

## Research Paper

## Evaluating challenges for improving medically unexplained symptoms in US military veterans via provider communication

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## ABSTRACT

**Objectives:** Medically unexplained symptoms (MUS) are common, with particularly high rates observed in military veterans. Effective patient-provider-communication is thought to be a key aspect of care; however there have been few empirical studies on the association between communication and outcomes for patients with MUS. We evaluate whether discussing veterans' MUS-illness representations and good interpersonal skills have the potential to promote MUS-treatment adherence and improvement.

**Methods:** Veterans experiencing MUS (n = 204) reported on their primary care providers' communication about illness representations and interpersonal skills; correlation, regression, and bootstrap-mediation analyses were conducted to test hypotheses regarding veteran-reported outcomes. Main outcomes included satisfaction with the provider, MUS-treatment adherence, intentions to adhere, and expectations for MUS improvement.

**Results:** Veterans reported infrequent discussion of MUS illness representations but high degrees of provider interpersonal skills. Communication regarding patients' illness representations and treatment expectations was significantly related to treatment adherence and adherence intentions; provider interpersonal skills were not. Both were related to veteran satisfaction.

**Conclusions and practice implications:** Providers' interpersonal skills may be important in chronic illness contexts, such as MUS, by contributing to satisfaction with the provider. The current study suggests that providers may better promote MUS-treatment adherence through discussing MUS illness representations and treatment expectations.

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## 1. Introduction

Medically unexplained symptoms (e.g., chronic fatigue) or syndromes (e.g., chronic fatigue syndrome), referred to as MUS, present unique challenges for clinical practice [1]. MUS are pervasive and difficult to treat [2], and even having one MUS has been shown to cause significant disability [3]. The cause of MUS is not well understood, but likely involves a complex interaction of physiological and psychological factors [4]. Further, evidence-based treatment approaches focus on behavioural self-

management (cognitive behavioral therapy, graded physical exercise) [5,6].

This frustrating combination of complex physical symptoms, complex and not fully understood cause, and behavioural management contribute to communication difficulties and distrust of medical providers [7,8]. Communication difficulties may contribute to the somatic symptoms themselves [8,9]. Experts on MUS agree the patient-provider relationship is a critical component of effective treatment for MUS, yet there are few empirical studies on this [10]. More research is needed regarding the provider communication practices that can improve the care of patients with MUS.

Understanding communication practices for MUS is particularly important for military veterans. In addition to experiencing high rates of MUS (30%) [11,12], veterans' MUS may be more difficult to

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treat compared to civilians' [13]. Veterans with MUS have a long history of feeling marginalized by the medical community; veterans sometimes attribute their MUS to their military experience and may feel the government and the medical community are covering up the true cause of their MUS [14]. This distrust makes improving communication critical. It also provides an opportunity to understand what communication practices lead to improvements in what are often especially demanding interactions, which may allow us to focus on the most important communication styles when treating civilians and veterans with MUS.

The current study evaluates veterans with MUS to determine the impact of two types of provider communication behaviors on treatment adherence and health outcomes: 1) through discussion of the illness and treatment representations with the patient; and 2) through promotion of supportive relationships with the patient via interpersonal skills.

First, research in primary care [15] and in populations with hypertension [16] and type 2 diabetes [17] finds that discussing components of illness and treatment representations (beliefs/perceptions) promotes better patient care and adherence. Representations include perceptions, or mental models, regarding the cause, duration, consequences, diagnosis/label, associated symptoms, and treatment for the illness, as posited by the Common-sense Self-Regulation Model (CS-SRM) [18] and the Necessities-Concerns Framework [19]. The CS-SRM also includes patients' perceptions that their illness makes sense and is understandable ('coherence' [20]).

Phillips et al. [15] found that when patients reported that their primary care providers (PCPs) discussed components of illness and treatment representations (e.g., such as how long the condition would last and the cause of the condition; 'CS-SRM communication'), they were more satisfied, more likely to agree with the provider, more adherent to prescribed treatment, more likely to experience problem resolution, and less likely to utilize emergency care services for the problem in the subsequent month (and predicted these outcomes more strongly than reports of the providers' interpersonal skills).

It has been hypothesized that discussion about illness and treatment representations improves care because patient's feel that their condition is more understandable. In support of this hypothesis, Heisler et al. [17] showed that provider communication on elements similar to CS-SRM communication (e.g., regarding what to expect from the disease or treatment) predicted better Type 2 diabetes self-management in a sample of military veterans than did a patient-centered communication style. This effect was

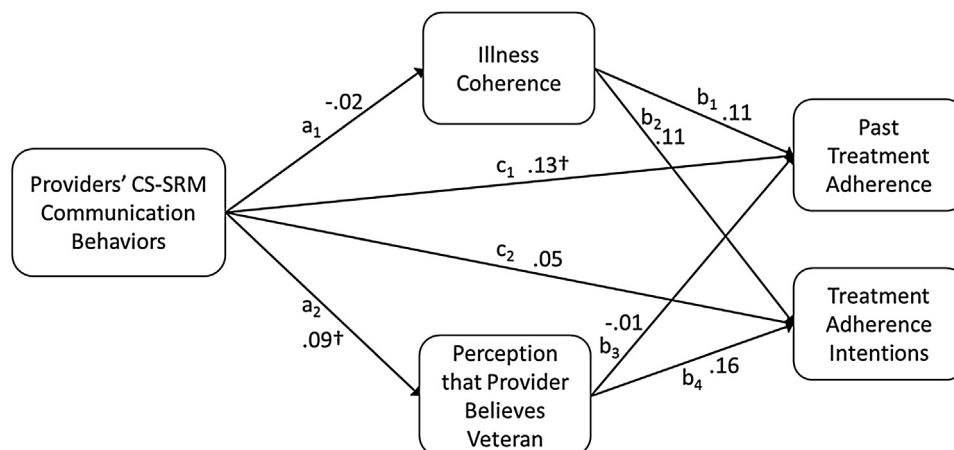
mediated by patient understanding of self-care of diabetes (similar to "illness coherence"). Similarly, Theunissen and colleagues [16] found that training providers to discuss patients' hypertension-related beliefs increased their understanding of the condition and decreased their concern about medications.

While not yet explicitly tested, there are reasons to believe that CS-SRM communication may be particularly important for patients with MUS. Qualitative work finds that both providers and patients believe that talking about explanatory models is a critical treatment strategy [21]; CS-SRM communication about symptoms should validate the patients' experience of MUS, which is an important predictor of outcomes. Further, providers who lack an explanation for MUS are frustrated with proving treatment for these patients [22]; having concrete guidelines on what to discuss about MUS with patients may help lower this frustration. However, it is possible that CS-SRM communication may not be beneficial, since research has shown that patients are less satisfied when providers express uncertainty [23].

Providers' interpersonal skills may also be particularly important for patients with MUS. Some research, as described above [15], as well as others [e.g.,24], shows that interpersonal skills and interventions to promote them are not linked with better adherence or outcomes. However, other research has shown that these skills do promote adherence in chronically ill populations [25], including in patients with MUS [26]. They may be important for patient adherence in chronic illness contexts such as MUS for several reasons. First, interpersonal skills are strongly linked to provider trust [27], which may determine adherence when other reasons for adherence are not possible (i.e., through clear demonstration of medical link between cause of the condition and treatment). Second, interpersonal skills predict satisfaction [28], which is an important predictor of continuity of care [29]. Continuity of care is more important for chronic illness than it is for acute problems. Lastly, it is important to patients with MUS that their provider believes them about the severity of the MUS and that the MUS warrant treatment [8], and providers' interpersonal skills may promote this perception.

### 1.1. The current study

The current study aims to evaluate the degree to which VA providers held discussions with veterans regarding their MUS and the possible effect of such discussions on veterans' MUS-related treatment behaviours and outcomes, compared to the provider's interpersonal skills. Veterans with at least one MUS were included



**Fig. 1.** This Figure illustrates the paths tested in analyses of Hypothesis 2, regarding mediation of the relationship between providers' CS-SRM Communication and Past Treatment Adherence, and separately, Treatment Adherence Intentions, by Illness Coherence and the Perception that the Provider disbelieves the Veteran regarding the MUS.

in the study. This is consistent with previous studies that find even one MUS is clinically significant [3]. The outcomes of interest include: satisfaction with the provider, improvement in physical and mental health in the previous year, past treatment adherence, intentions to adhere to treatment, and expectations for MUS improvement, which predict actual improvement [30].

We test the following *a priori* hypotheses: 1) Veterans' reports of their providers' CS-SRM communication behaviours and interpersonal skills will each uniquely predict the outcomes of interest, although CS-SRM communication may not be related to patient satisfaction. 2) Any relationship between veterans' reports of the provider's CS-SRM communication and adherence/intentions will be mediated by veterans' illness coherence and veterans' perception that the provider believes the veteran regarding the MUS severity. 3) Any relationship between veterans' reports of the provider's interpersonal skills and adherence/intentions will be mediated by the veteran's satisfaction with the provider and veterans' perception that the provider believes the veteran regarding the MUS severity. Figs. 1 and 2 illustrate these expected relationships (for Hypothesis 2 and 3, respectively).

**2. Method**

*2.1. Participants and procedure*

U.S. military veterans who receive care from a post-deployment health clinic of the Veterans' Administration (VA) were mailed a postal mail survey. Veterans' contact information was often inaccurate, with an estimated 50% not receiving the mailing. Of those estimated to have received the mailing, 40% responded (n=243; or 20% of the entire population). A previous survey with this population found few demographic differences between respondents and the clinic population [31]. The clinic is a tertiary referral center for veterans with post-deployment health concerns (particularly MUS). Veterans were asked about their communication with their primary care provider (PCP). In the VA, each veteran is assigned a PCP who organizes the veteran's care.

Recent research finds individual MUS symptoms significantly contribute to disability and distress [3,32]. Veterans were asked if they had any symptoms that have been diagnosed as medically unexplained. MUS was defined for veterans with the following text:

*Medically unexplained symptoms are chronic symptoms that are just difficult to diagnose or are connected to a problem we don't know enough about. For example, conditions with a lot of medically*

*unexplained symptoms include Gulf War Illness, fibromyalgia, chronic fatigue syndrome and irritable bowel syndrome. Sometimes these symptoms may not have a name or a known cause (e.g., headaches of unknown cause, lower back pain). Sometimes you or your doctor may have an idea about what causes these difficult-to-diagnose symptoms, but for this survey we will call them medically unexplained symptoms, or MUS.*

Previous research has found that physician diagnosis is not necessary to identify MUS [33,34], and we were most interested in understanding veterans' experiences with care when they perceived that they had a medically unexplained symptom/syndrome. The term "MUS" is consistent with research on patients' preferred terms for MUS [35].

Excluded were 36 respondents who reported having zero symptoms and no diagnosis (or mention) of MUS by a health-care provider (resulting in N=204). The study was approved by all relevant institutional review boards, informed consent was attained from all participants, and responders were compensated via a check for \$10. Statistical analyses were conducted using SPSS version-21.

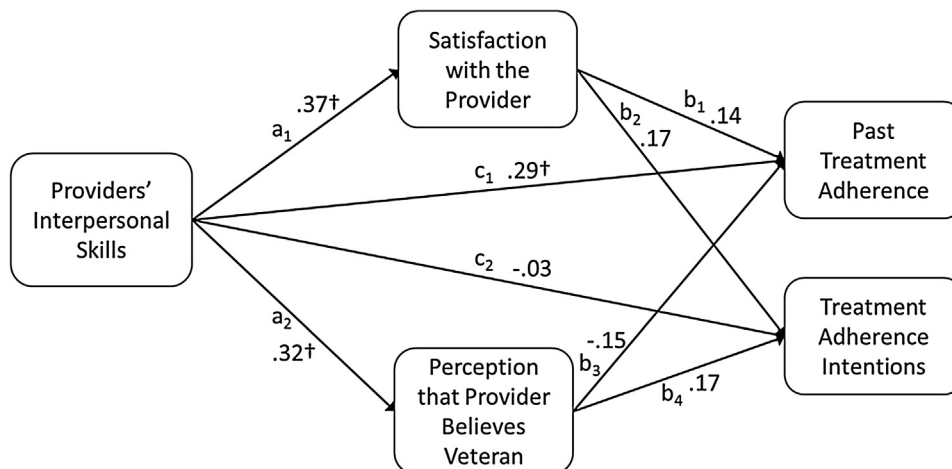
*2.2. Measures*

*2.2.1. CS-SRM communication scale*

Veterans were asked to report whether their PCP had engaged in certain behaviours during any previous medical interactions, all with yes/no options: e.g., 'My PCP discussed with me which symptoms are related to my MUS and which are not'. Veterans reported on their provider's communication behaviours, as in Phillips et al. [15], but a few items were added to assess behaviours that are more relevant to a population suffering from chronic MUS. Table 1 lists all items in the scale. The composite for this variable is a sum of the yes responses, so that higher scores indicate more discussion of the MUS with the veteran. Scores ranged from 0 to 12, with a mean (SD)=3.96(4.12). Internal consistency of the items was high (Kuder-Richardson 20=0.92).

*2.2.2. Interpersonal skills of the PCP*

Veterans responded to the following items (from Phillips et al. [15]), each with a yes or no response option, which were summed to create a composite to represent this construct: 'My PCP was sympathetic about my problem,' 'My PCP understood my feelings about this problem,' 'My PCP is a good person,' and 'My PCP is concerned about my feelings.' Scores ranged from 0 to 4, with a mean (SD)=2.51(1.65) (Kuder-Richardson 20=0.89).



**Fig. 2.** This Figure illustrates the paths tested in analyses of Hypothesis 3, regarding mediation of the relationship between providers' Interpersonal Skills and Past Treatment Adherence, and separately, Treatment Adherence Intentions by Satisfaction with the Provider and the Perception that the Provider disbelieves the Veteran regarding the MUS.

**Table 1**

Veterans (%) reporting that their PCP discussed each CS-SRM aspect of their MUS/treatment; Correlations between each item and: full composite scale ( $r_1$ ), treatment adherence ( $r_2$ ), and adherence intentions ( $r_3$ ).

CS-SRM Communication Behaviour Scale Items:	%Yes	$r_1$	$r_2$	$r_3$
'My primary care provider . . .'				
. . . discussed with me which symptoms are related to my MUS and which are not	34	0.72	0.28**	0.12
. . . discussed with me what might be the cause of my MUS	40	0.71	0.22**	0.16*
. . . discussed with me why my symptoms are 'medically unexplained'	35	0.73	0.24**	0.10
. . . told me what s/he was looking for during the physical exam	46	0.66	0.26**	0.07
. . . told me how long I could expect to have this problem/MUS	23	0.75	0.33**	0.19*
. . . gave me clear instructions about my treatment for my MUS: what to do, when, how often, and for how long	28	0.78	0.35**	0.21**
. . . told me what I might expect for my treatment for my MUS	32	0.81	0.34**	0.18*
. . . gave me some tips to help me work my MUS-treatment into my daily routine	36	0.75	0.32**	0.16*
. . . told me how to monitor my problem to see if the MUS-treatment is working	29	0.77	0.37**	0.14
. . . discussed with me whether or not time would resolve my MUS	27	0.77	0.29**	0.15*
. . . discussed with me whether or not stress might be playing a role in my MUS	42	0.71	0.32**	0.14
. . . discussed with me that the initial cause of my MUS may differ from what is causing them to continue	24	0.68	0.23**	0.12

### 2.2.3. Perception that the provider believes the veteran

This variable was represented as a composite (average) of two perceptions, which were reverse scored so that high scores on the variable indicate perception that the provider believes the veteran regarding the severity of the MUS: 'My primary care doctor doesn't believe me when I say how bad my MUS are: strongly disagree (=1) to strongly agree (=5)' and 'My primary care doctor thinks that I am only out to get attention or special treatment for my symptoms: strongly disagree (=1) to strongly agree (=5).' These two items correlated with each other  $r(226)=0.62, p < 0.001$ .

### 2.2.4. Satisfaction with the PCP

Veterans responded to: 'How satisfied are you with the overall care you have received from your PCP: not at all (=1) to very (=5)?'

### 2.2.5. Illness coherence

The illness coherence subscale of the Illness Perception Questionnaire Revised (IPQ-R [20]) represented veterans' overall understanding of their MUS. Veterans rated their agreement on 5 items (first four reverse-scored); higher scores indicate greater coherence or understanding of the MUS: 'The symptoms of my MUS are puzzling to me', 'My MUS are a mystery to me', 'I don't understand my MUS', 'My MUS don't make any sense to me', and 'I have clear picture or understanding of my MUS' (strongly disagree (=1) to strongly agree (=5)) (Mean = 3.57, SD = 0.92;  $\alpha=0.83$ ).

### 2.2.6. Past treatment adherence

Veterans reported on their adherence to MUS treatment recommendations in the preceding 6 months: 'To what degree did you follow your PCPs' recommendations for MUS treatment in the past 6 months: not at all (=1) to very much (=5)?' This item was general, since the recommended treatments for MUS can differ considerably (e.g., graded physical activity, counseling, medication).

### 2.2.7. Intentions to adhere

Veterans responded to: 'How likely are you to follow up on your providers' recommendations about treatment in the next 6 months: very unlikely (=1) to very likely (=5)?'

### 2.2.8. Improvement in health in the preceding year

Veterans reported on improvement in physical and mental health in the preceding year: 'Compared to one year ago, how would you rate your physical health in general now?' and 'Compared to one year ago, how would you rate your emotional problems now?' with options from 'much worse' (=1) to 'much better' (=5).

### 2.2.9. Expectations for improvement

Expectations for improvement in five MUS-related domains were assessed with: 'Do you expect to see improvement in any of the following over the next 6 months: number of physical symptoms? Severity of physical symptoms? How much are you bothered by your physical symptoms? Your experience of general pain? Your mood or stress levels?' Answer options for each of these ranged from 'no improvement' (=1) to 'great improvement' (=5). An average of participants' responses represented their overall expectations for improvement; higher scores indicate greater expectations for improvement ( $\alpha=0.89$ ).

## 2.3. Analysis

For the analyses, we first calculated basic descriptive data on veterans' reports of their PCPs' CS-SRM communication behaviours and interpersonal skills. We calculated bivariate correlations between individual items and their composite, past adherence, and adherence intentions; this allows us to evaluate the possible differences in importance between particular communication behaviours and interpersonal skills for future interventions. To test the first hypothesis, simultaneous regression with CS-SRM communication reports and interpersonal skills reports as predictors was run for each outcome. To test the second and third hypotheses, we used the PROCESS method (Model 4) developed by Andrew Hayes [36], which allows testing of multiple mediators (via bootstrapping) of a relationship at one time. Two analyses tested Hypothesis 2 (one for each outcome), and two analyses tested Hypothesis 3.

## 3. Results

The average age of participants ( $N=204$ ) was 50.71 years ( $SD=13.40$ ), ranging from 27 to 88 years of age. Age was significantly correlated with satisfaction with the PCP ( $r(187)=0.32, p < 0.001$ ). However, tests of the hypotheses did not alter when controlling for age. Eighty-seven percent of the sample was male ( $n = 177$ ), and gender was not significantly related to any of the study variables.

Scores on the CS-SRM communication scale ranged from 0 to 12, with a mean ( $SD$ ) = 4.33(4.22). Importantly, 62 veterans (30%) of the sample reported that their provider engaged in zero CS-SRM communication behaviours. The communication behaviour most reported by veterans was the provider telling the veteran what he/she was looking for during the physical exam (46% reported the behaviour). The least frequently reported communication behaviour was the provider discussing how long the veteran could expect to have the MUS (23%).



**Table 2**  
Percentage of veterans that reported their primary care provider had exhibited each interpersonal skill; correlation between each item and the full composite scale (r1), between each item and treatment adherence (r2), and between each item and adherence intentions (r3).

Provider Interpersonal Skills Items: 'My primary care provider . . .'	%Yes	r1 Scale	r2 Adherence	r3 Adherence Intentions
. . . was sympathetic about my problem	59	0.90	0.40**	0.12
. . . understood my feelings about this problem	54	0.88	0.35**	0.05
. . . is a good person	76	0.83	0.25**	0.06
. . . is concerned about my feelings	63	0.86	0.21**	0.17*

Table 1 provides the descriptive information and bivariate correlations for CS-SRM Communication item relations. Table 2 provides the descriptive information and bivariate correlations for interpersonal skills item relations. Of interest are the following: the specific CS-SRM communication behaviours that were most strongly related to veterans' adherence intentions were related to discussion of the treatment itself (e.g., whether the veteran reported that the provider gave him/her clear instructions on how to do the treatment). Every item in the CS-SRM communication scale and every item in the Interpersonal Skills scale was significantly related to veterans' reported treatment adherence. The only interpersonal skills item that was significantly related to intentions was, 'My PCP is concerned about my feelings' ( $r(170) = 0.17, p = 0.03$ ).

Table 3 presents bivariate correlations between CS-SRM communication, interpersonal skills (the composite variables) and outcomes of interest. Both composites were significantly related to treatment adherence, satisfaction with the provider, and the perception that the provider believes the veteran regarding the severity of the MUS. Neither was significantly related to veterans' expectations for MUS improvement nor to improvement in mental or physical health in the preceding year. Only CS-SRM Communication was related to adherence intentions ( $r(171) = 0.20, p < 0.01$ ).

The results of the multivariate analyses for evaluation of Hypothesis 1 are presented in Table 4: as in the bivariate analyses, despite being strongly correlated with each other ( $r(203) = 0.62, p < 0.001$ ), veterans' reports of the providers' CS-SRM communication and interpersonal skills explained unique variance in veterans' satisfaction with the PCP ( $\beta = 0.33, p < 0.001$  and  $\beta = 0.33, p < 0.001$ , respectively). Only CS-SRM Communication was significantly related to veterans' past treatment adherence and intentions to adhere ( $\beta = 0.31$  and  $\beta = 0.20$ , respectively,  $p < 0.01$ ; for Interpersonal skills:  $\beta = 0.17$  and  $\beta = 0.0$ , respectively,  $p > 0.05$ ).

Regarding Hypothesis 2, neither expected indirect effect between CS-SRM Communication and Past Treatment Adherence (paths  $a_1*b_1$  and  $a_2*b_3$  in Fig. 1) were significant. The direct effect was significant (path  $c_1 = 0.13, SE = 0.03, t = 5.35, p < 0.001, 95\% CI = 0.08, 0.18$ ). Neither indirect effect between CS-SRM Communication and Treatment Adherence Intentions (paths  $a_1*b_2$  and  $a_2*b_4$  in Fig. 1) were significant; the direct effect was not significant (path

$c_2 = 0.05, SE = 0.02, t = 1.93, p = 0.05, 95\% CI = -0.001, 0.10$ ). Fig. 1 shows all path coefficients.

Regarding Hypothesis 3, neither expected indirect effect between Interpersonal Skills and Past Treatment Adherence (paths  $a_1*b_1$  and  $a_2*b_3$  in Fig. 2) were significant. The direct effect was significant (path  $c_1 = 0.29, SE = 0.07, t = 3.84, p < 0.001, 95\% CI = 0.14, 0.44$ ). Neither indirect effect between Interpersonal Skills and Treatment Adherence Intentions (paths  $a_1*b_2$  and  $a_2*b_4$  in Fig. 2) were significant; the direct effect was not significant (path  $c_2 = -0.03, SE = 0.07, t = -0.39, p = 0.70, 95\% CI = -0.17, 0.11$ ). Fig. 2 shows all path coefficients.

A post-hoc analysis showed that veterans' perceptions that the provider believed the veteran regarding MUS-severity mediated the relationship between satisfaction and both types of communication (indirect effect 95% confidence interval for interpersonal skills and CS-SRM communication = (0.03, 0.15) and (0.01, 0.05), respectively).

#### 4. Discussion and conclusion

##### 4.1. Discussion

This study evaluated military veterans' reports of their PCP's communication behaviours about illness and treatment representations (CS-SRM communication) and found that they predicted veterans' MUS-treatment adherence and adherence intentions, whereas reports of the providers' interpersonal skills did not; both predicted satisfaction with the provider. This study was the first to assess CS-SRM communication and to evaluate the relative potential benefit of this type of communication compared to interpersonal skills-based communication for promoting treatment adherence in this population.

CS-SRM aspects of MUS were infrequently discussed between PCPs and veterans, at least according to reports of the veterans; this indicates there is much room for improvement in patient care through interventions that increase CS-SRM communication (and/or veterans' perceptions or memory for these behaviours). Indeed, it is possible that providers are discussing these points but the veterans are not attending to, understanding, or remembering these communication behaviours. Future research will involve an

**Table 3**  
Bivariate correlations between veterans' reports of their primary care provider's CS-SRM communication and interpersonal skills (the composite variables) and outcomes of interest. Scale internal consistency values are in diagonal cells, in italics.

	Mean (SD)	Median (IQR)	1	2	3	4	5	6	7	8	9	10
1 Providers' CS-SRM Communication	3.96 (4.12)	2.0 (7)	0.92									
2 Providers' Interpersonal Skills	2.51 (1.65)	3.0 (3)	0.62	0.89								
3 Illness Coherence	3.57 (0.92)	3.6 (1.2)	-0.07	0.00	0.83							
4 Perception that Provider Believes Veteran	2.59 (1.04)	2.5 (1)	0.35	0.46	-0.21	0.76						
5 Satisfaction with the Provider	3.36 (1.27)	4.0 (1)	0.48	0.50	-0.15	0.41	-					
6 Treatment Adherence	3.46 (1.35)	4.0 (2)	0.41	0.35	0.03	0.13	0.25	-				
7 Adherence Intentions	3.88 (1.20)	4.0 (2)	0.20	0.12	0.05	0.19	0.22	0.19	-			
8 Recent Physical Health Improvement	2.45 (0.90)	3.0 (1)	-0.04	0.01	-0.03	0.06	-0.02	-0.19	-0.14	-		
9 Recent Mental Health Improvement	2.69 (0.95)	3.0 (1)	-0.03	0.07	-0.14	0.10	0.11	-0.13	-0.08	0.42	-	
10 Expectations for MUS-Related Improvement	2.33 (0.97)	2.0 (2)	0.01	-0.04	-0.11	-0.02	0.11	-0.14	-0.12	0.15	-0.02	0.89

Note. Correlations magnitude >0.19 are significant at  $p < 0.01$ . Correlations magnitude >0.14 are significant at  $p < 0.05$ .

**Table 4**

Results of multivariate regression analyses for evaluation of Hypothesis 1. Each of six outcomes were regressed onto Veterans' reports of the primary care provider's CS-SRM communication and interpersonal skills.

Variable	Past Treatment Adherence			Treatment Adherence Intentions			Recent Mental Health Improvement		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Providers' CS-SRM Communication	0.10	0.03	0.31**	0.06	0.03	0.20*	-0.03	0.02	-0.12
Providers' Interpersonal Skills	0.14	0.07	0.17	0.00	0.07	0.00	0.08	0.05	0.14
<i>R</i> <sup>2</sup>	0.18			0.04			0.01		
<i>F</i>	18.99			3.50			1.34		

Variable	Recent Physical Health Improvement			Expectations for MUS-Related Improvement			Satisfaction with the Provider		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Providers' CS-SRM Communication	-0.01	0.02	-0.06	0.01	0.02	0.05	0.09	0.02	0.28**
Providers' Interpersonal Skills	0.03	0.05	0.05	-0.04	0.05	-0.07	0.26	0.06	0.33**
<i>R</i> <sup>2</sup>	0.00			0.00			0.30		
<i>F</i>	0.25			0.28			38.99		

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

observational component that allows us to parse the providers' behaviour from the veterans' reports of providers' behaviour.

We did not hypothesize that CS-SRM communication would be significantly related to satisfaction, because patients have shown to be dissatisfied with uncertainty [23]. However, veterans' reports of their PCP's CS-SRM communication and interpersonal skills were both uniquely predictive of veterans' satisfaction with the provider, indicating that discussing the uncertainty of MUS might not result in poor satisfaction. Veterans with MUS may want as many details on the MUS as possible, and even though elements may be 'medically uncertain', the provider may still be able to explain why a more certain explanation is not possible and, further, not necessary for successful treatment of MUS. With trust in the provider, a veteran may intend to and actually adhere to treatment recommendations for MUS despite not fully understanding the condition or treatment. The fact that veterans' reports of the provider's CS-SRM communication and interpersonal skills were uniquely related to satisfaction means that their relationship with satisfaction cannot be explained by possible overlap with each other. Whether both types of communication together optimally promote treatment adherence is not known from these results, due to study limitations discussed below; the evidence suggests, as does that in Phillips et al. [15], that CS-SRM communication may be more important if time for training/implementing in medical settings is limited.

Very few variables were related to veterans' expectations for improvement. It is generally recognized that MUS are pervasive and very stable [2,37]; there may be very little variation in expectations-for-improvement to predict. However, the study correlations show that the strongest relationships between expectations-for-improvement and any other measured variable were veterans' perceptions that the provider believed the veteran regarding the severity of the MUS. Further, the post-hoc mediation analysis indicated that both types of communication were related to veteran satisfaction, at least partially because of this perception. This suggests interventions geared towards promoting these perceptions (potentially through CS-SRM communication and/or interpersonal skills training).

Future research could evaluate veterans' other specific illness- and treatment-related beliefs (e.g., perceived causes and consequences; concerns regarding and perceived necessity of specific treatments) and how they may differentially influence treatment behavior and/or be differentially influenced by provider communication tactics. Salmon [8] reviews research that shows differing effects on patient satisfaction when providers attribute MUS to different causes (biological, psychological, etc). Future research

could also investigate the particular effects of different messages from the provider, regarding the cause of the MUS.

Regarding the limitation of self-reported measures in the present study: despite the fact that veterans' memory for and perception of the provider's behavior in the medical encounter are more proximal to the veteran's subsequent beliefs and behaviors, it is important that future research determine how accurate their reports/perceptions are through direct observations of medical interactions. Further, the observed effects may have been attenuated due to heterogeneity of provider characteristics (duration of care; provider demographics, etc); future studies should gather additional information about the providers to better understand contextual factors that influence different communication styles.

The limited number of items to assess the outcomes of interest were a limitation of the study. Although single-item measures may be clinically useful and more practical and with sufficient reliability [40], multi-item measures of the constructs of interest would only improve the reliability of the current analyses. Further, we did not use standardized self-report measures of adherence, because we were asking the veterans to report on unspecified treatment, since treatment for MUS is not typically a medication but is a combination of physical activity and psychological therapy. Measurement issues may account for why none of the mediation hypotheses were supported. On the other hand, some of the observed significant relationships may have been due to social desirability bias, such that those who were more satisfied with their providers were more likely to report past adherence and adherence intentions.

The representation/measurement of MUS in the current study may limit generalizability to MUS-populations that are determined by different criteria: Most often, MUS is defined by a count of symptoms using a scale such as the patient health questionnaire (PHQ-15 [38]), or through physician diagnosis. Future research should examine the generalizability of the current results to other clinically determined MUS populations (e.g., physician diagnosed fibromyalgia). However, as Sumathipala et al. [39] pointed out, not all MUS presentations in primary care can be attributed to underlying disorders and may be single, physical symptoms. Further, the findings should be evaluated with respect to the influence of comorbidity (i.e. with other chronic mental and/or physical health conditions), gender, age, and literacy of the patients with MUS.

A strength and limitation of this study was the study population. Although civilians and veterans with MUS are similar on many characteristics (e.g., comorbidity, literacy rates), military

veterans experience a disproportionate burden from MUS [41], and there is some evidence that care and treatment for veterans with MUS is more difficult than for civilians [13]. It is important that research focuses on helping this vulnerable population. Further, identifying the best communication practices in difficult situations (e.g., historic distrust) may focus our efforts to identify best communication practices in more general settings with civilians. Future research is needed to determine the generalizability of this study to other populations.

#### 4.2. Conclusion

The current results are a preliminary evaluation of the potential of different types of provider communication for improving MUS-related treatment adherence and well-being compromised by MUS. Future observational research should evaluate the direct effect of providers' communication behaviours on veterans' treatment representations and adherence and subsequent health changes in a longitudinal study design in order to warrant testing interventions involving provider-communication training.

#### 4.3. Practice implications

The current results indicate that training providers to discuss the CS-SRM aspects of MUS and treatment with the veteran may work to improve veterans' adherence to MUS-treatment recommendations and satisfaction with the provider—and hence, continuity of care and, potentially, improvement in MUS over time.

#### Disclosure statement

There are no conflicts of interest to declare for any of the authors.

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