tests of limited benefit.

Method

Participants. There were 769 men who completed the survey at the University of Michigan hospital in exchange for a $10 gift card. These men were approached in public areas inside the hospital (e.g., cafeteria) and were patient guests and hospital staff (e.g., 12% worked in a medical field). Participants were adult men who had never been diagnosed with prostate cancer. Participant characteristics are displayed in Table 1. Relative to Studies 1 and 2, these participants were older, more likely to be White, and were slightly more educated.

Design. All participants read and responded to two hypothetical medical decision scenarios (order was counterbalanced). In one scenario participants were asked to consider PSA screening for prostate cancer. In the other scenario participants imagined that they had been having migraine headaches and that they were considering getting a magnetic resonance image (MRI) to check for a possible brain tumor. After receiving basic information about the test, participants were randomized to receive additional information about overdiagnosis and overtreatment that could result from these tests. This included information about test risks (specifically the risk of overtreatment), lack of test benefit, and expert recommendations against the test (USPSTF in the case of PSA, and Choosing Wisely in the case of MRI). Participants then made a decision about whether or not to get the test. After reading and responding to both tests, participants completed the maximizer–minimizer items.[3] This was a 2 (Risk information: present vs. absent) × 2 (Information about lack of benefit: present vs. absent) × 2 (Expert counterrecommendation: present vs. absent) × 2 (Order: PSA scenario first vs. MRI scenario first) between-subjects design.

Results

Because these data were part of a larger survey, a more detailed description of the overall study results will be reported elsewhere. CFA was conducted on the maximizer–minimizer items, testing the same bifactor model as Studies 2 and 3. This model showed adequate fit, $\chi^2(24) = 143.19$, RMSEA = .080 (.068–.093), CFI = .942, Standardized RMR = .054, GFI = .959, NFI = .932. For the following results, the factor score and mean score produced identical conclusions. For the sake of brevity only the results for the factor score are reported.

Logistic regressions determined whether the maximizer–minimizer scale was predictive of MRI and PSA test decisions. Each regression included the mean maximizer–minimizer factor score as a predictor and controlled for experimental conditions. Results showed that participants who were relatively more maximizing were more likely to want the MRI to screen for brain cancer relative to participants who were more minimizing, B = .32, *SE* = .09, Wald = 11.06, $p = .001$, Exp(B) = 1.38. Maximizers were also more likely to want PSA screening, B = .55, *SE* = .09, Wald = 35.28, $p < .001$, Exp(B) = 1.74. Hence, medical maximizers were more likely to want to get these medical tests relative to medical minimizers.

Because the maximizer–minimizer items were measured after the experimental manipulations, it is additionally possible to test whether participants' maximizing–minimizing preferences are influenced by negative information about medical tests. A 2 (Risk information: present vs. absent) × 2 (Information about lack of benefits: present vs. absent) × 2 (Expert recommendation: present vs. absent) between-subjects analysis of variance (ANOVA) on the maximizing–minimizing factor score showed that participants reported less maximizing preferences after receiving risk information ($M = 3.40$, $SD = 0.87$) relative to when risk information was not presented ($M = 3.59$, $SD = 0.93$), $F(1, 761) = 8.23$, $p = .004$, $\eta_p^2 = .011$. No other main effects or interactions were significant, all $p > .22$.

Discussion

The bifactor model showed adequate fit in an in-person survey of adult men. As expected, the maximizer–minimizer scale was associated with PSA and MRI test acceptance, controlling for experimental condition. Further, information about the risks of testing (but not information about lack of benefits or expert recommendation) reduced maximizing preferences, indicating that the maximizing–minimizing construct should be viewed as somewhat mutable preferences, rather than a completely immutable trait.

General Discussion

This research explored the possibility that some people can be described as being medically maximizing, insofar as they seek out medical care even for minor illness, whereas others may be relatively more minimizing, insofar as they prefer to avoid care unless it is necessary. Results showed that the scale was associated with a broad array of health care utilization outcomes, from prescription medication use to number of hospital stays to flu vaccination. The scale was also associated with a variety of testing and treatment preferences, including preferences for surgery versus watchful waiting, surgery versus physical therapy, continued chemotherapy at the end of life, interest in PSA screening to prevent prostate cancer, and MRI screening to seek a cause for migraine headaches.

In Study 1, EFA showed that items related to our a priori definition of medical maximizing–minimizing loaded on two in-

[3] In this study, one maximizer–minimizer item was mistakenly omitted: *When it comes to medical treatment, more is usually better*. To determine whether this study was still suitable for the purposes of this article, we turned to the data. First, we found that the model derived from the 9 items included in this study showed adequate fit in CFA (as reported in the main text). Second, upon finding adequate fit with the 9-items in Study 4, we explored whether the 9-item model would similarly show adequate fit in the other samples. The data from Study 2 showed virtually no change in fit for the 9-item vs. 10-item model: for example, $\chi^2 = 118.95$, RMSEA = .078, CFI = .956 for the 9-item model. Study 3 similarly showed equivalent fit when comparing the 10 vs. 9-item models. Lastly, we returned to the EFA in Study 1 and conducted it without this item, and found that the factor structure and loadings of the remaining items were virtually unchanged by the exclusion. Together these data indicate that this particular item may not be necessary for model fit or reliability, and as a result, the conclusions derived from Study 4 are unlikely to have hinged upon the inclusion/exclusion of this item.

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terpretable factors. Study 2 indicated that these 10 items were best understood with a bifactor model; that is, the items measured a single latent construct consistent with maximizing–minimizing, with three of these items additionally cross loading on another factor. Two subsequent studies further confirmed this model. Tests of convergent and discriminant validity in Study 2 showed that the maximizer–minimizer factor score and a mean score of the 10 items produced very similar results, indicating that both of these approaches could be acceptable scoring procedures.

Study 3 showed that maximizing–minimizing preferences were stable over a 1–2 week period and Study 4 further confirmed the factor structure in a sample of relatively older men. Study 4 also showed that maximizing–minimizing preferences changed somewhat following information about the risks of PSA and MRI testing, but were not similarly influenced by information about the lack of test benefits or expert recommendations against the tests.

Together, these studies present initial empirical evidence that people have general preferences related to wanting more versus less health care, and that these preferences predict health care utilization as well as a range of health care decisions. One potential criticism of the present endeavor is that individuals are maximizing in some health domains but minimizing in others, and therefore, a measurement instrument that seeks to assess maximizing or minimizing across health care domains will be less useful than questions that are specific to the health domain at hand. However, this is an empirical question, and the evidence provided by these studies suggests that people may be maximizing or minimizing across multiple health domains. This scale may, therefore, provide researchers with insight into health care utilization patterns for individuals across health contexts. Knowledge of such utilization patterns could be useful in tailoring health information, explaining health-related behavior, and enhancing patient-provider communication.

Strengths, Limitations, and Future Directions

Strengths of the present research include large samples that were diverse in terms of participant age, gender, and education. However, one limitation is that in all studies the majority of participants were White. Future research should further explore the psychometric and predictive qualities of the scale in minority populations. The significant associations between the scale factors and race demographics suggest that racial disparities could be an interesting avenue for future research using this scale.

This research showed that the scale factors were predictive of reported health care utilization and treatment choice even when controlling for a number of other related variables. Nonetheless, one limitation is that the utilization measures were all self-reports, and treatment decisions were hypothetical. Future research should examine the extent to which these scales predict treatment utilization based on medical records, and medical decisions in real life.

Future research should also further examine the stability of these preferences, as well as the underlying reasons that people have these preferences. Study 3 indicated that these preferences are stable over time but Study 4 suggested that they are responsive to risk information. Further research should continue to explore the malleability of these preferences, for example, testing whether they are influenced by factors like personal experiences, cultural influences, or knowledge about the effectiveness of health care interventions. Moreover, people may have different motivations for doing versus not doing when it comes to their health, and these orientations may be means to different goals (Richetin, Conner, & Perugini, 2011). Our perspective is that maximizing–minimizing preferences are of theoretical and practical interest regardless of their malleability or ultimate cause. In fact, we expect and even hope that people's maximizing and minimizing tendencies are at least somewhat malleable, so that individuals who are too extreme in either respect can be given information that makes their medical preferences better calibrated to the actual risks and benefits of a given medical intervention.

Conclusions

Preferences for maximizing and minimizing in the context of health care may be consequential for health care decisions, communication, and health outcomes. We hope that this assessment tool proves to be useful in identifying how to best communicate treatment options and facilitate the delivery of effective, appropriate care. Ideally this measure will be used in future research to better understand the extent to which patient preferences for maximizing or minimizing drive over- and underutilization, inform interventions aimed at facilitating appropriate care, and explore the implications of these preferences for patient-provider communication.

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