BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015137
Article Type:	Research
Date Submitted by the Author:	10-Nov-2016
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Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Epidemiology, Health services research, Research methods, Public health
Keywords:	stoicism, help-seeking, health behavior theories, masculinity, patient perspectives, gender

A Theory of Self for Understanding Health Behavior:

Development and Preliminary Validation of the

Pathak-Wieten Stoicism Ideology Scale

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Acknowledgements: The authors are grateful to the respondents for their voluntary participation in this study.

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Funding: This study was unfunded.

Competing Interests: The authors have no competing interests.

Data Sharing: No additional data available.

ABSTRACT

Introduction: We theorize that patients who strongly endorse a personal ideology of stoicism will be more likely to avoid or delay seeking professional medical intervention for serious signs and symptoms of disease. Core elements of stoicism are imperviousness to strong emotions, indifference to death, taciturnity, and self-sufficiency. We developed and validated a multi-domain scale to assess stoic ideologies.

Methods: During 2013-2014, 390 adults aged 18+ years completed a brief anonymous paper questionnaire containing the preliminary 24-item 5-domain Pathak-Wieten Stoicism Ideology Scale (PW-SIS). Confirmatory factor analysis (CFA) was used to test the *a priori* theoretical model. Content validity and response distributions were examined. Socio-demographic predictors of strong endorsement of stoicism were explored with logistic regression.

Results: The final PW-SIS contains 4 conceptual domains and 12 items. CFA showed very good model fit: RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93. Cronbach's alpha was 0.78 and ranged from 0.64 to 0.71 for the sub-scales. Content validity analysis showed a statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest PW-SIS scores. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

Discussion: The PW-SIS is a valid and theoretically coherent scale which is brief and practical for integration into a wide range of empirical research studies.

Strengths and Limitations

- The Pathak-Wieten Stoicism Ideology Scale (PW-SIS) is a new, theoretically coherent, multi-dimensional scale which demonstrates good psychometric properties and content validity in a large sample (n=390) of educated adults.
- The PW-SIS contains 12 items and 4 domains: Stoic Taciturnity, Stoic Endurance, Stoic Serenity, and Stoic Death Indifference.
- Mean stoicism ideology scores were higher for men than women, but for both genders the most frequent scores were neutral on stoic ideology, and the response distributions by gender overlapped almost completely.
- Further validation of the PW-SIS in demographically and socioeconomically diverse populations is needed.

INTRODUCTION

In this paper, we outline a theory of illness behavior and help-seeking reluctance and present the conceptual development and empirical validation of a measurement tool to facilitate new research. We theorize that patients who strongly endorse a **personal ideology of stoicism** will be more likely to avoid or delay seeking professional medical intervention for serious signs and symptoms of disease. Each year thousands of individuals suffer needlessly and many die because of extended delays in seeking professional aid for acute medical conditions (e.g., myocardial infarctions, strokes, diabetic emergencies, cancer complications and pain, and acute exacerbations of congestive heart failure).[1-8] Numerous studies have been conducted to attempt to elucidate the reasons behind patient delays,[2-7,9] with the ultimate goal of designing education programs and interventions that will result in timely help-seeking. Significant risk factors for help-seeking reluctance have been identified (e.g. Black race[8,10,11]) but much of the variation remains unexplained and we still lack a complete understanding of *why* certain patients and not others delay seeking aid.

Given the rise of patient-centered health care,[12,13] understanding patients' motivations and perspectives has never been more important. The current health education paradigm holds that improving patients' knowledge of symptoms and signs will result in more timely help-seeking behavior.[14-17] A distinction of our theory is movement of the focus of inquiry away from the disease and the patient's relationship to the disease (e.g. health knowledge, symptom awareness, ability to comply with self-care regimens) and onto **patients' sense of self** – their self-concepts and self-identity.[18] We hypothesize that illness behaviors may become "noncompliant" or "irrational" or "self-harming" when specific courses of action would create an internal conflict with patients' ideas of **who they are.** Specifically, we posit that people who strongly believe that they should manage their problems on their own, not show emotions, and not complain about physical discomfort will experience an internal cognitive conflict when faced with a situation that could require help from others. This internal conflict will lead to delays in or avoidance of help-seeking, with potentially life-threatening consequences. For example, empirical studies of increasing rates of male suicide in rural Australia have identified hegemonic masculine norms of stoicism as an important causal factor in the context of severe economic stress.[19,20]

Stoicism is a school of philosophy which originated in ancient Greece.[21-23] Core elements in the classical definition of stoicism were an idealization of imperviousness to strong emotions, and an indifference to death.[23] Major Asian philosophical systems of thought, such as Buddhism and Confucianism, also endorsed stoic principles and teachings.[24,25] From the 19th century onward, academic and popular philosophers in Europe and the Americas have been exposed to and influenced by Asian philosophy and religion. Therefore, it may not always be possible to distinguish whether particular strands of contemporary thought associated with stoicism originated in ancient Greece, ancient India, or elsewhere. For example, using very different language and symbolism, both the Greek Stoics and the Buddha exhorted the student to live fully and completely in the present, while minimizing concern about the future. Contemporary meanings and connotations of stoicism have expanded beyond their ancient origins, to include ideals of taciturnity and self-sufficiency.[26-28] Today, personal ideologies, values and behaviors which fall under the umbrella of stoicism are commonplace across many industrial nations, and are evident in many non-Western cultures as well.[29-32] In the USA, the armed forces have explicitly embraced stoic ideology as a tool for mitigating combat stress.[33,34]

The purpose of our study was to develop a theoretically coherent multi-item, multi-dimensional scale to assess endorsement of a personal ideology of stoicism, and to empirically validate this scale in a multiethnic sample of healthy community-dwelling adults. We present the results of confirmatory factor analysis of the multi-domain Pathak-Wieten Stoicism Ideology Scale (PW-SIS), and discuss the potential usefulness of this tool for investigating constraints in health-related help-seeking behaviors.

METHODS

Conceptual Development of the Stoicism Ideology Scale

Drawing on multiple scholarly and popular sources,[21-23,26,35-38] we developed the preliminary 24-item Stoicism Ideology Scale (PW-SIS) to capture endorsement of 5 dimensions of stoicism (see Table S1 in the Technical Supplement, available online). We defined each domain as follows:

Stoic Taciturnity is the belief that one should conceal one's problems and emotions from others.
Stoic Endurance is the belief that one should endure physical suffering without complaining.
Stoic Composure is the belief that one should control one's emotions and behavior under stress.
Stoic Serenity is the belief that one should refrain from experiencing strong emotions.
Stoic Death Indifference is the belief that one should not fear or avoid death.

Each item in our scale was carefully worded to capture the respondents' ideology, not their past behavior, using a 5-point Likert response scale with the following responses: "disagree" (-2), "somewhat disagree" (-1), "not sure" (0), "somewhat agree" (+1), and "agree" (+2). An average score of 0 corresponds to a neutral stance – neither endorsement nor rejection of stoicism. Positive scores indicate endorsement of a stoic ideology, while negative scores indicate rejection of a stoic ideology. Nine of the original 24 items were "reverse" items that specified anti-stoic beliefs, i.e. "I believe I should experience strong emotions."

Data Collection

This study was approved by the Institutional Review Board (IRB) of the University of South Florida, and informed consent was obtained from all participants. Study participants were recruited in person by the authors and provided verbal informed consent. Written consent forms were waived by the IRB to ensure respondent anonymity. Each participant completed a brief paper-and-pencil questionnaire consisting of the 24-item preliminary PW-SIS, socio-demographic questions, and a final single item "I try to be a stoic" with a 7-item response scale ranging from "never" to "all the time." The study population consisted of a convenience sample of 390 university students, staff, and faculty aged 18 years and older. Data were collected over a period of 10 months during 2013-2014.

Data Analyses

Data analysis proceeded in 5 steps. During Step 1, we examined univariate response distributions for each of the 24 scale items. A simple correlation matrix was examined to identify redundant items. Finally, we assessed content validity based on agreement with the statement "I try to be a stoic." As a result of Step 1 analyses, 6 items were dropped from further analyses - including the entire Stoic Composure domain.

During Step 2, we conducted a confirmatory factor analysis (CFA) of the reduced 18-item PW-SIS. CFA is the appropriate analytic choice to test scales that have an *a priori*, theoretically explicit sub-domain structure.[39-43] We used SAS 9.4 for all statistical analyses. We chose an oblique (as opposed to orthogonal) rotation method (promax) because under our theoretical model the correlations among the underlying factors was not assumed to be zero. Based on the results of the first CFA, we eliminated 2 items with poor factor loadings.

During Step 3, we repeated the CFA on the reduced 16-item PW-SIS. Finally, for the purpose of parsimony we further reduced the total number of scale items to 12 (3 items in each of 4 domains) and conducted a CFA on the final 12-item version of the PW-SIS (Step 4). Additional details and rationale for analytic Steps 1-4, including data tables S1-S3, are provided in the Technical Supplement, available online.

Step 5 of our analysis consisted of preliminary content validation, examination of response distributions for the overall and domain scores, and exploratory logistic regression modeling of socio-demographic predictors of strong endorsement of stoicism.

RESULTS

The size of our study population (n=390) provided more than 15 respondents for each question in the preliminary scale, which exceeds the widely accepted norm of at least 10 respondents per question.[44] Although skewed toward younger adults (78% of respondents were < 25 years old), the study population was in other respects diverse. A majority self-identified as female (57%) and white (55%). Hispanics (15%) and Blacks (14%) were the second and third largest racial/ethnic groups, followed by Asians (9%) and biracial or other ethnicity (6%). A substantial minority of respondents (19%) were born outside the U.S or Puerto Rico.

The final 4-domain, 12-item Pathak-Wieten Stoicism Ideology Scale is shown in Table 1. Confirmatory factor analysis of the final scale showed very good model fit with individual item factor loadings ranging from 0.48 to 0.76, RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93.

Relationships among the PW-SIS and its four conceptual domains are shown in Table 2. Cronbach's alpha ranged from 0.64 to 0.71 for the sub-scales and was 0.78 for the 12-item PW-SIS. Scores for Stoic Taciturnity were strongly correlated with scores for both Stoic Endurance and Stoic Serenity, but Stoic Endurance and Stoic Serenity were not highly correlated with each other. Stoic Death Indifference had the highest (most stoic) mean scores among the four domains, and it was least correlated with the other three domains.

Figure 1 depicts mean PW-SIS scores by response to the statement "I try to be a stoic." There was a clear monotonic and statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest stoicism scores, and respondents who reported trying to be a stoic "never" having the lowest stoicism scores. Most respondents chose one of the 3 intermediate categories. Respondents who chose "I don't know" as their response had stoicism scores similar to those who said they "sometimes" tried to be a stoic.

The distributions of mean scores for the 4 conceptual domain sub-scales are shown in Figure 2. Domain scores are comprised of the mean score for the 3 questions in the domain. In this study population, respondents were least likely to endorse Stoic Serenity and most likely to endorse Stoic Death Indifference.

The full distribution of respondent scores is shown separately for women and men in Figure 3. The distributions overlapped almost completely, but there were no men with the least stoic scores, and no women with the most stoic scores. Response distributions were skewed to the left for women (less stoic) and to the right for men (more stoic), consistent with a statistically significant difference in the mean scores for women (-0.31, 95% CI -0.40 to -0.22) and men (+0.04, 95% CI -0.05 to +0.14).

Results of an exploratory analysis of sociodemographic predictors of high endorsement of stoicism are shown in Table 3. There is no *a priori* cutpoint designated as "highly stoic" in the PW-SIS; in this analysis the cutpoint used was a mean score greater than the 75th percentile of the overall response distribution. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Adults born in the USA or Puerto Rico were also twice as likely as adults born elsewhere to strongly endorse stoicism (OR=1.97, 95% CI 1.01 to 3.84, p=0.048). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

DISCUSSION

The Pathak-Wieten Stoicism Ideology Scale is a theoretically coherent, multi-dimensional scale which demonstrates good psychometric properties and content validity based on initial validation in a large sample of educated adults. The PW-SIS is also brief and practical for integration into a wide range of empirical research studies. In our study population of mostly younger adults, endorsement of stoicism varied by conceptual domain, with the weakest endorsement of the classical domain Stoic Serenity (aversion to strong emotions). Exploratory logistic regression analysis identified male gender and USA birth as significant predictors of strong endorsement of stoicism. Notably, for both genders the most frequent scores were in the middle of the distribution (neutral on stoic ideology), and the response distributions for women and men overlapped almost completely. Finally, point estimates suggested higher endorsement of stoicism for Blacks, Hispanics, and Biracial persons compared with Whites, but these results were not statistically significant.

Theoretical Context

In 1983, Kathy Charmaz published a very influential sociological study on the "loss of self" suffered by people with chronic illnesses.[45] Although stoicism *per se* was mentioned only briefly, the idea that the suffering caused by disease emerges as much (or more) from threats to a person's identity and sense of self as from purely bodily experiences of pathophysiology is one of the theoretical underpinnings of our work.

In this study, we have attempted to articulate an explicit theory of stoicism and its potential impact on health. We take the standpoint that stoicism is a system for self-regulation rather than a behavior or personality trait. As a guide to ideal self-conduct, it requires self-conscious implementation and regular enforcement; in other words, stoicism is an ideology (e.g. a belief system which informs one's attitudes and actions with the inherent potential for internal resistance and conflict). We posit that people who strongly endorse a personal ideology of stoicism have a set of expectations about who they are, what they should do, and what they should not do. This personal ideology of self will not mandate behavior in a deterministic fashion; rather, stoicism will create expectations of ideal behavior (which may not always be met).

Ironically, a personal ideology of stoicism almost guarantees failure to live up to one's personal ideal. Experiences of illness and disease often involve transient weakness and functional limitations. With aging, these experiences will increase in frequency, duration, and severity for most people. Simply put, experiences of illness and disease tend to require aid – whether from health professionals in a formal context, or from family members or friends in an informal context. An ideology of stoicism creates an internal resistance to an external ("objective") need, which can lead to negative consequences. For example, a study of major strain among family caretakers of elderly dementia patients found that those who used stoicism as a coping strategy suffered burnout, while those who sought social support did not.[46]

Future integration of our theory of a stoic ideology of the self into existing health behavior models could help explain the formation of beliefs and attitudes toward criterion-specific help-seeking behaviors. Reasoned action approaches - such as the Integrative Model of Behavior Prediction - poorly define background factors that underlie belief formation.[14] Measurement of self-concepts, such as stoicism ideologies, may help explain this

population variability. Expanding health behavior theory to include aspects of the self could also help inform health education messaging and risk-based communication.

Previous Research on Stoicism and Health

Much of the previous health-related research which mentions stoicism has invoked the term as a descriptor of particular patient groups or behaviors, without an explicit theoretical context.[28] Stoicism is mentioned most frequently in studies related to pain (particularly cancer pain) and coping strategies; indeed stoicism has been labeled a "coping strategy" in more than one study.[26-28,38,47] Stoicism has also been invoked as a defining characteristic of masculinity and as a key explanatory factor for certain health behaviors and outcomes among men. There are several psychometric instruments that measure endorsement or adherence to social norms of masculinity. However, the conceptual and measurement overlap between our 4-domain scale and these instruments is minor.[48] For example, in the widely used Personal Attributes Questionnaire, only 2 of 24 items relate to a single domain of the PW-SIS. The Conformance to Masculine Norms scale assesses 11 distinct domains of masculinity, of which only 2 (emotional control and self-reliance) overlap with domains of the PW-SIS.[49]

Direct measurement of stoicism in previous scales has implicitly defined stoicism as a pattern of behaviors, not as an ideology. The pain attitudes questionnaire (PAQ), published in 2001, has a brief subset of questions focused on stoic responses to physical pain.[50-52] The stoicism items in this scale were designed to capture pain coping strategies of chronically ill or injured patients. Of the 29 items in the PAQ, only 2 were explicitly focused on ideology: #2 "When I am in pain I should keep it to myself," and #24 "Pain is something that should be ignored." The 20-item Liverpool Stoicism Scale (LSS) (Table 1) was published in 1995[53] and has not been widely used.[54-57] The majority of items in the LSS focus on behavior or conduct, e.g. "I tend not to express my emotions." However, there are 3 items that are ideological, e.g. "One should keep a 'stiff upper lip'." Both the LSS and the PAQ contain statements that are aphorisms (i.e. "Pain is something that should be ignored") or proverbs (i.e. "A problem shared is a problem halved"). We consider

these formats problematic, because these statements do not refer explicitly to the respondent. Consequently agreement cannot be interpreted as a reflection of self-identity. Furthermore, aphorisms and proverbs may invite endorsement to a great extent simply because of familiarity. In fact, Yong et al found that item #24 "Pain is something that should be ignored" on the PAQ had a low alpha and reduced the internal consistency of their scale.[51]

Strengths of the PW-SIS

Our scale has several strengths. First, all items refer explicitly to the respondent; there are no aphorisms or proverbs. Second, each item refers to an expectation or belief about ideal self-conduct, rather than to a simple description of past behavior. So for example, Q5 states "I expect myself to manage my physical discomfort without complaining" rather than "I always manage my physical discomfort without complaining." This distinction is critical to the theoretical underpinnings of the scale. Thirdly, we deliberately chose not to mention disease or illness in the scale items, so that the scale would be appropriate for a wide range of study populations. (Although some items do explicitly mention "physical pain" and "everyday aches and pains.") Our intention was to capture the respondents' *global* endorsement of stoicism as a *code of ideal conduct*. Finally, the PW-SIS does not reference gender norms, so it can serve as a tool to empirically investigate gender differences in stoic ideology.

Directions for future research

The PW-SIS should be validated in multiple study populations with a range of socioeconomic and demographic characteristics. Our theory that ideologies of stoicism will result in constraints on health-related behaviors needs to be empirically tested, ideally in rigorously designed prospective studies. Hegemonic assumptions about gender and stoicism ("stoic men" and "emotional women") can be empirically investigated using the PW-SIS. Understanding the influences of race, ethnicity, socioeconomic status, religion, and other cultural factors on stoic ideologies may help explain past

research findings on delays in help-seeking. Finally, there may also be positive health consequences of stoic ideologies for individuals, which careful empirical research could also reveal.

Table 1. Pathak-Wieten Stoicism Ideology Scale (PW-SIS)

Please read each statement and choose the answer that best reflects your own views.

Disagree (-2)	Somewhat Disagree (-1)	Not Sure (0)	Somewhat Agree (+1)	Agree (+2)

Item	Domain	Original Item #*
1. I expect myself to hide my aches and pains from others.	Stoic Endurance	Q2
2. I don't believe in talking about my personal problems.	Stoic Taciturnity	Q3
3. I expect myself to manage my physical discomfort without complaining.	Stoic Endurance	Q5
4. I believe I should experience strong emotions. ***[reverse code]***	Stoic Serenity	Q8
5. When the time for my death comes, I believe I should accept it without fear.	Stoic Death Indifference	Q12
6. I expect myself to hide my strong emotions from others.	Stoic Taciturnity	Q13
7. I would prefer to be unemotional.	Stoic Serenity	Q14
8. I expect myself to manage my own problems without help from anyone.	Stoic Taciturnity	Q15
9. I believe my physical pain is best handled by just keeping quiet about it.	Stoic Endurance	Q17
10. I would be very upset if I knew my death was coming soon. ***[reverse code]***	Stoic Death Indifference	Q18
11. I expect myself to avoid feeling intense emotions.	Stoic Serenity	Q20
12. I would not allow myself to be bothered by the fear of death.	Stoic Death Indifference	Q24

* See Table S1 in the Technical Supplement, available online.

Table 2. Conceptual Domains of the Pathak-Wieten Stoicism Ideology Scale

Domain	Mean Score (95% CI)	Cronbach's α	Correlation with ST Score	Correlation with SE Score	Correlation with SS Score	Correlation with SDI Score
Stoic Taciturnity (ST): The belief that one should conceal one's problems and emotions from others (Modern)	-0.08 (-0.18 to +0.02)	0.71	1.00	0.59 p < 0.0001	0.53 p < 0.0001	0.09 p = 0.0729
Stoic Endurance (SE): The belief that one should endure physical suffering without complaining (Modern)	+0.04 (-0.06 to +0.13)	0.65	0.59 p < 0.0001	1.00	0.35 p < 0.0001	0.18 p = 0.0005
Stoic Serenity (SS): The belief that one should refrain from experiencing strong emotions (Classical)	-0.66 (-0.75 to -0.56)	0.64	0.53 p < 0.0001	0.35 p < 0.0001	1.00	0.15 p = 0.0031
Stoic Death Indifference (SDI): The belief that one should not fear or avoid death (Classical)	+0.08 (-0.03 to +0.18)	0.69	0.09 p = 0.0729	0.18 p = 0.0005	0.15 p = 0.0031	1.00
Stoicism Ideology Scale (PW-SIS)	-0.16 (-0.22 to -0.09)	0.78	0.79 p < 0.0001	0.74 p < 0.0001	0.72 p < 0.0001	0.53 p < 0.0001

Table 3. Sociodemographic Predictors of a Mean PW-SIS Score in the Top Quartile (> 0.167)

	Odds Ratio (95% CI)	p value
Age 18-24 years	1.00 (referent)	
Age 25-73 years	1.34 (0.76 - 2.35)	n.s.
Men	2.30 (1.44 - 3.68)	< 0.001
Women	1.00 (referent)	
Asian	0.93 (0.38 - 2.25)	n.s
Black	1.55 (0.78 - 3.09)	n.s
Biracial/Other	1.70 (0.66 - 4.34)	n.s
Hispanic	1.88 (0.99 - 3.56)	n.s
Whites	1.00 (referent)	
Born in the USA	1.97 (1.01 - 3.84)	0.048
Born elsewhere	1.00 (referent)	

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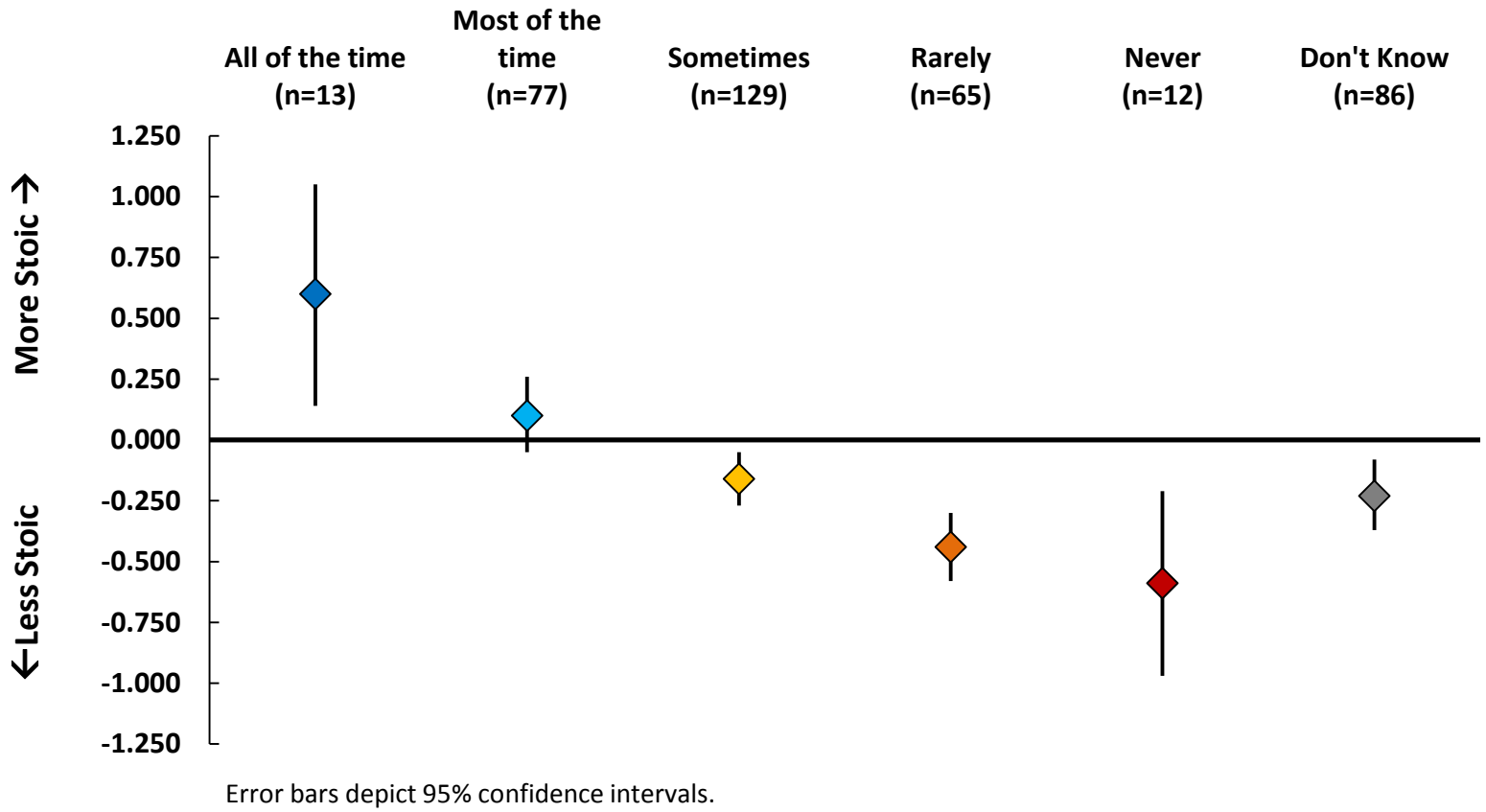
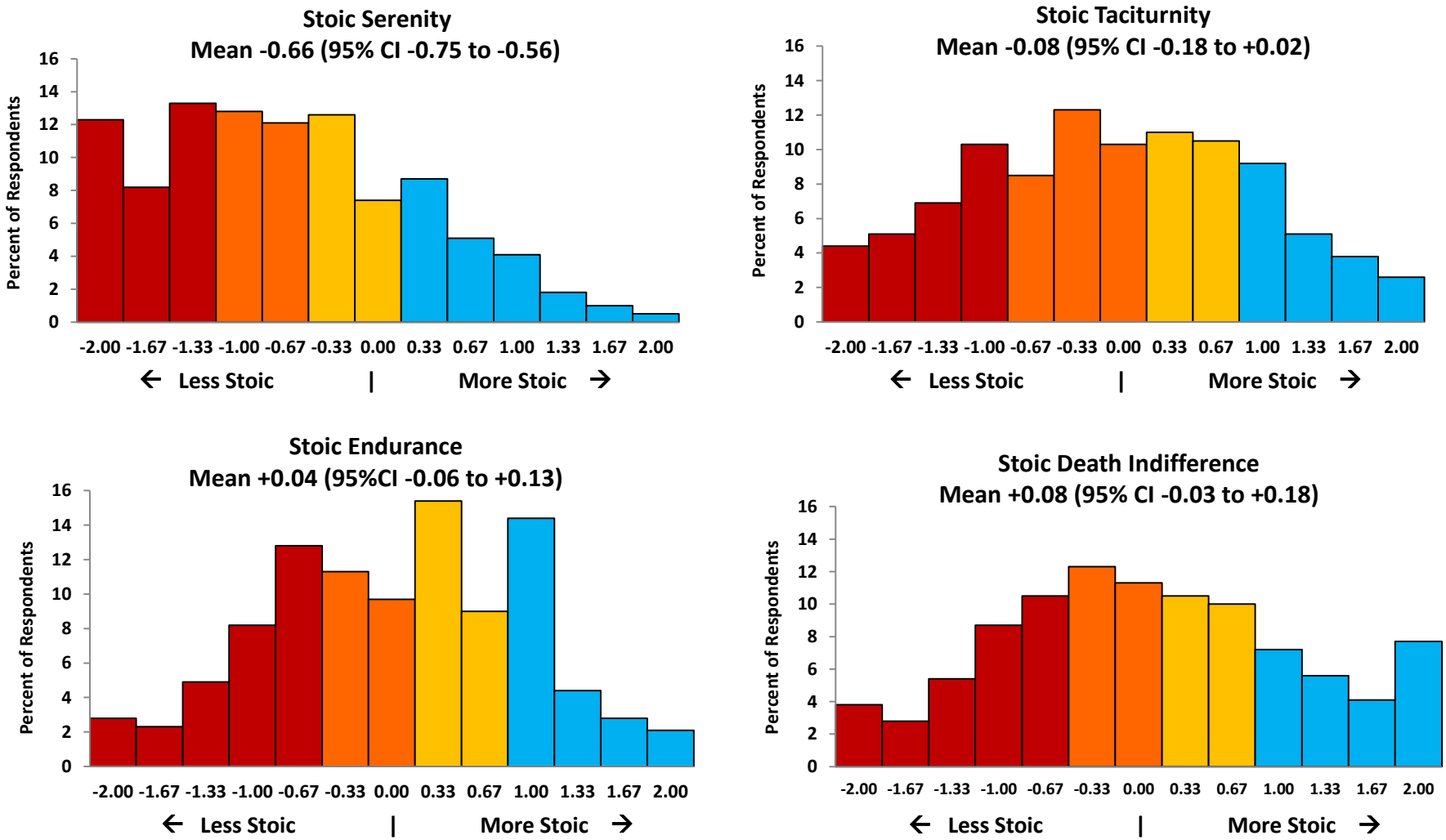
Figure 1.
Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"



Error bars depict 95% confidence intervals.

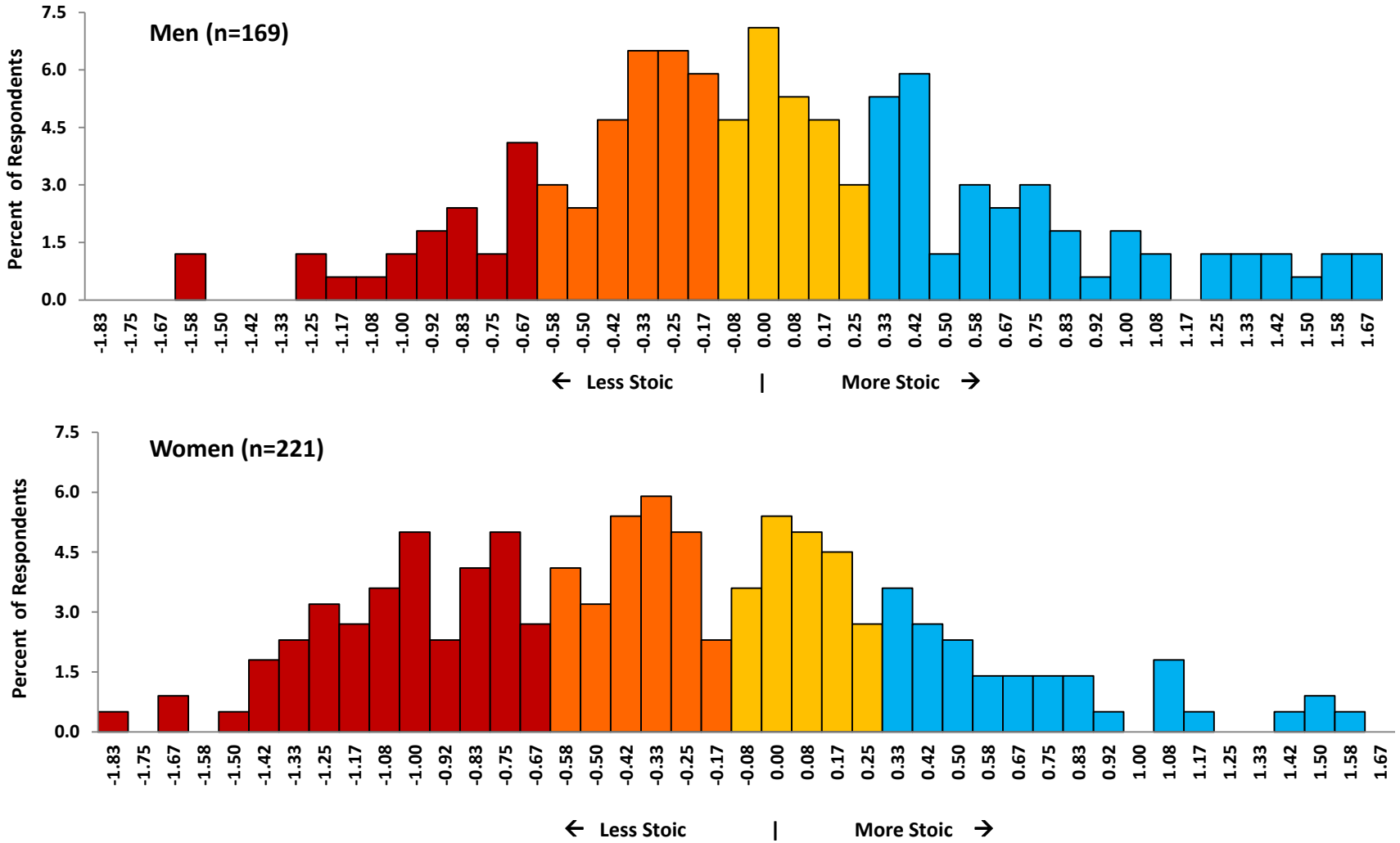
Figure 2.

Pathak-Wieten Stoicism Ideology Scale: Distribution of Mean Scores by Domain



Red = Quartile 1 **Orange** = Quartile 2 **Yellow** = Quartile 3 **Blue** = Quartile 4

Figure 3.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Mean Scores by Gender



Red = Quartile 1 **Orange** = Quartile 2 **Yellow** = Quartile 3 **Blue** = Quartile 4

Pathak Stoicism Paper

Technical Supplement

Scale items under each of the 5 domains along with response frequencies for the preliminary 24-item PW-SIS are shown in Table S1. The results of the assessment of redundancy and content validity (Step 1) are shown in Table S2. We dropped 2 items (Q1 and Q4) because they were highly correlated with other items. The entire Stoic Composure domain, with 4 questions, was dropped after consideration of content validity. At every level of response to the statement "I try to be a stoic," from "never" to all "all the time," responses to the 4 Stoic Composure items were highly pro-stoic. Furthermore, the overall response distributions for 3 of the 4 items (Q10, Q21, and Q22) were highly skewed, with only 7%, 4%, and 3% disagreeing with these statements (Table S1). There were no other items in the scale that resulted in such highly skewed response distributions. We concluded that this domain was referencing a strongly sanctioned social norm, and that while the items were not explicitly worded as aphorisms, they might be functioning in the same way. Some respondents may have been inhibited to admit that they did not believe that they should stay cool in an emergency, if they perceived that a strong socio-cultural norm existed. Interestingly, the only reverse-coded item under this domain, Q16: "I believe it's okay to let myself get upset and distracted in a major crisis," elicited a less skewed response, although the majority of respondents still disagreed with this statement. Given that there was only a single item which performed marginally well, we decided to drop the entire domain.

Confirmatory factor analysis of the reduced 18-item, 4-domain PW-SIS resulted in strong factor loadings for 16 of the 18 items (Table S2), and decent model fit statistics (Table S3). Both items which were dropped (Q23 and Q6) were reverse-code items. Removal of these 2 items resulted in slightly improved model fit statistics (Table S3) when the CFA was re-run on the remaining 16 items.

As shown in Table S2, the 16-item scale retained 6 items for Stoic Taciturnity, 4 items for Stoic Endurance, 3 items for Stoic Serenity, and 3 items for Stoic Death Indifference. In the interest of parsimony, we decided to remove an additional 4 items, so that the final scale would retain 3 items for each of the 4 domains. We dropped 3 items from Stoic Taciturnity (Q7, Q9, and Q19), and 1 item from Stoic Endurance (Q11) - all with the lowest

factor loadings, and all reverse-code items. Factor loadings for the remaining 12 items changed little in the final CFA model (Table S2), but model fit statistics improved so that the final RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96, and Tucker-Lewis Index = 0.93.

Table S1. Preliminary Pathak-Wieten Stoicism Ideology Scale: Domains, Item Content, and Response Frequencies (n=390)						
Original Item #	Core Meaning / Scale Items	Disagree (-2)	Somewhat Disagree (-1)	Not sure (0)	Somewhat Agree (+1)	Agree (+2)
	Stoic Taciturnity: The belief that one should conceal one's problems and emotions from others (Modern)					
Q1	I prefer to keep my intense feelings to myself.	10%	17%	6%	40%	27%
Q3	I don't believe in talking about my personal problems.	23%	31%	14%	26%	6%
Q7	I believe it's fine if I cry openly in front of other people. *(reverse)*	31%	28%	12%	18%	11%
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*	3%	12%	14%	37%	33%
Q13	I expect myself to hide my strong emotions from others.	13%	23%	19%	32%	13%
Q15	I expect myself to manage my own problems without help from anyone.	16%	24%	13%	34%	13%
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*	16%	25%	23%	27%	8%
	Stoic Endurance: The belief that one should endure physical suffering without complaining (Modern)					
Q2	I expect myself to hide my aches and pains from others.	8%	24%	12%	41%	15%
Q4	I don't believe in bothering people close to me with my aches and pains.	20%	27%	14%	27%	12%
Q5	I expect myself to manage my physical discomfort without complaining.	9%	18%	14%	44%	16%
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*	5%	9%	16%	37%	33%
Q17	I believe my physical pain is best handled by just keeping quiet about it.	29%	29%	22%	15%	5%
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*	39%	32%	16%	11%	3%
	Stoic Composure: The belief that one should control one's emotions and behavior under stress (Modern)					
Q10	I expect myself to remain calm and decisive in an emergency.	2%	5%	11%	29%	54%
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	29%	25%	19%	19%	7%
Q21	I believe I should be calm and level-headed.	2%	2%	5%	35%	56%
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	1%	2%	8%	36%	54%
	Stoic Serenity: The belief that one should refrain from experiencing strong emotions (Classical)					
Q8	I believe I should experience strong emotions. *(reverse)*	4%	8%	21%	33%	34%
Q14	I would prefer to be unemotional.	37%	20%	17%	14%	11%
Q20	I expect myself to avoid feeling intense emotions.	25%	31%	19%	19%	5%
	Stoic Death Indifference: The belief that one should not fear or avoid death (Classical)					
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*	25%	16%	24%	19%	17%
Q12	When the time for my death comes, I believe I should accept it without fear.	8%	12%	20%	21%	39%
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*	13%	6%	22%	21%	39%
Q24	I would not allow myself to be bothered by the fear of death.	14%	19%	26%	17%	24%

Table S2. Confirmatory Factor Analysis and Item Reduction (n=390)					
Item	**Core Meaning / Scale Items**	**Step 1: Assessment of Redundancy and Content Validity**	**Step 2: CFA of 4-Domain, 18-Item Scale**	**Step 3: CFA of 4-Domain, 16-Item Scale**	**Step 4: CFA of 4-Domain, 12-Item Final Scale**
	Stoic Taciturnity		factor loadings	factor loadings	factor loadings
Q1	I prefer to keep my intense feelings to myself.	Redundant to Q13 (r = 0.54)			
Q3	I don't believe in talking about my personal problems.		0.66	0.67	0.67
Q7	I believe it's fine if I cry openly in front of other people.*(reverse)*		0.46	0.46[a]	
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*		0.55	0.55[a]	
Q13	I expect myself to hide my strong emotions from others.		0.75	0.75	0.73
Q15	I expect myself to manage my own problems without help from anyone.		0.61	0.61	0.62
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*		0.49	0.48[a]	
	Stoic Endurance				
Q2	I expect myself to hide my aches and pains from others.		0.65	0.65	0.68
Q4	I don't believe in bothering people close to me with my aches and pains.	Redundant to Q3 (r = 0.57)			
Q5	I expect myself to manage my physical discomfort without complaining.		0.57	0.56	0.55
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*		0.54	0.55[a]	
Q17	I believe my physical pain is best handled by just keeping quiet about it.		0.62	0.62	0.61
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*		0.26[b]		
	Stoic Composure				
Q10	I expect myself to remain calm and decisive in an emergency.	Domain excluded[c]			
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	Domain excluded[c]			
Q21	I believe I should be calm and level-headed.	Domain excluded[c]			
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	Domain excluded[c]			
	Stoic Serenity				
Q8	I believe I should experience strong emotions. *(reverse)*		0.51	0.51	0.48
Q14	I would prefer to be unemotional.		0.70	0.70	0.71
Q20	I expect myself to avoid feeling intense emotions.		0.62	0.62	0.63
	Stoic Death Indifference				
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*		0.27[b]		
Q12	When the time for my death comes, I believe I should accept it without fear.		0.61	0.62	0.63
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*		0.57	0.57	0.57
Q24	I would not allow myself to be bothered by the fear of death.		0.78	0.76	0.76

Footnotes: [a] = Excluded for parsimony; [b] = Excluded for poor factor loading; [c] = Excluded for poor content validity and highly skewed response distribution.

Table S3. Model Fit Statistics for Confirmatory Factor Analysis of the PW-SIS

Model	Description	Chi square	df	RMSEA (90% CI)	Goodness-of-fit Index (GFI)	Adjusted GFI	Tucker-Lewis Index
	Step 2: After exclusion of 2 redundant items (q1 and q4) and 4 items from the Stoic Composure domain (q10, q16, q21, q22), confirmatory factor analysis (CFA) was performed on the 4-domain, 18-item PW-SIS.	318 p <.0001	129	0.06 (0.05 to 0.07)	0.91	0.89	0.86
	Step 3: After exclusion of 2 items with poor factor loading (q6 and q23), CFA was performed on the 4-domain, 16-item PW-SIS.	264 p <.0001	98	0.07 (0.06 to 0.08)	0.92	0.89	0.89
Final	**Step 4:** Factor loadings from Step 3 were examined, and for the purpose of parsimony, 4 additional items were excluded (q7, q9, q11, q19). Items with the strongest factor loadings in each domain were retained. The resulting 4-domain, 12-item PW-SIS has 3 items in each of the 4 domains.	103 p <.0001	48	0.05 (0.04 to 0.07)	0.96	0.93	0.93

BMJ Open

Stoic Beliefs and Health: Development and Preliminary Validation of the Pathak-Wieten Stoicism Ideology Scale

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015137.R1
Article Type:	Research
Date Submitted by the Author:	04-Jul-2017
Complete List of Authors:	Pathak, Elizabeth; University of South Florida, Morsani College of Medicine Wieten, Sarah; University of South Florida, Department of Philosophy and Morsani College of Medicine Wheldon, Christopher W.; University of South Florida, Department of Community and Family Health
Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Epidemiology, Health services research, Research methods, Public health
Keywords:	stoicism, help-seeking, health behavior theories, masculinity, patient perspectives, gender

Stoic Beliefs and Health:

Development and Preliminary Validation of the

Pathak-Wieten Stoicism Ideology Scale

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Acknowledgements: The authors are grateful to the respondents for their voluntary participation in this study.

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Funding: This study was unfunded.

Competing Interests: The authors have no competing interests.

Data Sharing: No additional data available.

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ABSTRACT

Introduction: We developed and validated a new parsimonious scale to measure stoic beliefs. Key domains of stoicism are imperviousness to strong emotions, indifference to death, taciturnity, and self-sufficiency. In the context of illness and disease, a personal ideology of stoicism may create an internal resistance to objective needs, which can lead to negative consequences. Stoicism has been linked to help-seeking delays, inadequate pain treatment, caregiver strain, and suicide after economic stress.

Methods: During 2013-2014, 390 adults aged 18+ years completed a brief anonymous paper questionnaire containing the preliminary 24-item Pathak-Wieten Stoicism Ideology Scale (PW-SIS). Confirmatory factor analysis (CFA) was used to test an *a priori* multi-domain theoretical model. Content validity and response distributions were examined. Socio-demographic predictors of strong endorsement of stoicism were explored with logistic regression.

Results: The final PW-SIS contains 4 conceptual domains and 12 items. CFA showed very good model fit: RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93. Cronbach's alpha was 0.78 and ranged from 0.64 to 0.71 for the sub-scales. Content validity analysis showed a statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest PW-SIS scores. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

Discussion: The PW-SIS is a valid and theoretically coherent scale which is brief and practical for integration into a wide range of health behavior and outcomes research studies.

Strengths and Limitations

- The Pathak-Wieten Stoicism Ideology Scale (PW-SIS) is a new, theoretically coherent, multi-dimensional scale which measures stoic beliefs and sense of self along 4 domains: Stoic Taciturnity, Stoic Endurance, Stoic Serenity, and Stoic Death Indifference.
- The PW-SIS contains 12 items and demonstrates good psychometric properties and content validity in a large sample (n=390) of educated adults.
- Mean stoicism ideology scores were higher for men than women, but for both genders the most frequent scores were neutral on stoic ideology, and the response distributions by gender overlapped almost completely.
- Further validation of the PW-SIS in demographically and socioeconomically diverse populations will improve its generalizability.

INTRODUCTION

Stoicism is a school of philosophy which originated in ancient Greece.[1-3] Core elements in the classical definition of stoicism were an idealization of imperviousness to strong emotions, and an indifference to death.[3] Major Asian philosophical systems of thought, such as Buddhism and Confucianism, also endorsed stoic principles and teachings.[4,5] Beginning in the 19th century, academic and popular philosophers in Europe and the Americas were exposed to and influenced by Asian philosophy and religion. Therefore, it may not always be possible to distinguish whether particular strands of contemporary thought associated with stoicism originated in ancient Greece, ancient India, or elsewhere. For example, using very different language and symbolism, both the Greek Stoics and the Buddha exhorted the student to live fully and completely in the present, while minimizing concern about the future.

Contemporary meanings and connotations of stoicism have expanded beyond their ancient origins, to include ideals of taciturnity and self-sufficiency.[6-8] Today, personal ideologies, values and behaviors which fall under the umbrella of stoicism are commonplace across many industrial nations, and are evident in many non-Western cultures as well.[9-12] In the USA, the armed forces have explicitly embraced stoic ideology as a tool for mitigating combat stress.[13,14]

Previous Research on Stoicism and Health

Much of the previous health-related research which mentions stoicism has invoked the term as a descriptor of particular patient groups or behaviors, without an explicit theoretical context.[8] Stoicism is mentioned most frequently in studies related to pain (particularly cancer pain) and coping strategies; indeed stoicism has been labeled a "coping strategy" in more than one study.[6-8,15,16] Stoicism has also been invoked as a defining characteristic of masculinity and as a key explanatory factor for certain health behaviors and outcomes among men. There are several psychometric instruments that measure endorsement or adherence to social norms of masculinity, but these scales include only a few items which explicitly assess stoicism.[17-19]

Direct measurement of stoicism in previous health-related scales has implicitly defined stoicism as a pattern of behaviors, not as an ideology. The pain attitudes questionnaire (PAQ), published in 2001, has a brief

subset of questions focused on stoic responses to physical pain.[20-22] The stoicism items in this scale were designed to capture pain coping strategies of chronically ill or injured patients. Of the 29 items in the PAQ, most measured past actions (i.e. pattern of behavior) and only 2 were explicitly focused on ideology: #2 "When I am in pain I should keep it to myself," and #24 "Pain is something that should be ignored." The 20-item Liverpool Stoicism Scale (LSS) (Table 1) was first published in 1995[23] and has not been widely used.[24-27] The majority of items in the LSS focus on behavior or conduct, e.g. "I tend not to express my emotions." However, there are 3 items that are ideological, e.g. "One should keep a 'stiff upper lip'." Both the LSS and the PAQ contain statements that are aphorisms (i.e. "Pain is something that should be ignored") or proverbs (i.e. "A problem shared is a problem halved"). We consider these formats problematic, because these statements do not refer explicitly to the respondent. Consequently agreement cannot be interpreted as a reflection of self-identity. Furthermore, aphorisms and proverbs may invite endorsement to a great extent simply because of familiarity. In fact, Yong et al found that item #24 "Pain is something that should be ignored" on the PAQ had a low alpha and reduced the internal consistency of their scale.[21]

Theoretical Context

In 1983, Kathy Charmaz published a very influential sociological study on the "loss of self" suffered by people with chronic illnesses.[28] Although stoicism *per se* was mentioned only briefly, the idea that the suffering caused by disease emerges as much (or more) from threats to a person's identity and sense of self as from purely bodily experiences of pathophysiology is one of the theoretical underpinnings of our work.

In this report, we attempt to articulate an explicit theory of stoicism and its potential impact on health. We take the standpoint that stoicism is a system for self-regulation rather than a behavior or personality trait. As a guide to ideal self-conduct, it requires self-conscious implementation and regular enforcement; in other words, stoicism is an ideology (e.g. a belief system which informs one's attitudes and actions with the inherent potential for internal resistance and conflict). Personal ideologies create expectations for people about who they are, what they should do, and what they should not do. Specifically, we theorize that people who strongly endorse a **personal ideology of stoicism** will be more likely to avoid or delay seeking professional medical intervention for

serious signs and symptoms of disease. This personal ideology of self will not mandate behavior in a deterministic fashion; rather, stoicism will create expectations of ideal behavior (which may not always be met).

The purpose of our study was to develop a theoretically coherent multi-dimensional scale to assess endorsement of a personal ideology of stoicism, and to empirically validate this scale in a multiethnic sample of healthy community-dwelling adults. We present the results of confirmatory factor analysis of the multi-domain Pathak-Wieten Stoicism Ideology Scale (PW-SIS), and discuss the potential usefulness of this tool for predicting constraints in health-related help-seeking behaviors. The PW-SIS is a generalized scale which assesses stoic beliefs and sense of self but does not explicitly measure health behaviors or health outcomes. Therefore the PW-SIS can be used in a wide range of empirical research studies.

METHODS

Conceptual Development of the Stoicism Ideology Scale

Drawing on multiple scholarly and popular sources,[1-3,6,15,29-31] we developed the preliminary 24-item Stoicism Ideology Scale (PW-SIS) to capture endorsement of 5 dimensions of stoicism (see Table S1 in the Technical Supplement, available online). Based on our literature review and expert (SW) knowledge of philosophy, we defined each domain as follows:

Stoic Taciturnity is the belief that one should conceal one's problems and emotions from others.
Stoic Endurance is the belief that one should endure physical suffering without complaining.
Stoic Composure is the belief that one should control one's emotions and behavior under stress.
Stoic Serenity is the belief that one should refrain from experiencing strong emotions.
Stoic Death Indifference is the belief that one should not fear or avoid death.

Each item in our scale was carefully worded to capture the respondents' ideology, not their past behavior, using a 5-point Likert response scale with the following responses: "disagree," "somewhat disagree," "not sure," "somewhat agree," and "agree." Nine of the original 24 items were "reverse" items that specified anti-stoic beliefs, i.e. "I believe I should experience strong emotions." The participant version of the scale (pen and paper questionnaire) listed response codes of 0 (disagree) through 4 (agree). These responses were re-coded during analysis to range from -2 (disagree) to +2 (agree). Consequently an average score of 0 corresponds to a neutral

stance – neither endorsement nor rejection of stoicism. Positive scores indicate endorsement of a stoic ideology, while negative scores indicate rejection of a stoic ideology.

Data Collection

This study was approved by the Institutional Review Board (IRB) of the University of South Florida. Data were collected over a period of 10 months during 2013-2014. All participants were university employees or students. Written consent forms were waived by the IRB to ensure respondent anonymity but all participants provided verbal informed consent. Each participant completed a brief paper-and-pencil questionnaire consisting of the 24-item preliminary PW-SIS, socio-demographic questions, and a final single item "I try to be a stoic" with a 7-item response scale ranging from "never" to "all the time." The study population consisted of a convenience sample of 390 adults aged 18 years and older who were recruited in person by the authors in public common areas of university facilities (e.g. cafeterias), using walk-up tables. Monetary incentives were not provided to participants. A study response rate could not be calculated due to the data collection methods.

Data Analyses

Data analysis proceeded in 5 steps. During Step 1, we examined univariate response distributions for each of the 24 scale items. A simple correlation matrix was examined to identify redundant items. Finally, we assessed content validity based on agreement with the statement "I try to be a stoic." As a result of Step 1 analyses, 6 items were dropped from further analyses - including the entire Stoic Composure domain. Further details of this scale reduction step are included in the Technical Supplement, including Table S2.

During Step 2, we conducted a confirmatory factor analysis (CFA) of the reduced 18-item PW-SIS. CFA is the appropriate analytic choice to test scales that have an *a priori*, theoretically explicit sub-domain structure.[32-36] We used *proc calis* in SAS 9.4 for the CFA. Based on the results of the first CFA, we eliminated 2 items with poor factor loadings (see Technical Supplement for details).

During Step 3, we repeated the CFA on the reduced 16-item PW-SIS. Finally, for the purpose of parsimony we further reduced the total number of scale items to 12 (3 items in each of 4 domains) and conducted a CFA on

the final 12-item version of the PW-SIS (Step 4; see Table S3). Additional details and rationale for analytic Steps 1-4, including data tables S1-S3, are provided in the Technical Supplement, available online.

Step 5 of our analysis consisted of preliminary content validation, examination of response distributions for the overall and domain scores, and exploratory logistic regression modeling of socio-demographic predictors of strong endorsement of stoicism. For the logistic regression analysis, we categorized the outcome using the top quartile of the overall distribution of responses to represent strong endorsement of stoicism.

RESULTS

The size of our study population (n=390) provided more than 15 respondents for each question in the preliminary scale, which exceeds the widely accepted norm of at least 10 respondents per question.[37] Although skewed toward younger adults (78% of respondents were < 25 years old), the study population was in other respects diverse (Table 1). A majority self-identified as female (57%) and white (55%). Hispanics (15%) and Blacks (14%) were the second and third largest racial/ethnic groups, followed by Asians (9%) and biracial or other ethnicity (6%). A substantial minority of respondents (19%) were born outside the U.S or Puerto Rico.

The final 4-domain, 12-item Pathak-Wieten Stoicism Ideology Scale is shown in Table 2. Confirmatory factor analysis of the final scale showed very good model fit with individual item factor loadings ranging from 0.48 to 0.76, RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93.

Relationships among the PW-SIS and its four conceptual domains are shown in Table 3. Cronbach's alpha ranged from 0.64 to 0.71 for the sub-scales and was 0.78 for the 12-item PW-SIS. Scores for Stoic Taciturnity were strongly correlated with scores for both Stoic Endurance and Stoic Serenity, but Stoic Endurance and Stoic Serenity were not highly correlated with each other. Stoic Death Indifference had the highest (most stoic) mean scores among the four domains, and it was least correlated with the other three domains.

Figure 1 depicts mean PW-SIS scores by response to the statement "I try to be a stoic." There was a clear monotonic and statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest stoicism scores, and respondents who reported trying to be a stoic "never" having the lowest

stoicism scores. Most respondents chose one of the 3 intermediate categories. Respondents who chose "I don't know" as their response had stoicism scores similar to those who said they "sometimes" tried to be a stoic.

The distributions of mean scores for the 4 conceptual domain sub-scales are shown in Figure 2. Domain scores are comprised of the mean score for the 3 questions in the domain. In this study population, respondents were least likely to endorse Stoic Serenity and most likely to endorse Stoic Death Indifference.

The full distribution of respondent scores is shown separately for women and men in Figure 3. The distributions overlapped almost completely, but there were no men with the least stoic scores, and no women with the most stoic scores. Response distributions were skewed to the left for women (less stoic) and to the right for men (more stoic), consistent with a statistically significant difference in the mean scores for women (-0.31, 95% CI -0.40 to -0.22) and men (+0.04, 95% CI -0.05 to +0.14).

Results of an exploratory analysis of sociodemographic predictors of high endorsement of stoicism are shown in Table 4. There is no *a priori* cut point designated as "highly stoic" in the PW-SIS; in this analysis the cut point used was a mean score greater than the 75th percentile of the overall response distribution. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Adults born in the USA or Puerto Rico were also twice as likely as adults born elsewhere to strongly endorse stoicism (OR=1.97, 95% CI 1.01 to 3.84, p=0.048). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

DISCUSSION

The Pathak-Wieten Stoicism Ideology Scale is a theoretically coherent, multi-dimensional scale which demonstrates good psychometric properties and content validity based on initial validation in a large sample of educated adults. The PW-SIS is also brief and practical for integration into a wide range of empirical research studies. In our study population of mostly younger adults, endorsement of stoicism varied by conceptual domain, with the weakest endorsement of the classical domain Stoic Serenity (aversion to strong emotions). Exploratory logistic regression analysis identified male gender and USA birth as significant predictors of strong endorsement of

stoicism. Finally, point estimates suggested higher endorsement of stoicism for Blacks, Hispanics, and Biracial persons compared with Whites, but these results were not statistically significant.

Integration of our theory of a stoic ideology of the self into existing health behavior models could help explain the formation of beliefs and attitudes toward criterion-specific help-seeking behaviors. Reasoned action approaches - such as the Integrative Model of Behavior Prediction - poorly define background factors that underlie belief formation.[38] Measurement of self-concepts, such as stoicism ideologies, may help explain this population variability. Expanding health behavior theory to include aspects of the self could also help inform health education messaging and risk-based communication.

Ironically, a personal ideology of stoicism almost guarantees failure to live up to one's personal ideal. Experiences of illness and disease often involve transient weakness and functional limitations. With aging, these experiences will increase in frequency, duration, and severity for most people. Simply put, experiences of illness and disease tend to require aid – whether from health professionals in a formal context, or from family members or friends in an informal context. An ideology of stoicism creates an internal resistance to external objective needs, which can lead to negative consequences.[8-12]

Gender and Stoicism

Stoicism is widely viewed as a defining attribute of masculinity. Instruments designed to assess endorsement of hegemonic masculine ideologies have included specific questions that touch on stoicism. However, the conceptual and measurement overlap between these instruments and the 4-domain PW-SIS is minor.[17] For example, in the widely used Personal Attributes Questionnaire, only 2 of 24 items relate to a single domain of the PW-SIS. The Conformance to Masculine Norms scale assesses 11 distinct domains of masculinity, of which only 2 (emotional control and self-reliance) partially overlap with domains of the PW-SIS.[18,19] In our study, the results are notable because for both genders the most frequent scores were in the middle of the distribution (neutral on stoic ideology), and the response distributions for women and men overlapped almost completely. Despite the fact that men were twice as likely as women to strongly endorse stoic ideology, our results suggest that gendered stereotypes about stoicism ("stoic men" and "emotional women") are overblown. Because the PW-

SIS is agnostic to respondents' genders, it is ideally suited to investigate the empirical reality of stoicism among both women and men. Furthermore, our finding that a minority of women strongly endorsed stoic ideology may be particularly important. For example, a study of major strain among family caretakers of elderly dementia patients found that those who used stoicism as a coping strategy suffered burnout, while those who sought social support did not.[39]

Study Limitations

In any questionnaire-based scale, validity of the individual items and the total scale against the concept of interest is of paramount concern. Unlike many psychometric instruments, the PW-SIS does not purport to measure a latent, inherent trait such as personality, or a clinically-definable disorder such as depression or anxiety. Rather, we attempt to measure an explicit set of beliefs, which by definition are neither inborn nor immutable. Therefore, a robust assessment of the content validity of our scale items must come after publication and evaluation by multiple experts and researchers. We included a single questionnaire item "I try to be a stoic" to assess content validity, but future validation and outcome studies could expand on this approach or include a qualitative component.

A related question pertains to the predictive validity of the PW-SIS. In other words, to what extent does strong endorsement of stoic ideology predict actual stoic behaviors? Predictive validity can only be rigorously addressed through prospective study designs.

Our study population, similar to many scale validation studies, was university-based. Therefore validity and generalizability to very different populations should not be assumed, but instead tested in future studies. In particular, validation of the PW-SIS among the elderly and persons of lower educational attainment would be valuable for health-related research.

Strengths of the PW-SIS

Our scale has several strengths. First, all items refer explicitly to the respondent; there are no aphorisms or proverbs. Second, each item refers to an expectation or belief about ideal self-conduct, rather than to a simple description of past behavior. So for example, Q5 states "I expect myself to manage my physical discomfort

without complaining" rather than "I always manage my physical discomfort without complaining." This distinction is critical to the theoretical underpinnings of the scale. Thirdly, we deliberately chose not to mention disease or illness in the scale items, so that the scale would be appropriate for a wide range of study populations, including currently healthy individuals. (Although some items do explicitly mention "physical pain" and "everyday aches and pains.") Our intention was to capture the respondents' *global* endorsement of stoicism as a *code of ideal conduct*. Finally, the PW-SIS does not reference gender norms, so it can serve as a tool to empirically investigate gender differences in stoic ideology.

Directions for future research

The PW-SIS should be validated in multiple study populations with a range of socioeconomic and demographic characteristics. Our theory that ideologies of stoicism will result in constraints on health-related behaviors needs to be empirically tested, ideally in rigorously designed prospective studies. Given the rise of patient-centered health care,[40,41] understanding patients' motivations and perspectives has never been more important. The current health education paradigm holds that improving patients' knowledge of symptoms and signs will result in more timely help-seeking behavior.[38,42-44] Each year thousands of individuals suffer needlessly and many die because of extended delays in seeking professional aid for acute medical conditions (e.g., myocardial infarctions, strokes, diabetic emergencies, cancer complications and pain, and acute exacerbations of congestive heart failure).[45-52] Numerous studies have been conducted to attempt to elucidate the reasons behind patient delays,[46-51,53] with the ultimate goal of designing education programs and interventions that will result in timely help-seeking. Significant risk factors for help-seeking reluctance have been identified (e.g. Black race[52,54,55]) but much of the variation remains unexplained and we still lack a complete understanding of *why* certain patients and not others delay seeking aid.

A distinction of our theory is movement of the focus of inquiry away from the disease and the patient's relationship to the disease (e.g. health knowledge, symptom awareness, ability to comply with self-care regimens) and onto **patients' sense of self** – their self-concepts and self-identity.[56] We hypothesize that illness behaviors may become "noncompliant" or "irrational" or "self-harming" when specific courses of action would create an

internal conflict with patients' ideas of **who they are.** Specifically, we posit that people who strongly believe that they should manage their problems on their own, not show emotions, and not complain about physical discomfort will experience an internal cognitive conflict when faced with a situation that could require help from others. This internal conflict will lead to delays in or avoidance of help-seeking, with potentially life-threatening consequences. For example, empirical studies of increasing rates of male suicide in rural Australia have identified hegemonic masculine norms of stoicism as an important causal factor in the context of severe economic stress.[57,58] Understanding the influences of race, ethnicity, socioeconomic status, religion, and other cultural factors on stoic ideologies may help explain past research findings on delays in help-seeking. Finally, there may also be positive health consequences of stoic ideologies for individuals,[15] which careful prospective research could confirm.

FIGURE LEGENDS

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

Table 1. Characteristics of the Study Population (n=390)

	Number	Percent
Age		
18 – 24 years	303	77.7
25 + years	87	22.3
Gender		
Female	221	56.7
Male	169	43.3
Race and Ethnicity		
White	215	55.1
Black	55	14.1
Hispanic	59	15.1
Asian	36	9.2
Biracial/Other	25	6.4
Nativity		
USA (inc. Puerto Rico)	315	80.8
Other	75	19.2

Table 2. Pathak-Wieten Stoicism Ideology Scale (PW-SIS)

Please read each statement and choose the answer that best reflects your own views.

Disagree	Somewhat Disagree	Not Sure	Somewhat Agree	Agree

Item	Domain	Original Item #*
1. I expect myself to hide my aches and pains from others.	Stoic Endurance	Q2
2. I don't believe in talking about my personal problems.	Stoic Taciturnity	Q3
3. I expect myself to manage my physical discomfort without complaining.	Stoic Endurance	Q5
4. I believe I should experience strong emotions. ***[reverse code]***	Stoic Serenity	Q8
5. When the time for my death comes, I believe I should accept it without fear.	Stoic Death Indifference	Q12
6. I expect myself to hide my strong emotions from others.	Stoic Taciturnity	Q13
7. I would prefer to be unemotional.	Stoic Serenity	Q14
8. I expect myself to manage my own problems without help from anyone.	Stoic Taciturnity	Q15
9. I believe my physical pain is best handled by just keeping quiet about it.	Stoic Endurance	Q17
10. I would be very upset if I knew my death was coming soon. ***[reverse code]***	Stoic Death Indifference	Q18
11. I expect myself to avoid feeling intense emotions.	Stoic Serenity	Q20
12. I would not allow myself to be bothered by the fear of death.	Stoic Death Indifference	Q24

See Methods for scoring instructions

* See Table S1 in the Technical Supplement, available online.

Table 3. Conceptual Domains of the Pathak-Wieten Stoicism Ideology Scale

Domain	Mean Score (95% CI)	Cronbach's α	Correlation with ST Score	Correlation with SE Score	Correlation with SS Score	Correlation with SDI Score
Stoic Taciturnity (ST): The belief that one should conceal one's problems and emotions from others (Modern)	-0.08 (-0.18 to +0.02)	0.71	1.00	0.59 p < 0.0001	0.53 p < 0.0001	0.09 p = 0.0729
Stoic Endurance (SE): The belief that one should endure physical suffering without complaining (Modern)	+0.04 (-0.06 to +0.13)	0.65	0.59 p < 0.0001	1.00	0.35 p < 0.0001	0.18 p = 0.0005
Stoic Serenity (SS): The belief that one should refrain from experiencing strong emotions (Classical)	-0.66 (-0.75 to -0.56)	0.64	0.53 p < 0.0001	0.35 p < 0.0001	1.00	0.15 p = 0.0031
Stoic Death Indifference (SDI): The belief that one should not fear or avoid death (Classical)	+0.08 (-0.03 to +0.18)	0.69	0.09 p = 0.0729	0.18 p = 0.0005	0.15 p = 0.0031	1.00
Stoicism Ideology Scale (PW-SIS)	-0.16 (-0.22 to -0.09)	0.78	0.79 p < 0.0001	0.74 p < 0.0001	0.72 p < 0.0001	0.53 p < 0.0001

Table 4. Sociodemographic Predictors of a Mean PW-SIS Score in the Top Quartile (> 0.167)

	Odds Ratio (95% CI)	p value
Age 18-24 years	1.00 (referent)	
Age 25-73 years	1.34 (0.76 - 2.35)	n.s.
Men	2.30 (1.44 - 3.68)	< 0.001
Women	1.00 (referent)	
Asian	0.93 (0.38 - 2.25)	n.s
Black	1.55 (0.78 - 3.09)	n.s
Biracial/Other	1.70 (0.66 - 4.34)	n.s
Hispanic	1.88 (0.99 - 3.56)	n.s
Whites	1.00 (referent)	
Born in the USA	1.97 (1.01 - 3.84)	0.048
Born elsewhere	1.00 (referent)	

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Figure 1.
Content Validity of the Pathak-Wieten Stoicism Ideology Scale:
Mean Scores by Response to the Statement "I try to be a stoic"

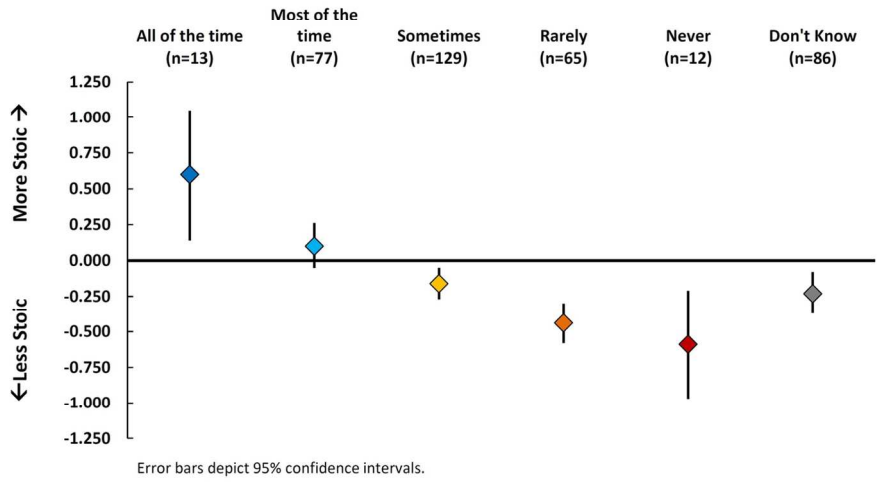

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

130x87mm (300 x 300 DPI)

Figure 2.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

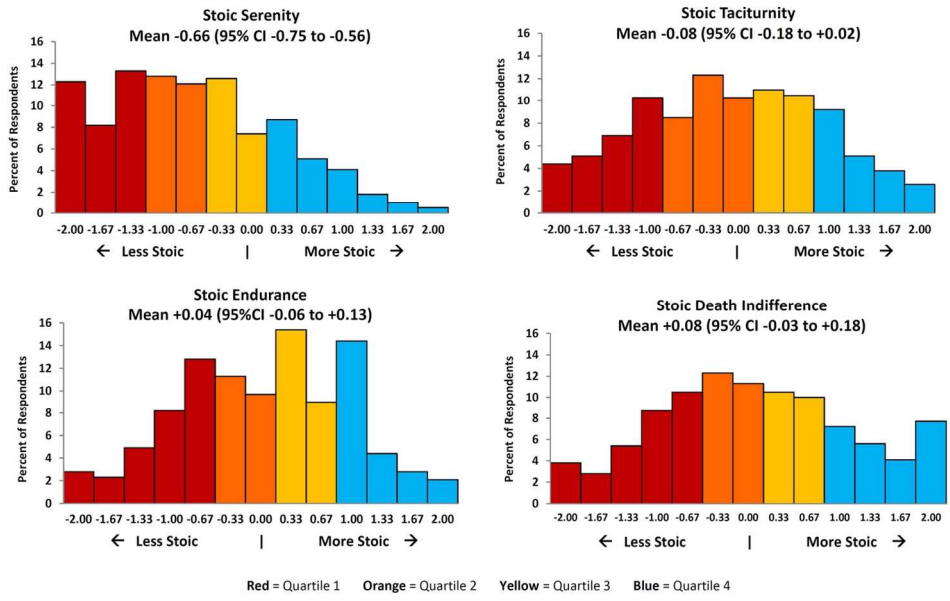

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

139x100mm (300 x 300 DPI)

Figure 3.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

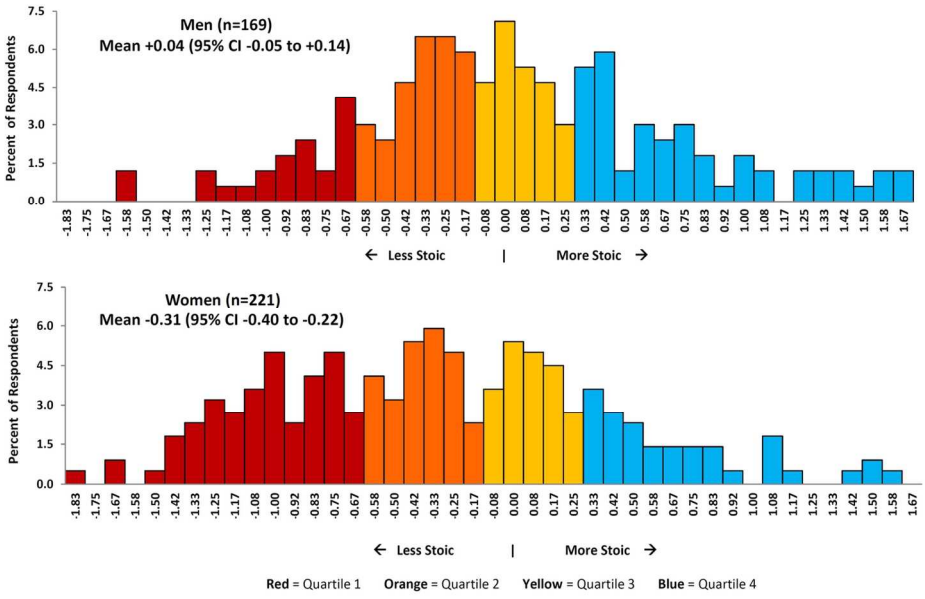

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

142x104mm (300 x 300 DPI)

Pathak Stoicism Paper

Technical Supplement

Scale items under each of the 5 domains along with response frequencies for the preliminary 24-item PW-SIS are shown in Table S1. The results of the assessment of redundancy and content validity (Step 1) are shown in Table S2. We dropped 2 items (Q1 and Q4) because they were highly correlated with other items. The entire Stoic Composure domain, with 4 questions, was dropped after consideration of content validity. At every level of response to the statement "I try to be a stoic," from "never" to all "all the time," responses to the 4 Stoic Composure items were highly pro-stoic. Furthermore, the overall response distributions for 3 of the 4 items (Q10, Q21, and Q22) were highly skewed, with only 7%, 4%, and 3% disagreeing with these statements (Table S1). There were no other items in the scale that resulted in such highly skewed response distributions. We concluded that this domain was referencing a strongly sanctioned social norm, and that while the items were not explicitly worded as aphorisms, they might be functioning in the same way. Some respondents may have been inhibited to admit that they did not believe that they should stay cool in an emergency, if they perceived that a strong socio-cultural norm existed. Interestingly, the only reverse-coded item under this domain, Q16: "I believe it's okay to let myself get upset and distracted in a major crisis," elicited a less skewed response, although the majority of respondents still disagreed with this statement. Given that there was only a single item which performed marginally well, we decided to drop the entire domain.

Confirmatory factor analysis of the reduced 18-item, 4-domain PW-SIS resulted in strong factor loadings for 16 of the 18 items (Table S2), and decent model fit statistics (Table S3). Both items which were dropped (Q23 and Q6) were reverse-code items. Removal of these 2 items resulted in slightly improved model fit statistics (Table S3) when the CFA was re-run on the remaining 16 items.

As shown in Table S2, the 16-item scale retained 6 items for Stoic Taciturnity, 4 items for Stoic Endurance, 3 items for Stoic Serenity, and 3 items for Stoic Death Indifference. In the interest of parsimony, we decided to remove an additional 4 items, so that the final scale would retain 3 items for each of the 4 domains. We dropped 3 items from Stoic Taciturnity (Q7, Q9, and Q19), and 1 item from Stoic Endurance (Q11) - all with the lowest

factor loadings, and all reverse-code items. Factor loadings for the remaining 12 items changed little in the final CFA model (Table S2), but model fit statistics improved so that the final RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96, and Tucker-Lewis Index = 0.93.

Table S1. Preliminary Pathak-Wieten Stoicism Ideology Scale: Domains, Item Content, and Response Frequencies (n=390)						
Original Item #	Core Meaning / Scale Items	Disagree (-2)	Somewhat Disagree (-1)	Not sure (0)	Somewhat Agree (+1)	Agree (+2)
	Stoic Taciturnity: The belief that one should conceal one's problems and emotions from others (Modern)					
Q1	I prefer to keep my intense feelings to myself.	10%	17%	6%	40%	27%
Q3	I don't believe in talking about my personal problems.	23%	31%	14%	26%	6%
Q7	I believe it's fine if I cry openly in front of other people. *(reverse)*	31%	28%	12%	18%	11%
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*	3%	12%	14%	37%	33%
Q13	I expect myself to hide my strong emotions from others.	13%	23%	19%	32%	13%
Q15	I expect myself to manage my own problems without help from anyone.	16%	24%	13%	34%	13%
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*	16%	25%	23%	27%	8%
	Stoic Endurance: The belief that one should endure physical suffering without complaining (Modern)					
Q2	I expect myself to hide my aches and pains from others.	8%	24%	12%	41%	15%
Q4	I don't believe in bothering people close to me with my aches and pains.	20%	27%	14%	27%	12%
Q5	I expect myself to manage my physical discomfort without complaining.	9%	18%	14%	44%	16%
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*	5%	9%	16%	37%	33%
Q17	I believe my physical pain is best handled by just keeping quiet about it.	29%	29%	22%	15%	5%
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*	39%	32%	16%	11%	3%
	Stoic Composure: The belief that one should control one's emotions and behavior under stress (Modern)					
Q10	I expect myself to remain calm and decisive in an emergency.	2%	5%	11%	29%	54%
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	29%	25%	19%	19%	7%
Q21	I believe I should be calm and level-headed.	2%	2%	5%	35%	56%
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	1%	2%	8%	36%	54%
	Stoic Serenity: The belief that one should refrain from experiencing strong emotions (Classical)					
Q8	I believe I should experience strong emotions. *(reverse)*	4%	8%	21%	33%	34%
Q14	I would prefer to be unemotional.	37%	20%	17%	14%	11%
Q20	I expect myself to avoid feeling intense emotions.	25%	31%	19%	19%	5%
	Stoic Death Indifference: The belief that one should not fear or avoid death (Classical)					
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*	25%	16%	24%	19%	17%
Q12	When the time for my death comes, I believe I should accept it without fear.	8%	12%	20%	21%	39%
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*	13%	6%	22%	21%	39%
Q24	I would not allow myself to be bothered by the fear of death.	14%	19%	26%	17%	24%

Table S2. Confirmatory Factor Analysis and Item Reduction (n=390)					
Item	**Core Meaning / Scale Items**	**Step 1: Assessment of Redundancy and Content Validity**	**Step 2: CFA of 4-Domain, 18-Item Scale**	**Step 3: CFA of 4-Domain, 16-Item Scale**	**Step 4: CFA of 4-Domain, 12-Item Final Scale**
	Stoic Taciturnity		factor loadings	factor loadings	factor loadings
Q1	I prefer to keep my intense feelings to myself.	Redundant to Q13 (r = 0.54)			
Q3	I don't believe in talking about my personal problems.		0.66	0.67	0.67
Q7	I believe it's fine if I cry openly in front of other people.*(reverse)*		0.46	0.46[a]	
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*		0.55	0.55[a]	
Q13	I expect myself to hide my strong emotions from others.		0.75	0.75	0.73
Q15	I expect myself to manage my own problems without help from anyone.		0.61	0.61	0.62
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*		0.49	0.48[a]	
	Stoic Endurance				
Q2	I expect myself to hide my aches and pains from others.		0.65	0.65	0.68
Q4	I don't believe in bothering people close to me with my aches and pains.	Redundant to Q3 (r = 0.57)			
Q5	I expect myself to manage my physical discomfort without complaining.		0.57	0.56	0.55
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*		0.54	0.55[a]	
Q17	I believe my physical pain is best handled by just keeping quiet about it.		0.62	0.62	0.61
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*		0.26[b]		
	Stoic Composure				
Q10	I expect myself to remain calm and decisive in an emergency.	Domain excluded[c]			
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	Domain excluded[c]			
Q21	I believe I should be calm and level-headed.	Domain excluded[c]			
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	Domain excluded[c]			
	Stoic Serenity				
Q8	I believe I should experience strong emotions. *(reverse)*		0.51	0.51	0.48
Q14	I would prefer to be unemotional.		0.70	0.70	0.71
Q20	I expect myself to avoid feeling intense emotions.		0.62	0.62	0.63
	Stoic Death Indifference				
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*		0.27[b]		
Q12	When the time for my death comes, I believe I should accept it without fear.		0.61	0.62	0.63
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*		0.57	0.57	0.57
Q24	I would not allow myself to be bothered by the fear of death.		0.78	0.76	0.76

Footnotes: [a] = Excluded for parsimony; [b] = Excluded for poor factor loading; [c] = Excluded for poor content validity and highly skewed response distribution.

Table S3. Model Fit Statistics for Confirmatory Factor Analysis of the PW-SIS

Model	Description	Chi square	df	RMSEA (90% CI)	Goodness-of-fit Index (GFI)	Adjusted GFI	Tucker-Lewis Index
	Step 2: After exclusion of 2 redundant items (q1 and q4) and 4 items from the Stoic Composure domain (q10, q16, q21, q22), confirmatory factor analysis (CFA) was performed on the 4-domain, 18-item PW-SIS.	318 p <.0001	129	0.06 (0.05 to 0.07)	0.91	0.89	0.86
	Step 3: After exclusion of 2 items with poor factor loading (q6 and q23), CFA was performed on the 4-domain, 16-item PW-SIS.	264 p <.0001	98	0.07 (0.06 to 0.08)	0.92	0.89	0.89
Final	**Step 4:** Factor loadings from Step 3 were examined, and for the purpose of parsimony, 4 additional items were excluded (q7, q9, q11, q19). Items with the strongest factor loadings in each domain were retained. The resulting 4-domain, 12-item PW-SIS has 3 items in each of the 4 domains.	103 p <.0001	48	0.05 (0.04 to 0.07)	0.96	0.93	0.93

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6-7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	*n.a.*
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-9
		(*c*) Explain how missing data were addressed	n.a
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	7-9
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6-9
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	n.a.
Outcome data	15*	Report numbers of outcome events or summary measures	8-9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	8-9
		(*b*) Report category boundaries when continuous variables were categorized	8-9
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8-9
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8-9
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	11-13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Stoic Beliefs and Health: Development and Preliminary Validation of the Pathak-Wieten Stoicism Ideology Scale

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015137.R2
Article Type:	Research
Date Submitted by the Author:	31-Jul-2017
Complete List of Authors:	Pathak, Elizabeth; University of South Florida, Morsani College of Medicine Wieten, Sarah; University of South Florida, Department of Philosophy and Morsani College of Medicine Wheldon, Christopher W.; University of South Florida, Department of Community and Family Health
Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Epidemiology, Health services research, Research methods, Public health
Keywords:	stoicism, help-seeking, health behavior theories, masculinity, patient perspectives, gender

Stoic Beliefs and Health:

Development and Preliminary Validation of the

Pathak-Wieten Stoicism Ideology Scale

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Acknowledgements: The authors are grateful to the respondents for their voluntary participation in this study. We would particularly like to thank the 4 peer reviewers of this manuscript, whose detailed and thoughtful readings resulted in a substantially improved final paper.

Contributors: EBP conceived the study. EBP and SW developed the preliminary PW-SIS. All authors enrolled participants and collected questionnaire data. CW contributed statistical expertise to the confirmatory factor analysis. EBP analyzed the data. All authors interpreted the results and outlined the paper. EBP drafted the manuscript. All authors contributed to literature review and substantive revisions to the paper.

Funding: This study was unfunded.

Competing Interests: The authors have no competing interests.

Data Sharing: No additional data available.

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ABSTRACT

Introduction: We developed and validated a new parsimonious scale to measure stoic beliefs. Key domains of stoicism are imperviousness to strong emotions, indifference to death, taciturnity, and self-sufficiency. In the context of illness and disease, a personal ideology of stoicism may create an internal resistance to objective needs, which can lead to negative consequences. Stoicism has been linked to help-seeking delays, inadequate pain treatment, caregiver strain, and suicide after economic stress.

Methods: During 2013-2014, 390 adults aged 18+ years completed a brief anonymous paper questionnaire containing the preliminary 24-item Pathak-Wieten Stoicism Ideology Scale (PW-SIS). Confirmatory factor analysis (CFA) was used to test an *a priori* multi-domain theoretical model. Content validity and response distributions were examined. Socio-demographic predictors of strong endorsement of stoicism were explored with logistic regression.

Results: The final PW-SIS contains 4 conceptual domains and 12 items. CFA showed very good model fit: RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93. Cronbach's alpha was 0.78 and ranged from 0.64 to 0.71 for the sub-scales. Content validity analysis showed a statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest PW-SIS scores. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

Discussion: The PW-SIS is a valid and theoretically coherent scale which is brief and practical for integration into a wide range of health behavior and outcomes research studies.

Strengths and Limitations

- The Pathak-Wieten Stoicism Ideology Scale (PW-SIS) is a new, theoretically coherent, multi-dimensional scale which measures stoic beliefs and sense of self along 4 domains: Stoic Taciturnity, Stoic Endurance, Stoic Serenity, and Stoic Death Indifference.
- The PW-SIS contains 12 items and demonstrates good psychometric properties and content validity in a large sample (n=390) of educated adults.
- Mean stoicism ideology scores were higher for men than women, but for both genders the most frequent scores were neutral on stoic ideology, and the response distributions by gender overlapped almost completely.
- Further validation of the PW-SIS in demographically and socioeconomically diverse populations will improve its generalizability.

INTRODUCTION

Stoicism is a school of philosophy which originated in ancient Greece.[1-3] Core elements in the classical definition of stoicism were an idealization of imperviousness to strong emotions, and an indifference to death.[3] Major Asian philosophical systems of thought, such as Buddhism and Confucianism, also endorsed stoic principles and teachings.[4,5] Beginning in the 19th century, academic and popular philosophers in Europe and the Americas were exposed to and influenced by Asian philosophy and religion. Therefore, it may not always be possible to distinguish whether particular strands of contemporary thought associated with stoicism originated in ancient Greece, ancient India, or elsewhere. For example, using very different language and symbolism, both the Greek Stoics and the Buddha exhorted the student to live fully and completely in the present, while minimizing concern about the future.

Contemporary meanings and connotations of stoicism have expanded beyond their ancient origins, to include ideals of taciturnity and self-sufficiency.[6-8] Today, the philosophical principles of stoicism can be seen to closely align with some personal ideologies, values and behaviors which are commonplace across many industrial nations, and are evident in many non-Western cultures as well.[9-12] For example, in the USA, the armed forces have explicitly embraced stoic ideology as a tool for mitigating combat stress.[13,14]

Previous Research on Stoicism and Health

Much of the previous health-related research which mentions stoicism has invoked the term as a descriptor of particular patient groups or behaviors, without an explicit theoretical context.[8] Stoicism is mentioned most frequently in studies related to pain (particularly cancer pain) and coping strategies; indeed stoicism has been labeled a “coping strategy” in more than one study.[6-8,15,16] Stoicism has also been invoked as a defining characteristic of masculinity and as a key explanatory factor for certain health behaviors and outcomes among men. There are several psychometric instruments that measure endorsement or adherence to social norms of masculinity, but these scales include only a few items which explicitly assess stoicism.[17-19]

Direct measurement of stoicism in previous health-related measures has implicitly defined stoicism as a pattern of behaviors, not as an ideology. The pain attitudes questionnaire (PAQ), published in 2001, has a brief

subset of questions focused on stoic responses to physical pain.[20-22] The stoicism items in this scale were designed to capture pain coping strategies of chronically ill or injured patients. Of the 29 items in the PAQ, most measured past actions (i.e. pattern of behavior) and only 2 were explicitly focused on ideology: #2 "When I am in pain I should keep it to myself," and #24 "Pain is something that should be ignored." The 20-item Liverpool Stoicism Scale (LSS) (Table 1) was first published in 1995[23] and has not been widely used.[24-27] The LSS predominantly (16 of 20 items) assesses a single theoretical domain (stoic taciturnity) of the 4 validated theoretical domains included in the final PW-SIS scale.

Furthermore, the majority of items in the LSS focus on behavior or conduct, e.g. "I tend not to express my emotions." However, there are 3 items that are ideological, e.g. "One should keep a 'stiff upper lip'." Both the LSS and the PAQ contain statements that are aphorisms (i.e. "Pain is something that should be ignored") or proverbs (i.e. "A problem shared is a problem halved"). We consider these formats problematic, because these statements do not refer explicitly to the respondent. Consequently agreement cannot be interpreted as a reflection of self-identity. Furthermore, aphorisms and proverbs may invite endorsement to a great extent simply because of familiarity. In fact, Yong et al found that item #24, "Pain is something that should be ignored," on the PAQ had a low alpha and reduced the internal consistency of their scale.[21]

Theoretical Context

In 1983, Kathy Charmaz published a very influential sociological study on the "loss of self" suffered by people with chronic illnesses.[28] Although stoicism *per se* was mentioned only briefly, the idea that the suffering caused by disease emerges as much (or more) from threats to a person's identity and sense of self as from purely bodily experiences of pathophysiology is one of the theoretical underpinnings of our work.

In this report, we attempt to articulate an explicit theory of stoicism and its potential impact on health. We theorize that stoicism is a system for self-regulation rather than a behavior or personality trait. As a guide to ideal self-conduct, it requires self-conscious implementation and regular enforcement; in other words, stoicism is an ideology (e.g. a belief system which informs one's attitudes and actions with the inherent potential for internal resistance and conflict). Personal ideologies create expectations for people about who they are, as well as how

they should and should not behave. For example, we theorize that people who strongly endorse a personal ideology of stoicism may be more likely to avoid or delay seeking professional medical intervention for serious signs and symptoms of disease. This personal ideology of self will not mandate behavior in a deterministic fashion; rather, stoicism will create expectations of ideal behavior (which may not always be met). In order to test these theoretical propositions in future research, a validated measure of an individual's endorsement of stoic ideologies is needed.

The purpose of our study was to develop a theoretically coherent multi-dimensional scale to assess endorsement of a personal ideology of stoicism, and to empirically validate this scale in a multiethnic sample of healthy community-dwelling adults. We present the results of confirmatory factor analysis of the multi-domain Pathak-Wieten Stoicism Ideology Scale (PW-SIS), and discuss the potential usefulness of this tool for predicting constraints in health-related help-seeking behaviors. The PW-SIS is a generalized scale which assesses stoic beliefs and sense of self but does not explicitly measure health behaviors or health outcomes. Therefore the PW-SIS can be used in a wide range of empirical research studies.

In addition, in this report we conducted an exploratory assessment of the association between high endorsement of stoicism and participant age, gender, and race and ethnicity. We expect stoic ideologies to be embedded in larger system of cultural beliefs that may be related to age, gender, race and ethnicity, and other social characteristics.

METHODS

Conceptual Development of the Stoicism Ideology Scale

Drawing on multiple scholarly and popular sources,[1-3,6,15,29-31] we developed the preliminary 24-item Stoicism Ideology Scale (PW-SIS) to capture endorsement of 5 dimensions of stoicism (see Table S1 in the Technical Supplement, available online). Based on our literature review and expert (SW) knowledge of philosophy, we defined each domain as follows:

Stoic Taciturnity is the belief that one should conceal one's problems and emotions from others.
Stoic Endurance is the belief that one should endure physical suffering without complaining.

Stoic Composure is the belief that one should control one's emotions and behavior under stress.
Stoic Serenity is the belief that one should refrain from experiencing strong emotions.
Stoic Death Indifference is the belief that one should not fear or avoid death.

Each item in our scale was carefully worded to capture the respondents' ideology, not their past behavior, using a 5-point Likert response scale with the following responses: "disagree," "somewhat disagree," "not sure," "somewhat agree," and "agree." Nine of the original 24 items were "reverse" items that specified anti-stoic beliefs, i.e. "I believe I should experience strong emotions." The participant version of the scale (pen and paper questionnaire) listed response codes of 0 (disagree) through 4 (agree). These responses were re-coded during analysis to range from -2 (disagree) to +2 (agree). Consequently an average score of 0 corresponds to a neutral stance – neither endorsement nor rejection of stoicism. Positive scores indicate endorsement of a stoic ideology, while negative scores indicate rejection of a stoic ideology.

Data Collection

This study was approved by the Institutional Review Board (IRB) of the University of South Florida. Data were collected over a period of 10 months during 2013-2014. All participants were university employees or students. Written consent forms were waived by the IRB to ensure respondent anonymity but all participants provided verbal informed consent. Each participant completed a brief paper-and-pencil questionnaire consisting of the 24-item preliminary PW-SIS, socio-demographic questions, and a final single item "I try to be a stoic" with a 7-item response scale ranging from "never" to "all the time." The study population consisted of a convenience sample of 390 adults aged 18 years and older who were recruited in person by the authors in public common areas of university facilities (e.g. cafeterias), using walk-up tables. Monetary incentives were not provided to participants. A study response rate could not be calculated due to the data collection methods.

Data Analyses

Data analysis proceeded in 5 steps. During Step 1, we examined univariate response distributions for each of the 24 scale items. A simple correlation matrix was examined to identify redundant items. Finally, we assessed content validity based on agreement with the statement "I try to be a stoic." As a result of Step 1 analyses, 6

items were dropped from further analyses - including the entire Stoic Composure domain. Further details of this scale reduction step are included in the Technical Supplement, including Table S2.

During Step 2, we conducted a confirmatory factor analysis (CFA) of the reduced 18-item PW-SIS. CFA is the appropriate analytic choice to test scales that have an *a priori*, theoretically explicit sub-domain structure.[32-36] We used *proc calis* in SAS 9.4 for the CFA. Based on the results of the first CFA, we eliminated 2 items with poor factor loadings (see Technical Supplement for details).

During Step 3, we repeated the CFA on the reduced 16-item PW-SIS. Finally, for the purpose of parsimony we further reduced the total number of scale items to 12 (3 items in each of 4 domains) and conducted a CFA on the final 12-item version of the PW-SIS (Step 4; see Table S3). Additional details and rationale for analytic Steps 1-4, including data tables S1-S3, are provided in the Technical Supplement, available online.

Step 5 of our analysis consisted of preliminary content validation, examination of response distributions for the overall and domain scores, and exploratory logistic regression modeling of socio-demographic predictors of strong endorsement of stoicism. For the logistic regression analysis, we categorized the outcome using the top quartile of the overall distribution of responses to represent strong endorsement of stoicism.

RESULTS

The size of our study population (n=390) provided more than 15 respondents for each question in the preliminary scale, which exceeds the widely accepted norm of at least 10 respondents per question.[37] Although skewed toward younger adults (78% of respondents were < 25 years old), the study population was in other respects diverse (Table 2). A majority self-identified as female (57%) and white (55%). Hispanics (15%) and Blacks (14%) were the second and third largest racial/ethnic groups, followed by Asians (9%) and biracial or other ethnicity (6%). A substantial minority of respondents (19%) were born outside the U.S or Puerto Rico.

The final 4-domain, 12-item Pathak-Wieten Stoicism Ideology Scale is shown in Table 3. Confirmatory factor analysis of the final scale showed very good model fit with individual item factor loadings ranging from 0.48 to 0.76, RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93.

Relationships among the PW-SIS and its four conceptual domains are shown in Table 4. Cronbach's alpha ranged from 0.64 to 0.71 for the sub-scales and was 0.78 for the 12-item PW-SIS. Scores for Stoic Taciturnity were strongly correlated with scores for both Stoic Endurance and Stoic Serenity, but Stoic Endurance and Stoic Serenity were not highly correlated with each other. Stoic Death Indifference had the highest (most stoic) mean scores among the four domains, and it was least correlated with the other three domains.

Figure 1 depicts mean PW-SIS scores by response to the statement "I try to be a stoic." There was a clear monotonic and statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest stoicism scores, and respondents who reported trying to be a stoic "never" having the lowest stoicism scores. Most respondents chose one of the 3 intermediate categories. Respondents who chose "I don't know" as their response had stoicism scores similar to those who said they "sometimes" tried to be a stoic.

The distributions of mean scores for the 4 conceptual domain sub-scales are shown in Figure 2. Domain scores are comprised of the mean score for the 3 questions in the domain. In this study population, respondents were least likely to endorse Stoic Serenity and most likely to endorse Stoic Death Indifference.

The full distribution of respondent scores is shown separately for women and men in Figure 3. The distributions overlapped almost completely, but there were no men with the least stoic scores, and no women with the most stoic scores. Response distributions were skewed to the left for women (less stoic) and to the right for men (more stoic), consistent with a statistically significant difference in the mean scores for women (-0.31, 95% CI -0.40 to -0.22) and men (+0.04, 95% CI -0.05 to +0.14).

Results of an exploratory analysis of sociodemographic predictors of high endorsement of stoicism are shown in Table 5. There is no *a priori* cut point designated as "highly stoic" in the PW-SIS; in this analysis the cut point used was a mean score greater than the 75th percentile of the overall response distribution. The top quartile of the distribution of all respondents (n=390) ranged from +0.33 to +1.67. Among women, 18.9% strongly endorsed stoicism, compared with 32.8% of men. After multivariate adjustment, men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Adults born in the USA or Puerto Rico were also twice as likely as adults born elsewhere to strongly endorse stoicism (OR=1.97,

95% CI 1.01 to 3.84, p=0.048). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, Biracial persons, and adults 25 years and older were not statistically significant.

DISCUSSION

The Pathak-Wieten Stoicism Ideology Scale is a theoretically coherent, multi-dimensional scale which demonstrates good psychometric properties and content validity based on initial validation in a large sample of educated adults. The PW-SIS is also brief and practical for integration into a wide range of empirical research studies. In our study population of mostly younger adults, endorsement of stoicism varied by conceptual domain, with the weakest endorsement of the classical domain Stoic Serenity (aversion to strong emotions). Exploratory logistic regression analysis identified male gender and USA birth as significant predictors of strong endorsement of stoicism. Finally, point estimates suggested higher endorsement of stoicism for Blacks, Hispanics, and Biracial persons compared with Whites, but these results were not statistically significant.

Integration of our theory of a stoic ideology of the self into existing health behavior models could help explain the formation of beliefs and attitudes toward criterion-specific help-seeking behaviors. Reasoned action approaches - such as the Integrative Model of Behavior Prediction - poorly define background factors that underlie belief formation.[38] Measurement of self-concepts, such as stoicism ideologies, may help explain this population variability. Expanding health behavior theory to include aspects of the self could also help inform health education messaging and risk-based communication.

Ironically, a personal ideology of stoicism almost guarantees failure to live up to one's personal ideal. Experiences of illness and disease often involve transient weakness and functional limitations. With aging, these experiences will increase in frequency, duration, and severity for most people. Simply put, experiences of illness and disease tend to require aid – whether from health professionals in a formal context, or from family members or friends in an informal context. An ideology of stoicism creates an internal resistance to external objective needs, which can lead to negative consequences.[8-12]

Gender and Stoicism

Stoicism is widely viewed as a defining attribute of masculinity. Instruments designed to assess endorsement of hegemonic masculine ideologies have included specific questions that touch on stoicism. However, the conceptual and measurement overlap between these instruments and the 4-domain PW-SIS is minor.[17] For example, in the widely used Personal Attributes Questionnaire, only 2 of 24 items relate to a single domain of the PW-SIS. The Conformance to Masculine Norms scale assesses 11 distinct domains of masculinity, of which only 2 (emotional control and self-reliance) partially overlap with domains of the PW-SIS.[18,19] In our study, the results are notable because for both genders the most frequent scores were in the middle of the distribution (neutral on stoic ideology), and the response distributions for women and men overlapped almost completely. Despite the fact that men were twice as likely as women to strongly endorse stoic ideology, our results suggest that gendered stereotypes about stoicism ("stoic men" and "emotional women") are overblown. Because the PW-SIS is agnostic to respondents' genders, it is ideally suited to investigate the empirical reality of stoicism among both women and men. Furthermore, our finding that a minority of women strongly endorsed stoic ideology may be particularly important. For example, a study of major strain among family caretakers of elderly dementia patients found that those who used stoicism as a coping strategy suffered burnout, while those who sought social support did not.[39]

Study Limitations

In any questionnaire-based scale, validity of the individual items and the total scale against the concept of interest is of paramount concern. Unlike many psychometric instruments, the PW-SIS does not purport to measure a latent, inherent trait such as personality, or a clinically-definable disorder such as depression or anxiety. Rather, we attempt to measure an explicit set of beliefs, which by definition are neither inborn nor immutable. Therefore, a robust assessment of the content validity of our scale items must come after publication and evaluation by multiple experts and researchers. We included a single questionnaire item "I try to be a stoic" to assess content validity, but future validation and outcome studies could expand on this approach or include a qualitative component.

A related question pertains to the predictive validity of the PW-SIS. In other words, to what extent does strong endorsement of stoic ideology predict actual stoic behaviors? Predictive validity can only be rigorously addressed through prospective study designs.

Our study population, similar to many scale validation studies, was university-based. Therefore validity and generalizability to very different populations should not be assumed, but instead tested in future studies. In particular, validation of the PW-SIS among the elderly and persons of lower educational attainment would be valuable for health-related research.

Strengths of the PW-SIS

Our scale has several strengths. First, all items refer explicitly to the respondent; there are no aphorisms or proverbs. Second, each item refers to an expectation or belief about ideal self-conduct, rather than to a simple description of past behavior. So for example, Q5 states "I expect myself to manage my physical discomfort without complaining" rather than "I always manage my physical discomfort without complaining." This distinction is critical to the theoretical underpinnings of the scale. Thirdly, we deliberately chose not to mention disease or illness in the scale items, so that the scale would be appropriate for a wide range of study populations, including currently healthy individuals. (Although some items do explicitly mention "physical pain" and "everyday aches and pains.") Our intention was to capture the respondents' *global* endorsement of stoicism as a *code of ideal conduct*. Finally, the PW-SIS does not reference gender norms, so it can serve as a tool to empirically investigate gender differences in stoic ideology.

Directions for future research

The PW-SIS should be validated in multiple study populations with a range of socioeconomic and demographic characteristics. Our theory that ideologies of stoicism will result in constraints on health-related behaviors needs to be empirically tested, ideally in rigorously designed prospective studies. Given the rise of patient-centered health care,[40,41] understanding patients' motivations and perspectives has never been more important. The current health education paradigm holds that improving patients' knowledge of symptoms and signs will result in more timely help-seeking behavior.[38,42-44] Each year thousands of individuals suffer needlessly

and many die because of extended delays in seeking professional aid for acute medical conditions (e.g., myocardial infarctions, strokes, diabetic emergencies, cancer complications and pain, and acute exacerbations of congestive heart failure).[45-52] Numerous studies have been conducted to attempt to elucidate the reasons behind patient delays,[46-51,53] with the ultimate goal of designing education programs and interventions that will result in timely help-seeking. Significant risk factors for help-seeking reluctance have been identified (e.g. Black race[52,54,55]) but much of the variation remains unexplained and we still lack a complete understanding of *why* certain patients and not others delay seeking aid.

A distinction of our theory is movement of the focus of inquiry away from the disease and the patient's relationship to the disease (e.g. health knowledge, symptom awareness, ability to comply with self-care regimens) and onto *patients' sense of self* – their self-concepts and self-identity.[56] We hypothesize that illness behaviors may become "noncompliant" or "irrational" or "self-harming" when specific courses of action would create an internal conflict with patients' ideas of *who they are***.** Specifically, we posit that people who strongly believe that they should manage their problems on their own, not show emotions, and not complain about physical discomfort will experience an internal cognitive conflict when faced with a situation that could require help from others. This internal conflict will lead to delays in or avoidance of help-seeking, with potentially life-threatening consequences. For example, empirical studies of increasing rates of male suicide in rural Australia have identified hegemonic masculine norms of stoicism as an important causal factor in the context of severe economic stress.[57,58] Understanding the influences of race, ethnicity, socioeconomic status, religion, and other cultural factors on stoic ideologies may help explain past research findings on delays in help-seeking. Finally, there may also be positive health consequences of stoic ideologies for individuals,[15] which careful prospective research could confirm.

FIGURE LEGENDS

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

Table 1. Liverpool Stoicism Scale[23]

Item #	Item	Closest Domain from the Pathak-Wieten Stoicism Ideology Scale
1	I tend to cry at sad films	Stoic Taciturnity
2	I sometimes cry in public	Stoic Taciturnity
3	I do not let my problems interfere with my everyday life	Stoic Taciturnity
4	I tend not to express my emotions	Stoic Taciturnity
5	I like someone to hold me when I am upset	Stoic Taciturnity
6	I do not get emotionally involved when I see suffering on television	Stoic Serenity
7	I would consider going to a counsellor if I had a problem	Stoic Taciturnity
8	I tend to keep my feelings to myself	Stoic Taciturnity
9	I would not mind sharing my problems with a male friend	Stoic Taciturnity
10	It makes me uncomfortable when people express their emotions in front of me	None
11	I don't really like people to know what I am feeling	Stoic Taciturnity
12	I rely heavily on my friends for emotional support	Stoic Taciturnity
13	I always take time out to discuss my problems with my family	Stoic Taciturnity
14	One should keep a "stiff upper lip"	Stoic Serenity
15	I believe that it is healthy to express one's emotions	Stoic Taciturnity
16	Getting upset over the death of a loved one does not help	Stoic Death Indifference
17	I would not mind sharing my problems with a female friend	Stoic Taciturnity
18	A problem shared is a problem halved	Stoic Taciturnity
19	I would not cry at the funeral of a close friend or relative	Stoic Taciturnity
20	Expressing one's emotions is a sign of weakness	Stoic Taciturnity

Table 2. Characteristics of the Study Population (n=390)

	Number	Percent
Age		
18 – 24 years	303	77.7
25 + years	87	22.3
Gender		
Female	221	56.7
Male	169	43.3
Race and Ethnicity		
White	215	55.1
Black	55	14.1
Hispanic	59	15.1
Asian	36	9.2
Biracial/Other	25	6.4
Nativity		
USA (inc. Puerto Rico)	315	80.8
Other	75	19.2

Table 3. Pathak-Wieten Stoicism Ideology Scale (PW-SIS)

Please read each statement and choose the answer that best reflects your own views.

Disagree	Somewhat Disagree	Not Sure	Somewhat Agree	Agree

Item	Domain	Original Item #*
1. I expect myself to hide my aches and pains from others.	Stoic Endurance	Q2
2. I don't believe in talking about my personal problems.	Stoic Taciturnity	Q3
3. I expect myself to manage my physical discomfort without complaining.	Stoic Endurance	Q5
4. I believe I should experience strong emotions. ***[reverse code]***	Stoic Serenity	Q8
5. When the time for my death comes, I believe I should accept it without fear.	Stoic Death Indifference	Q12
6. I expect myself to hide my strong emotions from others.	Stoic Taciturnity	Q13
7. I would prefer to be unemotional.	Stoic Serenity	Q14
8. I expect myself to manage my own problems without help from anyone.	Stoic Taciturnity	Q15
9. I believe my physical pain is best handled by just keeping quiet about it.	Stoic Endurance	Q17
10. I would be very upset if I knew my death was coming soon. ***[reverse code]***	Stoic Death Indifference	Q18
11. I expect myself to avoid feeling intense emotions.	Stoic Serenity	Q20
12. I would not allow myself to be bothered by the fear of death.	Stoic Death Indifference	Q24

See Methods for scoring instructions

* See Table S1 in the Technical Supplement, available online.

Table 4. Conceptual Domains of the Pathak-Wieten Stoicism Ideology Scale

Domain	Mean Score (95% CI)	Cronbach's α	Correlation with ST Score	Correlation with SE Score	Correlation with SS Score	Correlation with SDI Score
Stoic Taciturnity (ST): The belief that one should conceal one's problems and emotions from others (Modern)	-0.08 (-0.18 to +0.02)	0.71	1.00	0.59 p < 0.0001	0.53 p < 0.0001	0.09 p = 0.0729
Stoic Endurance (SE): The belief that one should endure physical suffering without complaining (Modern)	+0.04 (-0.06 to +0.13)	0.65	0.59 p < 0.0001	1.00	0.35 p < 0.0001	0.18 p = 0.0005
Stoic Serenity (SS): The belief that one should refrain from experiencing strong emotions (Classical)	-0.66 (-0.75 to -0.56)	0.64	0.53 p < 0.0001	0.35 p < 0.0001	1.00	0.15 p = 0.0031
Stoic Death Indifference (SDI): The belief that one should not fear or avoid death (Classical)	+0.08 (-0.03 to +0.18)	0.69	0.09 p = 0.0729	0.18 p = 0.0005	0.15 p = 0.0031	1.00
Stoicism Ideology Scale (PW-SIS)	-0.16 (-0.22 to -0.09)	0.78	0.79 p < 0.0001	0.74 p < 0.0001	0.72 p < 0.0001	0.53 p < 0.0001

Table 5. Sociodemographic Predictors of a Mean PW-SIS Score in the Top Quartile (> 0.167)

	Odds Ratio (95% CI)	p value
Age 18-24 years	1.00 (referent)	
Age 25-73 years	1.34 (0.76 - 2.35)	n.s.
Men	2.30 (1.44 - 3.68)	< 0.001
Women	1.00 (referent)	
Asian	0.93 (0.38 - 2.25)	n.s
Black	1.55 (0.78 - 3.09)	n.s
Biracial/Other	1.70 (0.66 - 4.34)	n.s
Hispanic	1.88 (0.99 - 3.56)	n.s
Whites	1.00 (referent)	
Born in the USA	1.97 (1.01 - 3.84)	0.048
Born elsewhere	1.00 (referent)	

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Figure 1.
Content Validity of the Pathak-Wieten Stoicism Ideology Scale:
Mean Scores by Response to the Statement "I try to be a stoic"

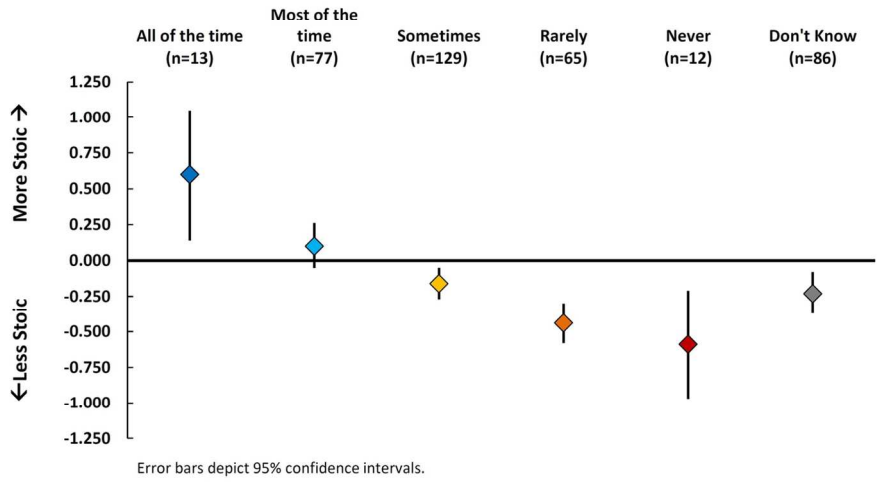

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

130x87mm (300 x 300 DPI)

Figure 2.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

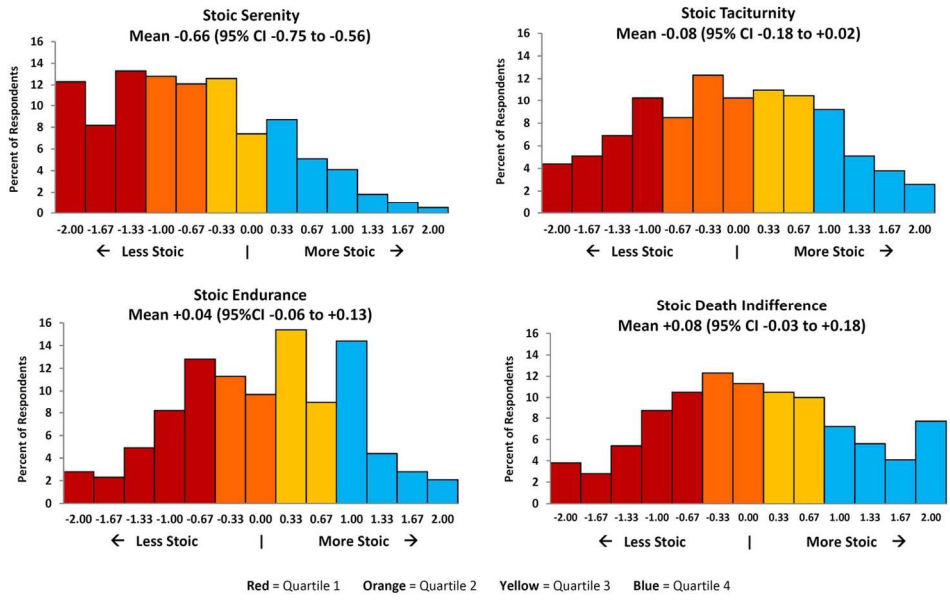

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

139x100mm (300 x 300 DPI)

Figure 3.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

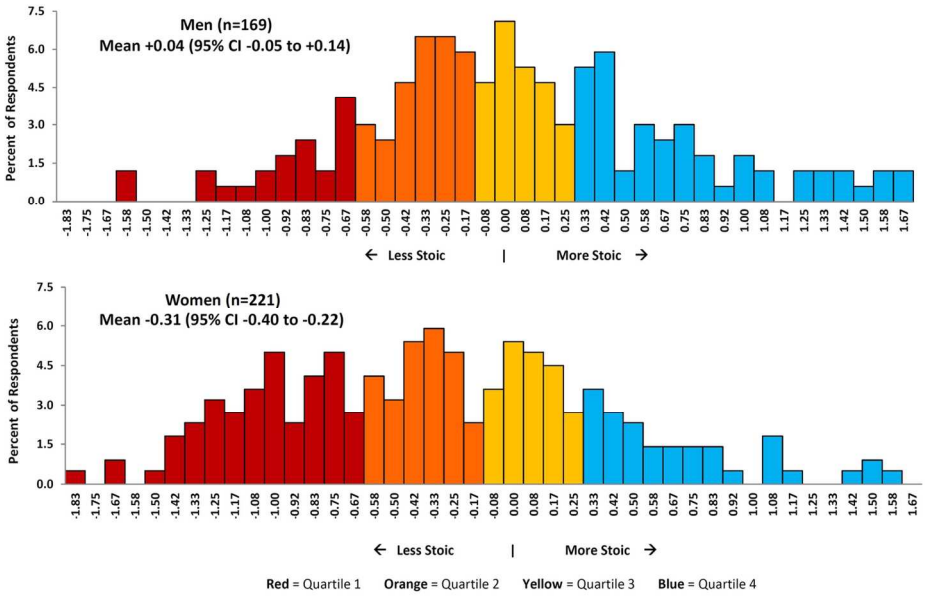

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

142x104mm (300 x 300 DPI)

Pathak Stoicism Paper

Technical Supplement

Scale items under each of the 5 domains along with response frequencies for the preliminary 24-item PW-SIS are shown in Table S1. The results of the assessment of redundancy and content validity (Step 1) are shown in Table S2. We dropped 2 items (Q1 and Q4) because they were highly correlated with other items. The entire Stoic Composure domain, with 4 questions, was dropped after consideration of content validity. At every level of response to the statement "I try to be a stoic," from "never" to all "all the time," responses to the 4 Stoic Composure items were highly pro-stoic. Furthermore, the overall response distributions for 3 of the 4 items (Q10, Q21, and Q22) were highly skewed, with only 7%, 4%, and 3% disagreeing with these statements (Table S1). There were no other items in the scale that resulted in such highly skewed response distributions. We concluded that this domain was referencing a strongly sanctioned social norm, and that while the items were not explicitly worded as aphorisms, they might be functioning in the same way. Some respondents may have been inhibited to admit that they did not believe that they should stay cool in an emergency, if they perceived that a strong socio-cultural norm existed. Interestingly, the only reverse-coded item under this domain, Q16: "I believe it's okay to let myself get upset and distracted in a major crisis," elicited a less skewed response, although the majority of respondents still disagreed with this statement. Given that there was only a single item which performed marginally well, we decided to drop the entire domain.

Confirmatory factor analysis of the reduced 18-item, 4-domain PW-SIS resulted in strong factor loadings for 16 of the 18 items (Table S2), and decent model fit statistics (Table S3). Both items which were dropped (Q23 and Q6) were reverse-code items. Removal of these 2 items resulted in slightly improved model fit statistics (Table S3) when the CFA was re-run on the remaining 16 items.

As shown in Table S2, the 16-item scale retained 6 items for Stoic Taciturnity, 4 items for Stoic Endurance, 3 items for Stoic Serenity, and 3 items for Stoic Death Indifference. In the interest of parsimony, we decided to remove an additional 4 items, so that the final scale would retain 3 items for each of the 4 domains. We dropped 3 items from Stoic Taciturnity (Q7, Q9, and Q19), and 1 item from Stoic Endurance (Q11) - all with the lowest

factor loadings, and all reverse-code items. Factor loadings for the remaining 12 items changed little in the final CFA model (Table S2), but model fit statistics improved so that the final RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96, and Tucker-Lewis Index = 0.93.

Table S1. Preliminary Pathak-Wieten Stoicism Ideology Scale: Domains, Item Content, and Response Frequencies (n=390)						
Original Item #	**Core Meaning / Scale Items**	**Disagree (-2)**	**Somewhat Disagree (-1)**	**Not sure (0)**	**Somewhat Agree (+1)**	**Agree (+2)**
	Stoic Taciturnity: The belief that one should conceal one's problems and emotions from others (Modern)					
Q1	I prefer to keep my intense feelings to myself.	10%	17%	6%	40%	27%
Q3	I don't believe in talking about my personal problems.	23%	31%	14%	26%	6%
Q7	I believe it's fine if I cry openly in front of other people. *(reverse)*	31%	28%	12%	18%	11%
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*	3%	12%	14%	37%	33%
Q13	I expect myself to hide my strong emotions from others.	13%	23%	19%	32%	13%
Q15	I expect myself to manage my own problems without help from anyone.	16%	24%	13%	34%	13%
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*	16%	25%	23%	27%	8%
	Stoic Endurance: The belief that one should endure physical suffering without complaining (Modern)					
Q2	I expect myself to hide my aches and pains from others.	8%	24%	12%	41%	15%
Q4	I don't believe in bothering people close to me with my aches and pains.	20%	27%	14%	27%	12%
Q5	I expect myself to manage my physical discomfort without complaining.	9%	18%	14%	44%	16%
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*	5%	9%	16%	37%	33%
Q17	I believe my physical pain is best handled by just keeping quiet about it.	29%	29%	22%	15%	5%
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*	39%	32%	16%	11%	3%
	Stoic Composure: The belief that one should control one's emotions and behavior under stress (Modern)					
Q10	I expect myself to remain calm and decisive in an emergency.	2%	5%	11%	29%	54%
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	29%	25%	19%	19%	7%
Q21	I believe I should be calm and level-headed.	2%	2%	5%	35%	56%
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	1%	2%	8%	36%	54%
	Stoic Serenity: The belief that one should refrain from experiencing strong emotions (Classical)					
Q8	I believe I should experience strong emotions. *(reverse)*	4%	8%	21%	33%	34%
Q14	I would prefer to be unemotional.	37%	20%	17%	14%	11%
Q20	I expect myself to avoid feeling intense emotions.	25%	31%	19%	19%	5%
	Stoic Death Indifference: The belief that one should not fear or avoid death (Classical)					
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*	25%	16%	24%	19%	17%
Q12	When the time for my death comes, I believe I should accept it without fear.	8%	12%	20%	21%	39%
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*	13%	6%	22%	21%	39%
Q24	I would not allow myself to be bothered by the fear of death.	14%	19%	26%	17%	24%

Table S2. Confirmatory Factor Analysis and Item Reduction (n=390)					
Item	**Core Meaning / Scale Items**	**Step 1: Assessment of Redundancy and Content Validity**	**Step 2: CFA of 4-Domain, 18-Item Scale**	**Step 3: CFA of 4-Domain, 16-Item Scale**	**Step 4: CFA of 4-Domain, 12-Item Final Scale**
	Stoic Taciturnity		factor loadings	factor loadings	factor loadings
Q1	I prefer to keep my intense feelings to myself.	Redundant to Q13 (r = 0.54)			
Q3	I don't believe in talking about my personal problems.		0.66	0.67	0.67
Q7	I believe it's fine if I cry openly in front of other people.*(reverse)*		0.46	0.46[a]	
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*		0.55	0.55[a]	
Q13	I expect myself to hide my strong emotions from others.		0.75	0.75	0.73
Q15	I expect myself to manage my own problems without help from anyone.		0.61	0.61	0.62
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*		0.49	0.48[a]	
	Stoic Endurance				
Q2	I expect myself to hide my aches and pains from others.		0.65	0.65	0.68
Q4	I don't believe in bothering people close to me with my aches and pains.	Redundant to Q3 (r = 0.57)			
Q5	I expect myself to manage my physical discomfort without complaining.		0.57	0.56	0.55
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*		0.54	0.55[a]	
Q17	I believe my physical pain is best handled by just keeping quiet about it.		0.62	0.62	0.61
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*		0.26[b]		
	Stoic Composure				
Q10	I expect myself to remain calm and decisive in an emergency.	Domain excluded[c]			
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	Domain excluded[c]			
Q21	I believe I should be calm and level-headed.	Domain excluded[c]			
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	Domain excluded[c]			
	Stoic Serenity				
Q8	I believe I should experience strong emotions. *(reverse)*		0.51	0.51	0.48
Q14	I would prefer to be unemotional.		0.70	0.70	0.71
Q20	I expect myself to avoid feeling intense emotions.		0.62	0.62	0.63
	Stoic Death Indifference				
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*		0.27[b]		
Q12	When the time for my death comes, I believe I should accept it without fear.		0.61	0.62	0.63
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*		0.57	0.57	0.57
Q24	I would not allow myself to be bothered by the fear of death.		0.78	0.76	0.76

Footnotes: [a] = Excluded for parsimony; [b] = Excluded for poor factor loading; [c] = Excluded for poor content validity and highly skewed response distribution.

Table S3. Model Fit Statistics for Confirmatory Factor Analysis of the PW-SIS

Model	Description	Chi square	df	RMSEA (90% CI)	Goodness-of-fit Index (GFI)	Adjusted GFI	Tucker-Lewis Index
	Step 2: After exclusion of 2 redundant items (q1 and q4) and 4 items from the Stoic Composure domain (q10, q16, q21, q22), confirmatory factor analysis (CFA) was performed on the 4-domain, 18-item PW-SIS.	318 p <.0001	129	0.06 (0.05 to 0.07)	0.91	0.89	0.86
	Step 3: After exclusion of 2 items with poor factor loading (q6 and q23), CFA was performed on the 4-domain, 16-item PW-SIS.	264 p <.0001	98	0.07 (0.06 to 0.08)	0.92	0.89	0.89
Final	**Step 4:** Factor loadings from Step 3 were examined, and for the purpose of parsimony, 4 additional items were excluded (q7, q9, q11, q19). Items with the strongest factor loadings in each domain were retained. The resulting 4-domain, 12-item PW-SIS has 3 items in each of the 4 domains.	103 p <.0001	48	0.05 (0.04 to 0.07)	0.96	0.93	0.93

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6-7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	*n.a.*
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-9
		(*c*) Explain how missing data were addressed	n.a
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	7-9
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6-9
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	n.a.
Outcome data	15*	Report numbers of outcome events or summary measures	8-9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	8-9
		(*b*) Report category boundaries when continuous variables were categorized	8-9
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8-9
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8-9
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	11-13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Stoic Beliefs and Health: Development and Preliminary Validation of the Pathak-Wieten Stoicism Ideology Scale

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015137.R3
Article Type:	Research
Date Submitted by the Author:	15-Aug-2017
Complete List of Authors:	Pathak, Elizabeth; University of South Florida, Morsani College of Medicine Wieten, Sarah; University of South Florida, Department of Philosophy and Morsani College of Medicine Wheldon, Christopher W.; University of South Florida, Department of Community and Family Health
Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Epidemiology, Health services research, Research methods, Public health
Keywords:	stoicism, help-seeking, health behavior theories, masculinity, patient perspectives, gender

Stoic Beliefs and Health:

Development and Preliminary Validation of the

Pathak-Wieten Stoicism Ideology Scale

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Acknowledgements: The authors are grateful to the respondents for their voluntary participation in this study. We would particularly like to thank the 4 peer reviewers of this manuscript, whose detailed and thoughtful readings resulted in a substantially improved final paper.

Contributors: EBP conceived the study. EBP and SW developed the preliminary PW-SIS. All authors enrolled participants and collected questionnaire data. CW contributed statistical expertise to the confirmatory factor analysis. EBP analyzed the data. All authors interpreted the results and outlined the paper. EBP drafted the manuscript. All authors contributed to literature review and substantive revisions to the paper.

Funding: This study was unfunded.

Competing Interests: The authors have no competing interests.

Data Sharing: No additional data available.

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ABSTRACT

Introduction: We developed and validated a new parsimonious scale to measure stoic beliefs. Key domains of stoicism are imperviousness to strong emotions, indifference to death, taciturnity, and self-sufficiency. In the context of illness and disease, a personal ideology of stoicism may create an internal resistance to objective needs, which can lead to negative consequences. Stoicism has been linked to help-seeking delays, inadequate pain treatment, caregiver strain, and suicide after economic stress.

Methods: During 2013-2014, 390 adults aged 18+ years completed a brief anonymous paper questionnaire containing the preliminary 24-item Pathak-Wieten Stoicism Ideology Scale (PW-SIS). Confirmatory factor analysis (CFA) was used to test an *a priori* multi-domain theoretical model. Content validity and response distributions were examined. Socio-demographic predictors of strong endorsement of stoicism were explored with logistic regression.

Results: The final PW-SIS contains 4 conceptual domains and 12 items. CFA showed very good model fit: RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93. Cronbach's alpha was 0.78 and ranged from 0.64 to 0.71 for the sub-scales. Content validity analysis showed a statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest PW-SIS scores. Men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, and Biracial persons were not statistically significant.

Discussion: The PW-SIS is a valid and theoretically coherent scale which is brief and practical for integration into a wide range of health behavior and outcomes research studies.

Strengths and Limitations

- The Pathak-Wieten Stoicism Ideology Scale (PW-SIS) is a new, theoretically coherent, multi-dimensional scale which measures stoic beliefs and sense of self along 4 domains: Stoic Taciturnity, Stoic Endurance, Stoic Serenity, and Stoic Death Indifference.
- The PW-SIS contains 12 items and demonstrates good psychometric properties and content validity in a large sample (n=390) of educated adults.
- Mean stoicism ideology scores were higher for men than women, but for both genders the most frequent scores were neutral on stoic ideology, and the response distributions by gender overlapped almost completely.
- Further validation of the PW-SIS in demographically and socioeconomically diverse populations will improve its generalizability.

INTRODUCTION

Stoicism is a school of philosophy which originated in ancient Greece.[1-3] Core elements in the classical definition of stoicism were an idealization of imperviousness to strong emotions, and an indifference to death.[3] Major Asian philosophical systems of thought, such as Buddhism and Confucianism, also endorsed stoic principles and teachings.[4,5] Beginning in the 19th century, academic and popular philosophers in Europe and the Americas were exposed to and influenced by Asian philosophy and religion. Therefore, it may not always be possible to distinguish whether particular strands of contemporary thought associated with stoicism originated in ancient Greece, ancient India, or elsewhere. For example, using very different language and symbolism, both the Greek Stoics and the Buddha exhorted the student to live fully and completely in the present, while minimizing concern about the future.

Contemporary meanings and connotations of stoicism have expanded beyond their ancient origins, to include ideals of taciturnity and self-sufficiency.[6-8] Today, the philosophical principles of stoicism can be seen to closely align with some personal ideologies, values and behaviors which are commonplace across many industrial nations, and are evident in many non-Western cultures as well.[9-12] For example, in the USA, the armed forces have explicitly embraced stoic ideology as a tool for mitigating combat stress.[13,14]

Previous Research on Stoicism and Health

Much of the previous health-related research which mentions stoicism has invoked the term as a descriptor of particular patient groups or behaviors, without an explicit theoretical context.[8] Stoicism is mentioned most frequently in studies related to pain (particularly cancer pain) and coping strategies; indeed stoicism has been labeled a "coping strategy" in more than one study.[6-8,15,16] Stoicism has also been invoked as a defining characteristic of masculinity and as a key explanatory factor for certain health behaviors and outcomes among men. There are several psychometric instruments that measure endorsement or adherence to social norms of masculinity, but these scales include only a few items which explicitly assess stoicism.[17-19]

Direct measurement of stoicism in previous health-related measures has implicitly defined stoicism as a pattern of behaviors, not as an ideology. The pain attitudes questionnaire (PAQ), published in 2001, has a brief

subset of questions focused on stoic responses to physical pain.[20-22] The stoicism items in this scale were designed to capture pain coping strategies of chronically ill or injured patients. Of the 29 items in the PAQ, most measured past actions (i.e. pattern of behavior) and only 2 were explicitly focused on ideology: #2 "When I am in pain I should keep it to myself," and #24 "Pain is something that should be ignored." The 20-item Liverpool Stoicism Scale (LSS) was first developed in 1995[23] and has not been widely used.[24-27] The LSS predominantly (16 of 20 items) assesses a single theoretical domain (stoic taciturnity) of the 4 validated theoretical domains included in the final PW-SIS scale (Table 1).

Table 1. Liverpool Stoicism Scale Items and Correspondence to Pathak-Wieten Stoicism Ideology Scale Conceptual Domains

Item #	Liverpool Stoicism Scale Item^	Closest Domain from the Pathak-Wieten Stoicism Ideology Scale
1	I tend to cry at sad films	Stoic Taciturnity
2	I sometimes cry in public	Stoic Taciturnity
3	I do not let my problems interfere with my everyday life	Stoic Taciturnity
4	I tend not to express my emotions	Stoic Taciturnity
5	I like someone to hold me when I am upset	Stoic Taciturnity
6	I do not get emotionally involved when I see suffering on television	Stoic Serenity
7	I would consider going to a counsellor if I had a problem	Stoic Taciturnity
8	I tend to keep my feelings to myself	Stoic Taciturnity
9	I would not mind sharing my problems with a male friend	Stoic Taciturnity
10	It makes me uncomfortable when people express their emotions in front of me	None
11	I don't really like people to know what I am feeling	Stoic Taciturnity
12	I rely heavily on my friends for emotional support	Stoic Taciturnity
13	I always take time out to discuss my problems with my family	Stoic Taciturnity
14	One should keep a "stiff upper lip"	Stoic Serenity
15	I believe that it is healthy to express one's emotions	Stoic Taciturnity
16	Getting upset over the death of a loved one does not help	Stoic Death Indifference
17	I would not mind sharing my problems with a female friend	Stoic Taciturnity
18	A problem shared is a problem halved	Stoic Taciturnity
19	I would not cry at the funeral of a close friend or relative	Stoic Taciturnity
20	Expressing one's emotions is a sign of weakness	Stoic Taciturnity

^ The Liverpool Stoicism Scale is reprinted with permission from Gaitniece-Putāne A. Liverpool Stoicism Scale Adaptation. Baltic Journal of Psychology. 2005;6(1):57-64. © Department of Psychology, University of Latvia, 2005. All rights reserved.

Furthermore, the majority of items in the LSS focus on behavior or conduct, e.g. "I tend not to express my emotions." However, there are 3 items that are ideological, e.g. "One should keep a 'stiff upper lip'." Both the LSS and the PAQ contain statements that are aphorisms (i.e. "Pain is something that should be ignored") or proverbs (i.e. "A problem shared is a problem halved"). We consider these formats problematic, because these statements do not refer explicitly to the respondent. Consequently agreement cannot be interpreted as a reflection of self-identity. Furthermore, aphorisms and proverbs may invite endorsement to a great extent simply because of familiarity. In fact, Yong et al found that item #24, "Pain is something that should be ignored," on the PAQ had a low alpha and reduced the internal consistency of their scale.[21]

Theoretical Context

In 1983, Kathy Charmaz published a very influential sociological study on the "loss of self" suffered by people with chronic illnesses.[28] Although stoicism *per se* was mentioned only briefly, the idea that the suffering caused by disease emerges as much (or more) from threats to a person's identity and sense of self as from purely bodily experiences of pathophysiology is one of the theoretical underpinnings of our work.

In this report, we attempt to articulate an explicit theory of stoicism and its potential impact on health. We theorize that stoicism is a system for self-regulation rather than a behavior or personality trait. As a guide to ideal self-conduct, it requires self-conscious implementation and regular enforcement; in other words, stoicism is an ideology (e.g. a belief system which informs one's attitudes and actions with the inherent potential for internal resistance and conflict). Personal ideologies create expectations for people about who they are, as well as how they should and should not behave. For example, we theorize that people who strongly endorse a personal ideology of stoicism may be more likely to avoid or delay seeking professional medical intervention for serious signs and symptoms of disease. This personal ideology of self will not mandate behavior in a deterministic fashion; rather, stoicism will create expectations of ideal behavior (which may not always be met). In order to test these theoretical propositions in future research, a validated measure of an individual's endorsement of stoic ideologies is needed.

The purpose of our study was to develop a theoretically coherent multi-dimensional scale to assess endorsement of a personal ideology of stoicism, and to empirically validate this scale in a multiethnic sample of healthy community-dwelling adults. We present the results of confirmatory factor analysis of the multi-domain Pathak-Wieten Stoicism Ideology Scale (PW-SIS), and discuss the potential usefulness of this tool for predicting constraints in health-related help-seeking behaviors. The PW-SIS is a generalized scale which assesses stoic beliefs and sense of self but does not explicitly measure health behaviors or health outcomes. Therefore the PW-SIS can be used in a wide range of empirical research studies.

In addition, in this report we conducted an exploratory assessment of the association between high endorsement of stoicism and participant age, gender, and race and ethnicity. We expect stoic ideologies to be embedded in a larger system of cultural beliefs that may be related to age, gender, race and ethnicity, and other social characteristics.

METHODS

Conceptual Development of the Stoicism Ideology Scale

Drawing on multiple scholarly and popular sources,[1-3,6,15,29-31] we developed the preliminary 24-item Stoicism Ideology Scale (PW-SIS) to capture endorsement of 5 dimensions of stoicism (see Table S1 in the Technical Supplement, available online). Based on our literature review and expert knowledge of philosophy, we defined each domain as follows:

Stoic Taciturnity is the belief that one should conceal one's problems and emotions from others.
Stoic Endurance is the belief that one should endure physical suffering without complaining.
Stoic Composure is the belief that one should control one's emotions and behavior under stress.
Stoic Serenity is the belief that one should refrain from experiencing strong emotions.
Stoic Death Indifference is the belief that one should not fear or avoid death.

Each item in our scale was carefully worded to capture the respondents' ideology, not their past behavior, using a 5-point Likert response scale with the following responses: "disagree," "somewhat disagree," "not sure," "somewhat agree," and "agree." Nine of the original 24 items were "reverse" items that specified anti-stoic beliefs, i.e. "I believe I should experience strong emotions." The participant version of the scale (pen and paper

questionnaire) listed response codes of 0 (disagree) through 4 (agree). These responses were re-coded during analysis to range from -2 (disagree) to +2 (agree). Consequently an average score of 0 corresponds to a neutral stance – neither endorsement nor rejection of stoicism. Positive scores indicate endorsement of a stoic ideology, while negative scores indicate rejection of a stoic ideology.

Data Collection

This study was approved by the Institutional Review Board (IRB) of the University of South Florida. Data were collected over a period of 10 months during 2013-2014. All participants were university employees or students. Written consent forms were waived by the IRB to ensure respondent anonymity but all participants provided verbal informed consent. Each participant completed a brief paper-and-pencil questionnaire consisting of the 24-item preliminary PW-SIS, socio-demographic questions, and a final single item "I try to be a stoic" with a 7-item response scale ranging from "never" to "all the time." The study population consisted of a convenience sample of 390 adults aged 18 years and older who were recruited in person by the authors in public common areas of university facilities (e.g. cafeterias), using walk-up tables. Monetary incentives were not provided to participants. A study response rate could not be calculated due to the data collection methods.

Data Analyses

Data analysis proceeded in 5 steps. During Step 1, we examined univariate response distributions for each of the 24 scale items. A simple correlation matrix was examined to identify redundant items. Finally, we assessed content validity based on agreement with the statement "I try to be a stoic." As a result of Step 1 analyses, 6 items were dropped from further analyses - including the entire Stoic Composure domain. Further details of this scale reduction step are included in the Technical Supplement, including Table S2.

During Step 2, we conducted a confirmatory factor analysis (CFA) of the reduced 18-item PW-SIS. CFA is the appropriate analytic choice to test scales that have an *a priori*, theoretically explicit sub-domain structure.[32-36] We used *proc calis* in SAS 9.4 for the CFA. Based on the results of the first CFA, we eliminated 2 items with poor factor loadings (see Technical Supplement for details).

During Step 3, we repeated the CFA on the reduced 16-item PW-SIS. Finally, for the purpose of parsimony we further reduced the total number of scale items to 12 (3 items in each of 4 domains) and conducted a CFA on the final 12-item version of the PW-SIS (Step 4; see Table S3). Additional details and rationale for analytic Steps 1-4, including data tables S1-S3, are provided in the Technical Supplement.

Step 5 of our analysis consisted of preliminary content validation, examination of response distributions for the overall and domain scores, and exploratory logistic regression modeling of socio-demographic predictors of strong endorsement of stoicism. For the logistic regression analysis, we categorized the outcome using the top quartile of the overall distribution of responses to represent strong endorsement of stoicism.

RESULTS

The size of our study population (n=390) provided more than 15 respondents for each question in the preliminary scale, which exceeds the widely accepted norm of at least 10 respondents per question.[37] Although skewed toward younger adults (78% of respondents were < 25 years old), the study population was in other respects diverse (Table 2). A majority self-identified as female (57%) and white (55%). Hispanics (15%) and Blacks (14%) were the second and third largest racial/ethnic groups, followed by Asians (9%) and biracial or other ethnicity (6%). A substantial minority of respondents (19%) were born outside the U.S or Puerto Rico.

Table 2. Characteristics of the Study Population (n=390)

	Number	Percent
Age		
18 – 24 years	303	77.7
25 + years	87	22.3
Gender		
Female	221	56.7
Male	169	43.3
Race and Ethnicity		
White	215	55.1
Black	55	14.1
Hispanic	59	15.1
Asian	36	9.2
Biracial/Other	25	6.4
Nativity		
USA (inc. Puerto Rico)	315	80.8
Other	75	19.2

The final 4-domain, 12-item Pathak-Wieten Stoicism Ideology Scale is shown in Table 3. Confirmatory factor analysis of the final scale showed very good model fit with individual item factor loadings ranging from 0.48 to 0.76, RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96 and Tucker-Lewis Index = 0.93.

Table 3. Pathak-Wieten Stoicism Ideology Scale (PW-SIS)

Please read each statement and choose the answer that best reflects your own views.

⍰ Disagree	Somewhat Disagree	Not Sure	Somewhat Agree	Agree

Item	Domain^	Original Item #*
1. I expect myself to hide my aches and pains from others.	Stoic Endurance	Q2
2. I don't believe in talking about my personal problems.	Stoic Taciturnity	Q3
3. I expect myself to manage my physical discomfort without complaining.	Stoic Endurance	Q5
4. I believe I should experience strong emotions. ***[reverse code]***	Stoic Serenity	Q8
5. When the time for my death comes, I believe I should accept it without fear.	Stoic Death Indifference	Q12
6. I expect myself to hide my strong emotions from others.	Stoic Taciturnity	Q13
7. I would prefer to be unemotional.	Stoic Serenity	Q14
8. I expect myself to manage my own problems without help from anyone.	Stoic Taciturnity	Q15
9. I believe my physical pain is best handled by just keeping quiet about it.	Stoic Endurance	Q17
10. I would be very upset if I knew my death was coming soon. ***[reverse code]***	Stoic Death Indifference	Q18
11. I expect myself to avoid feeling intense emotions.	Stoic Serenity	Q20
12. I would not allow myself to be bothered by the fear of death.	Stoic Death Indifference	Q24

⍰ See Methods for scoring instructions
* See Table S1 in the Technical Supplement, available online.
^ Not included in participant questionnaire.

Relationships among the PW-SIS and its four conceptual domains are shown in Table 4. Cronbach's alpha ranged from 0.64 to 0.71 for the sub-scales and was 0.78 for the 12-item PW-SIS. Scores for Stoic Taciturnity were strongly correlated with scores for both Stoic Endurance and Stoic Serenity, but Stoic Endurance and Stoic Serenity were not highly correlated with each other. Stoic Death Indifference had the highest (most stoic) mean scores among the four domains, and it was least correlated with the other three domains.

Table 4. Conceptual Domains of the Pathak-Wieten Stoicism Ideology Scale

Domain	Mean Score (95% CI)	Cronbach's α	Correlation with ST Score	Correlation with SE Score	Correlation with SS Score	Correlation with SDI Score
Stoic Taciturnity (ST): The belief that one should conceal one's problems and emotions from others (Modern)	-0.08 (-0.18 to +0.02)	0.71	1.00	0.59 p < 0.0001	0.53 p < 0.0001	0.09 p = 0.0729
Stoic Endurance (SE): The belief that one should endure physical suffering without complaining (Modern)	+0.04 (-0.06 to +0.13)	0.65	0.59 p < 0.0001	1.00	0.35 p < 0.0001	0.18 p = 0.0005
Stoic Serenity (SS): The belief that one should refrain from experiencing strong emotions (Classical)	-0.66 (-0.75 to -0.56)	0.64	0.53 p < 0.0001	0.35 p < 0.0001	1.00	0.15 p = 0.0031
Stoic Death Indifference (SDI): The belief that one should not fear or avoid death (Classical)	+0.08 (-0.03 to +0.18)	0.69	0.09 p = 0.0729	0.18 p = 0.0005	0.15 p = 0.0031	1.00
Stoicism Ideology Scale (PW-SIS)	-0.16 (-0.22 to -0.09)	0.78	0.79 p < 0.0001	0.74 p < 0.0001	0.72 p < 0.0001	0.53 p < 0.0001

Figure 1 depicts mean PW-SIS scores by response to the statement "I try to be a stoic." There was a clear monotonic and statistically significant trend, with respondents who reported trying to be a stoic "all of the time" having the highest stoicism scores, and respondents who reported trying to be a stoic "never" having the lowest stoicism scores. Most respondents chose one of the 3 intermediate categories. Respondents who chose "I don't know" as their response had stoicism scores similar to those who said they "sometimes" tried to be a stoic.

[Figure 1 here]

The distributions of mean scores for the 4 conceptual domain sub-scales are shown in Figure 2. Domain scores are comprised of the mean score for the 3 questions in the domain. In this study population, respondents were least likely to endorse Stoic Serenity and most likely to endorse Stoic Death Indifference.

[Figure 2 here]

The full distribution of respondent scores is shown separately for women and men in Figure 3. The distributions overlapped almost completely, but there were no men with the least stoic scores, and no women with the most stoic scores. Response distributions were skewed to the left for women (less stoic) and to the right for men (more stoic), consistent with a statistically significant difference in the mean scores for women (-0.31, 95% CI -0.40 to -0.22) and men (+0.04, 95% CI -0.05 to +0.14).

[Figure 3 here]

Results of an exploratory analysis of sociodemographic predictors of high endorsement of stoicism are shown in Table 5. There is no *a priori* cut point designated as "highly stoic" in the PW-SIS; in this analysis the cut point used was a mean score greater than the 75th percentile of the overall response distribution. The top quartile of the distribution of all respondents (n=390) ranged from +0.33 to +1.67. Among women, 18.9% strongly endorsed stoicism, compared with 32.8% of men. After multivariate adjustment, men were over two times as likely as women to fall into the top quartile of responses (OR=2.30, 95% CI 1.44 to 3.68, p<0.001). Adults born in the USA or Puerto Rico were also twice as likely as adults born elsewhere to strongly endorse stoicism (OR=1.97, 95% CI 1.01 to 3.84, p=0.048). Odds ratios showing stronger endorsement of stoicism by Hispanics, Blacks, Biracial persons, and adults 25 years and older were not statistically significant.

Table 5. Sociodemographic Predictors of a Mean PW-SIS Score in the Top Quartile (> 0.167)

	Odds Ratio (95% CI)	p value
Age 18-24 years	1.00 (referent)	
Age 25-73 years	1.34 (0.76 - 2.35)	n.s.
Men	2.30 (1.44 - 3.68)	< 0.001
Women	1.00 (referent)	
Asian	0.93 (0.38 - 2.25)	n.s
Black	1.55 (0.78 - 3.09)	n.s
Biracial/Other	1.70 (0.66 - 4.34)	n.s
Hispanic	1.88 (0.99 - 3.56)	n.s
Whites	1.00 (referent)	
Born in the USA	1.97 (1.01 - 3.84)	0.048
Born elsewhere	1.00 (referent)	

DISCUSSION

The Pathak-Wieten Stoicism Ideology Scale is a theoretically coherent, multi-dimensional scale which demonstrates good psychometric properties and content validity based on initial validation in a large sample of educated adults. The PW-SIS is also brief and practical for integration into a wide range of empirical research studies. In our study population of mostly younger adults, endorsement of stoicism varied by conceptual domain, with the weakest endorsement of the classical domain Stoic Serenity (aversion to strong emotions). Exploratory logistic regression analysis identified male gender and USA birth as significant predictors of strong endorsement of stoicism. Finally, point estimates suggested higher endorsement of stoicism for Blacks, Hispanics, and Biracial persons compared with Whites, but these results were not statistically significant.

Integration of our theory of a stoic ideology of the self into existing health behavior models could help explain the formation of beliefs and attitudes toward criterion-specific help-seeking behaviors. Reasoned action approaches - such as the Integrative Model of Behavior Prediction - poorly define background factors that underlie belief formation.[38] Measurement of self-concepts, such as stoicism ideologies, may help explain this population variability. Expanding health behavior theory to include aspects of the self could also help inform health education messaging and risk-based communication.

Ironically, a personal ideology of stoicism almost guarantees failure to live up to one's personal ideal. Experiences of illness and disease often involve transient weakness and functional limitations. With aging, these experiences will increase in frequency, duration, and severity for most people. Simply put, experiences of illness and disease tend to require aid – whether from health professionals in a formal context, or from family members or friends in an informal context. An ideology of stoicism creates an internal resistance to external objective needs, which can lead to negative consequences.[8-12]

Gender and Stoicism

Stoicism is widely viewed as a defining attribute of masculinity. Instruments designed to assess endorsement of hegemonic masculine ideologies have included specific questions that touch on stoicism. However, the conceptual and measurement overlap between these instruments and the 4-domain PW-SIS is minor.[17] For example, in the widely used Personal Attributes Questionnaire, only 2 of 24 items relate to a single domain of the PW-SIS. The Conformance to Masculine Norms scale assesses 11 distinct domains of masculinity, of which only 2 (emotional control and self-reliance) partially overlap with domains of the PW-SIS.[18,19] In our study, the results are notable because for both genders the most frequent scores were in the middle of the distribution (neutral on stoic ideology), and the response distributions for women and men overlapped almost completely. Despite the fact that men were twice as likely as women to strongly endorse stoic ideology, our results suggest that gendered stereotypes about stoicism ("stoic men" and "emotional women") are overblown. Because the PW-SIS is agnostic to respondents' genders, it is ideally suited to investigate the empirical reality of stoicism among both women and men. Furthermore, our finding that a minority of women strongly endorsed stoic ideology may be particularly important. For example, a study of major strain among family caretakers of elderly dementia patients found that those who used stoicism as a coping strategy suffered burnout, while those who sought social support did not.[39]

Study Limitations

In any questionnaire-based scale, validity of the individual items and the total scale against the concept of interest is of paramount concern. Unlike many psychometric instruments, the PW-SIS does not purport to measure a latent, inherent trait such as personality, or a clinically-definable disorder such as depression or anxiety. Rather, we attempt to measure an explicit set of beliefs, which by definition are neither inborn nor immutable. Therefore, a robust assessment of the content validity of our scale items must come after publication and evaluation by multiple experts and researchers. We included a single questionnaire item "I try to be a stoic" to assess content validity, but future validation and outcome studies could expand on this approach or include a qualitative component.

A related question pertains to the predictive validity of the PW-SIS. In other words, to what extent does strong endorsement of stoic ideology predict actual stoic behaviors? Predictive validity can only be rigorously addressed through prospective study designs.

Our study population, similar to many scale validation studies, was university-based. Therefore validity and generalizability to very different populations should not be assumed, but instead tested in future studies. In particular, validation of the PW-SIS among the elderly and persons of lower educational attainment would be valuable for health-related research.

Strengths of the PW-SIS

Our scale has several strengths. First, all items refer explicitly to the respondent; there are no aphorisms or proverbs. Second, each item refers to an expectation or belief about ideal self-conduct, rather than to a simple description of past behavior. So for example, Q5 states "I expect myself to manage my physical discomfort without complaining" rather than "I always manage my physical discomfort without complaining." This distinction is critical to the theoretical underpinnings of the scale. Thirdly, we deliberately chose not to mention disease or illness in the scale items, so that the scale would be appropriate for a wide range of study populations, including currently healthy individuals. (Although some items do explicitly mention "physical pain" and "everyday aches and pains.") Our intention was to capture the respondents' *global* endorsement of stoicism as a *code of ideal conduct*.

Finally, the PW-SIS does not reference gender norms, so it can serve as a tool to empirically investigate gender differences in stoic ideology.

Directions for future research

The PW-SIS should be validated in multiple study populations with a range of socioeconomic and demographic characteristics. Our theory that ideologies of stoicism will result in constraints on health-related behaviors needs to be empirically tested, ideally in rigorously designed prospective studies. Given the rise of patient-centered health care,[40,41] understanding patients' motivations and perspectives has never been more important. The current health education paradigm holds that improving patients' knowledge of symptoms and signs will result in more timely help-seeking behavior.[38,42-44] Each year thousands of individuals suffer needlessly and many die because of extended delays in seeking professional aid for acute medical conditions (e.g., myocardial infarctions, strokes, diabetic emergencies, cancer complications and pain, and acute exacerbations of congestive heart failure).[45-52] Numerous studies have been conducted to attempt to elucidate the reasons behind patient delays,[46-51,53] with the ultimate goal of designing education programs and interventions that will result in timely help-seeking. Significant risk factors for help-seeking reluctance have been identified (e.g. Black race[52,54,55]) but much of the variation remains unexplained and we still lack a complete understanding of *why* certain patients and not others delay seeking aid.

A distinction of our theory is movement of the focus of inquiry away from the disease and the patient's relationship to the disease (e.g. health knowledge, symptom awareness, ability to comply with self-care regimens) and onto *patients' sense of self* – their self-concepts and self-identity.[56] We hypothesize that illness behaviors may become "noncompliant" or "irrational" or "self-harming" when specific courses of action would create an internal conflict with patients' ideas of *who they are***.** Specifically, we posit that people who strongly believe that they should manage their problems on their own, not show emotions, and not complain about physical discomfort will experience an internal cognitive conflict when faced with a situation that could require help from others. This internal conflict will lead to delays in or avoidance of help-seeking, with potentially life-threatening consequences. For example, empirical studies of increasing rates of male suicide in rural Australia have identified hegemonic

masculine norms of stoicism as an important causal factor in the context of severe economic stress.[57,58] Understanding the influences of race, ethnicity, socioeconomic status, religion, and other cultural factors on stoic ideologies may help explain past research findings on delays in help-seeking. Finally, there may also be positive health consequences of stoic ideologies for individuals,[15] which careful prospective research could confirm.

FIGURE LEGENDS

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

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Figure 1.
Content Validity of the Pathak-Wieten Stoicism Ideology Scale:
Mean Scores by Response to the Statement "I try to be a stoic"

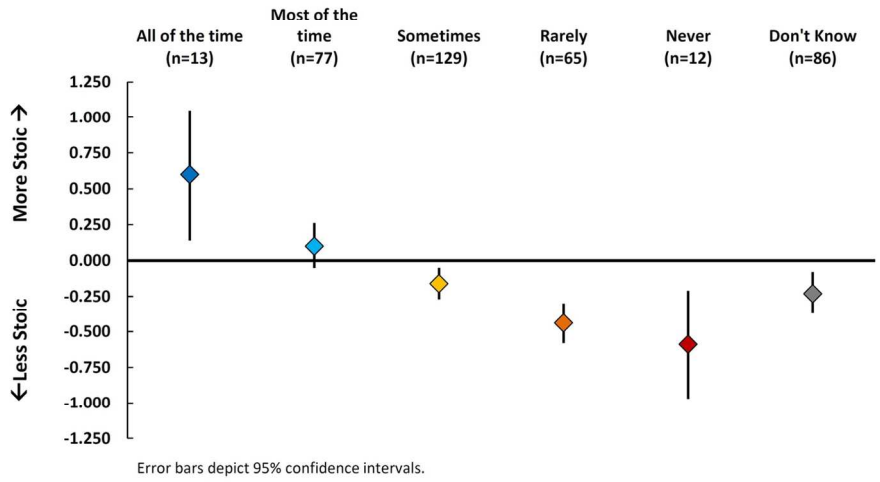

Figure 1. Content Validity of the Pathak-Wieten Stoicism Ideology Scale: Mean Scores by Response to the Statement "I try to be a stoic"

130x87mm (300 x 300 DPI)

Figure 2.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

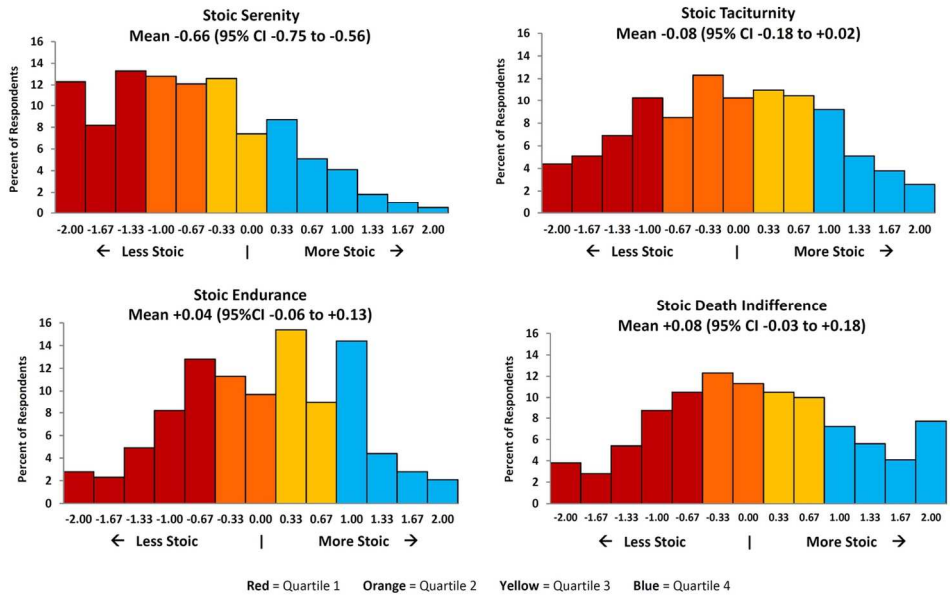

Figure 2. Pathak-Wieten Stoicism Ideology Scale: Distribution of Domain Scores

139x100mm (300 x 300 DPI)

Figure 3.
Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

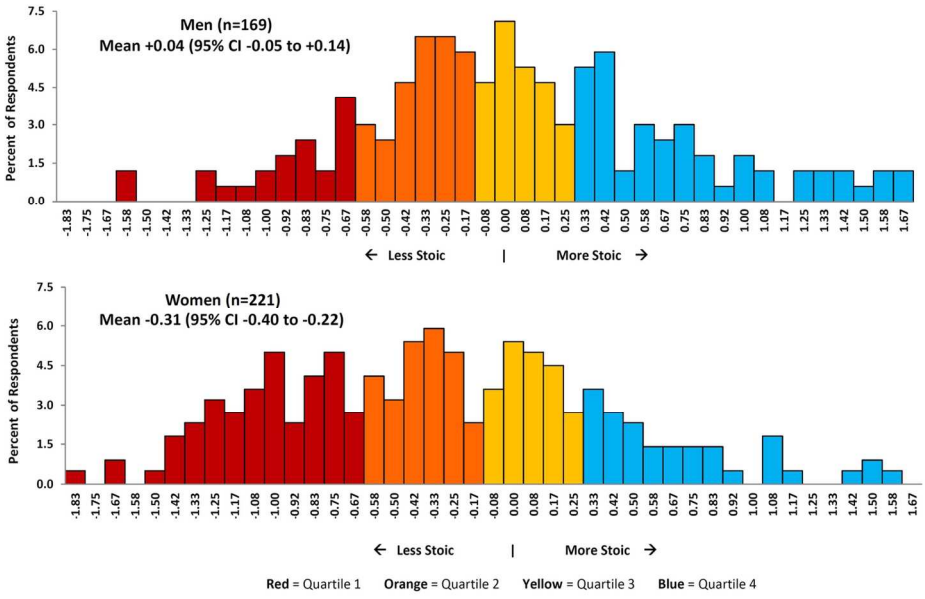

Figure 3. Pathak-Wieten Stoicism Ideology Scale: Distribution of Overall Scores by Gender

142x104mm (300 x 300 DPI)

Pathak Stoicism Paper

Technical Supplement

Scale items under each of the 5 domains along with response frequencies for the preliminary 24-item PW-SIS are shown in Table S1. The results of the assessment of redundancy and content validity (Step 1) are shown in Table S2. We dropped 2 items (Q1 and Q4) because they were highly correlated with other items. The entire Stoic Composure domain, with 4 questions, was dropped after consideration of content validity. At every level of response to the statement "I try to be a stoic," from "never" to all "all the time," responses to the 4 Stoic Composure items were highly pro-stoic. Furthermore, the overall response distributions for 3 of the 4 items (Q10, Q21, and Q22) were highly skewed, with only 7%, 4%, and 3% disagreeing with these statements (Table S1). There were no other items in the scale that resulted in such highly skewed response distributions. We concluded that this domain was referencing a strongly sanctioned social norm, and that while the items were not explicitly worded as aphorisms, they might be functioning in the same way. Some respondents may have been inhibited to admit that they did not believe that they should stay cool in an emergency, if they perceived that a strong socio-cultural norm existed. Interestingly, the only reverse-coded item under this domain, Q16: "I believe it's okay to let myself get upset and distracted in a major crisis," elicited a less skewed response, although the majority of respondents still disagreed with this statement. Given that there was only a single item which performed marginally well, we decided to drop the entire domain.

Confirmatory factor analysis of the reduced 18-item, 4-domain PW-SIS resulted in strong factor loadings for 16 of the 18 items (Table S2), and decent model fit statistics (Table S3). Both items which were dropped (Q23 and Q6) were reverse-code items. Removal of these 2 items resulted in slightly improved model fit statistics (Table S3) when the CFA was re-run on the remaining 16 items.

As shown in Table S2, the 16-item scale retained 6 items for Stoic Taciturnity, 4 items for Stoic Endurance, 3 items for Stoic Serenity, and 3 items for Stoic Death Indifference. In the interest of parsimony, we decided to remove an additional 4 items, so that the final scale would retain 3 items for each of the 4 domains. We dropped 3 items from Stoic Taciturnity (Q7, Q9, and Q19), and 1 item from Stoic Endurance (Q11) - all with the lowest

factor loadings, and all reverse-code items. Factor loadings for the remaining 12 items changed little in the final CFA model (Table S2), but model fit statistics improved so that the final RMSEA = 0.05 (95% CI 0.04-0.07), Goodness-of-Fit Index = 0.96, and Tucker-Lewis Index = 0.93.

Table S1. Preliminary Pathak-Wieten Stoicism Ideology Scale: Domains, Item Content, and Response Frequencies (n=390)						
Original Item #	Core Meaning / Scale Items	Disagree (-2)	Somewhat Disagree (-1)	Not sure (0)	Somewhat Agree (+1)	Agree (+2)
	Stoic Taciturnity: The belief that one should conceal one's problems and emotions from others (Modern)					
Q1	I prefer to keep my intense feelings to myself.	10%	17%	6%	40%	27%
Q3	I don't believe in talking about my personal problems.	23%	31%	14%	26%	6%
Q7	I believe it's fine if I cry openly in front of other people. *(reverse)*	31%	28%	12%	18%	11%
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*	3%	12%	14%	37%	33%
Q13	I expect myself to hide my strong emotions from others.	13%	23%	19%	32%	13%
Q15	I expect myself to manage my own problems without help from anyone.	16%	24%	13%	34%	13%
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*	16%	25%	23%	27%	8%
	Stoic Endurance: The belief that one should endure physical suffering without complaining (Modern)					
Q2	I expect myself to hide my aches and pains from others.	8%	24%	12%	41%	15%
Q4	I don't believe in bothering people close to me with my aches and pains.	20%	27%	14%	27%	12%
Q5	I expect myself to manage my physical discomfort without complaining.	9%	18%	14%	44%	16%
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*	5%	9%	16%	37%	33%
Q17	I believe my physical pain is best handled by just keeping quiet about it.	29%	29%	22%	15%	5%
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*	39%	32%	16%	11%	3%
	Stoic Composure: The belief that one should control one's emotions and behavior under stress (Modern)					
Q10	I expect myself to remain calm and decisive in an emergency.	2%	5%	11%	29%	54%
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	29%	25%	19%	19%	7%
Q21	I believe I should be calm and level-headed.	2%	2%	5%	35%	56%
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	1%	2%	8%	36%	54%
	Stoic Serenity: The belief that one should refrain from experiencing strong emotions (Classical)					
Q8	I believe I should experience strong emotions. *(reverse)*	4%	8%	21%	33%	34%
Q14	I would prefer to be unemotional.	37%	20%	17%	14%	11%
Q20	I expect myself to avoid feeling intense emotions.	25%	31%	19%	19%	5%
	Stoic Death Indifference: The belief that one should not fear or avoid death (Classical)					
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*	25%	16%	24%	19%	17%
Q12	When the time for my death comes, I believe I should accept it without fear.	8%	12%	20%	21%	39%
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*	13%	6%	22%	21%	39%
Q24	I would not allow myself to be bothered by the fear of death.	14%	19%	26%	17%	24%

Table S2. Confirmatory Factor Analysis and Item Reduction (n=390)					
Item	**Core Meaning / Scale Items**	**Step 1: Assessment of Redundancy and Content Validity**	**Step 2: CFA of 4-Domain, 18-Item Scale**	**Step 3: CFA of 4-Domain, 16-Item Scale**	**Step 4: CFA of 4-Domain, 12-Item Final Scale**
	Stoic Taciturnity		factor loadings	factor loadings	factor loadings
Q1	I prefer to keep my intense feelings to myself.	Redundant to Q13 (r = 0.54)			
Q3	I don't believe in talking about my personal problems.		0.66	0.67	0.67
Q7	I believe it's fine if I cry openly in front of other people.*(reverse)*		0.46	0.46[a]	
Q9	I believe in discussing my personal problems with family and friends. *(reverse)*		0.55	0.55[a]	
Q13	I expect myself to hide my strong emotions from others.		0.75	0.75	0.73
Q15	I expect myself to manage my own problems without help from anyone.		0.61	0.61	0.62
Q19	If my emotions get very intense, I believe it's all right to just show them openly. *(reverse)*		0.49	0.48[a]	
	Stoic Endurance				
Q2	I expect myself to hide my aches and pains from others.		0.65	0.65	0.68
Q4	I don't believe in bothering people close to me with my aches and pains.	Redundant to Q3 (r = 0.57)			
Q5	I expect myself to manage my physical discomfort without complaining.		0.57	0.56	0.55
Q11	If I am suffering, I believe in telling someone about my physical pain. *(reverse)*		0.54	0.55[a]	
Q17	I believe my physical pain is best handled by just keeping quiet about it.		0.62	0.62	0.61
Q23	I believe in letting myself complain about everyday aches and pains. *(reverse)*		0.26[b]		
	Stoic Composure				
Q10	I expect myself to remain calm and decisive in an emergency.	Domain excluded[c]			
Q16	I believe it's okay to let myself get upset and distracted in a major crisis. *(reverse)*	Domain excluded[c]			
Q21	I believe I should be calm and level-headed.	Domain excluded[c]			
Q22	I believe I should stay cool and steady when the pressure is high and the situation is tense.	Domain excluded[c]			
	Stoic Serenity				
Q8	I believe I should experience strong emotions. *(reverse)*		0.51	0.51	0.48
Q14	I would prefer to be unemotional.		0.70	0.70	0.71
Q20	I expect myself to avoid feeling intense emotions.		0.62	0.62	0.63
	Stoic Death Indifference				
Q6	I believe it's okay if I worry about dying too soon. *(reverse)*		0.27[b]		
Q12	When the time for my death comes, I believe I should accept it without fear.		0.61	0.62	0.63
Q18	I would be very upset if I knew my death was coming soon. *(reverse)*		0.57	0.57	0.57
Q24	I would not allow myself to be bothered by the fear of death.		0.78	0.76	0.76

Footnotes: [a] = Excluded for parsimony; [b] = Excluded for poor factor loading; [c] = Excluded for poor content validity and highly skewed response distribution.

Table S3. Model Fit Statistics for Confirmatory Factor Analysis of the PW-SIS

Model	Description	Chi square	df	RMSEA (90% CI)	Goodness-of-fit Index (GFI)	Adjusted GFI	Tucker-Lewis Index
	Step 2: After exclusion of 2 redundant items (q1 and q4) and 4 items from the Stoic Composure domain (q10, q16, q21, q22), confirmatory factor analysis (CFA) was performed on the 4-domain, 18-item PW-SIS.	318 p <.0001	129	0.06 (0.05 to 0.07)	0.91	0.89	0.86
	Step 3: After exclusion of 2 items with poor factor loading (q6 and q23), CFA was performed on the 4-domain, 16-item PW-SIS.	264 p <.0001	98	0.07 (0.06 to 0.08)	0.92	0.89	0.89
Final	**Step 4:** Factor loadings from Step 3 were examined, and for the purpose of parsimony, 4 additional items were excluded (q7, q9, q11, q19). Items with the strongest factor loadings in each domain were retained. The resulting 4-domain, 12-item PW-SIS has 3 items in each of the 4 domains.	103 p <.0001	48	0.05 (0.04 to 0.07)	0.96	0.93	0.93

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6-7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	*n.a.*
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-9
		(*c*) Explain how missing data were addressed	n.a
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	7-9
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6-9
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	n.a.
Outcome data	15*	Report numbers of outcome events or summary measures	8-9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	8-9
		(*b*) Report category boundaries when continuous variables were categorized	8-9
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8-9
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8-9
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	11-13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.