Title: What you wear does not affect the credibility of your treatment: a blinded randomized controlled study.

Authors:

1. Adrian C Traeger (Corresponding author), Prince of Wales Clinical School, University of New South Wales, Sydney, Australia and Neuroscience Research Australia, Sydney, Australia a.traeger@neura.edu.au

2. Ian W Skinner, Prince of Wales Clinical School, University of New South Wales, Sydney, Australia and Neuroscience Research Australia, Sydney, Australia i.skinner@neura.edu.au

3. Markus Hübscher, Prince of Wales Clinical School, University of New South Wales, Sydney, Australia and Neuroscience Research Australia, Sydney, Australia m.huebscher@neura.edu.au

4. Nicholas Henschke, Institute of Public Health, University of Heidelberg, Heidelberg, Germany henschke@uni-heidelberg.de

5. G Lorimer Moseley, Sansom Institute for Health Research, University of South Australia, Adelaide, Australia and Neuroscience Research Australia, Sydney, Australia Lorimer.Moseley@unisa.edu.au

6. James H McAuley, Prince of Wales Clinical School, University of New South Wales, Sydney, Australia and Neuroscience Research Australia, Sydney, Australia J.McAuley@neura.edu.au

Corresponding author at:
Mr Adrian C Traeger
Neuroscience Research Australia. Barker Street, Randwick, Sydney 2031, Australia.
Tel: +61 2 9399 1049 Fax: +61 2 9399 1121 Email: a.traeger@neura.edu.au

Abbreviated title: Substance over style: a randomized study
Key words: Randomized Controlled Trial, Low Back Pain, Professional Practice, Patient-Centered Care, Patient Education
Word Count: 196 words (Abstract)
2561 words (Introduction, Method, Results, Discussion)
References: 28
Tables: 4
Figures: 3
Ethics approval: We obtained ethical approval for this study from the University of New South Wales Human Research Ethics Committee in June 2013 (HC12664). Participants gave written informed consent before data collection began.
Competing interests: Nil

Source(s) of support: AT and IS are supported by a National Health and Medical Research Council PhD Scholarships. GLM is supported by a National Health and Medical Research Council research fellowship NHMRC ID 1061279. JM and MH are supported by a National Health and Medical Research Council project grant ID 1047827.

Acknowledgements: Nil

Abstract

Objective: Professional appearance is easily modifiable, and might alter the effects of a clinical encounter. We aimed to determine whether professional attire influences a patient's perception of treatment credibility.

Methods: We performed a single-blind randomized controlled study on 128 patients with acute non-specific low back pain who were about to receive treatment in primary care. The treating clinician was randomly allocated to wear formal attire (experimental condition) or casual attire (control condition) to the consultation. Clinicians provided a standardized briefing on the rationale behind the patient's forthcoming treatment. Treatment credibility (Credibility and Expectancy Questionnaire) was assessed immediately after this briefing.

Results: All patients received the experimental or control condition as allocated and provided complete primary outcome data. Formal attire had no effect on perceived treatment credibility (Mean difference between groups 1.2 [95%CI -1.1 to 3.5]). Age was the only significant predictor of treatment credibility; older patients rated treatment credibility higher (Beta = 0.16 [95%CI 0.08 to 0.24]).

Conclusion: In a trial setting, whether or not a clinician is formally dressed has no effect on perceptions of treatment credibility in patients with acute low back pain.

Practice Implication: Clinicians should dress comfortably without fear of losing credibility.

Key Words: Randomized Controlled Trial; Low Back Pain; Professional Practice; Patient-Centered Care; Patient Education

(This abstract is 196 words)

1. Introduction

Credibility refers to the quality of being trusted or believed in [1]. Clinicians place high value on their credibility - some junior clinicians make dangerous decisions, such as not asking for clinical support when patients are in life-threatening situations (e.g. a prolonged seizure), because they fear losing credibility in front of their patients and peers [2]. Clinicians who are considered credible are likely to elicit changes in health attitudes and behaviors [3] that are critical for effective first contact care [4]. The credibility of the treatment is also important - treatment adherence [5], patient satisfaction [6] and physical function [7] all increase in line with treatment credibility. Even inert treatments can affect health outcomes if patients perceive them to be credible [8, 9].

The success or failure of many primary care treatments might therefore depend, at least in part, on credibility. However, maintaining credibility can be a challenge for some clinicians, particularly those working in hierarchical, multidisciplinary settings. A recent systematic review, for example, found that doctors produced better outcomes from patient education treatments than physiotherapists or nurses [10]. In this review, while professional background of the clinician did affect treatment outcomes, other aspects of the education such as content (traditional biomedical vs. biospychosocial) did not. Jackson [11] also found that boosting the credentials of the provider improved the outcomes of educational materials containing identical content. It is therefore conceivable that the differences observed in outcomes from patient education interventions could be explained by differences in the credibility of the provider."

Simple changes to professional appearance might be one way for clinicians to enhance credibility. Wearing formal attire (suit, tie), for example, communicates status, authority and expertise [12-14]. Most physicians prefer formal attire [6] whereas allied health clinicians, such as physiotherapists, tend to dress casually or in uniforms [15]. However, many clinicians might reconsider their dress code, if the evidence suggested that formal attire affected the credibility, and therefore outcomes,

of their treatment. A recent systematic review found conflicting evidence that formal attire can improve trust in physicians.[6] Of the 30 studies included, only two studies [16, 17] used a randomised design involving a clinical encounter and neither of these studies measured treatment credibility.

There are no high quality empirical data on the effect of professional attire on patient perceptions of treatment credibility [6]. In light of this lack of evidence to inform current practice, we aimed to investigate the following research questions:

1. Does the professional attire of a clinician influence a patient's perception of treatment credibility?
2. Which are the factors that either predict treatment credibility or moderate the effects of professional attire?

2. Methods

2.1 Design

We performed a randomized, parallel-group study nested within a larger trial, the PREVENT Trial. The PREVENT Trial, details of which are published elsewhere [18] investigates the effects of two clinical education consultations for acute low back pain (LBP). In the PREVENT Trial, patients receive two, 1-hour consultations of either pain education or sham education. The sham education is based on a reflective, non-directive counseling approach. Because both interventions in the PREVENT Trial involve talking, and contain elements of counseling, to ensure blinding the treatment rationale provided to patients was identical for both study arms. One of two male physiotherapists provided the intervention. In Australia, physiotherapists are first contact primary care clinicians who commonly treat low back pain.

The present 'nested' study took place prior to the PREVENT Trial consultation. Patients were randomly allocated to receive a standardized briefing on the forthcoming treatment with a study physiotherapist wearing either formal attire (experimental condition) or casual attire (control condition) (Table 1, Figure 1). In the experimental condition, in addition to formal attire, clinicians wore an ID badge

to emphasize their affiliation with an academic institution. In the control condition, clinicians did not wear the ID badge.

An independent researcher, who was not involved in any other aspect of the trial, generated a random number list using Microsoft Excel to determine group allocation. Patients completed baseline questionnaires online prior to their study consultation. Allocation to group (clinician in formal or casual attire) was via concealed randomization – study physiotherapists opened the sealed, opaque envelope containing group allocation before meeting with their patient. Outcome assessment was performed blind to group allocation.

2.2 Participants, therapists, and centers

Patients aged 18-75 years with acute non-specific LBP (<4 weeks' duration) were recruited from general practices and physiotherapy clinics in the Sydney metropolitan area between October 2013 and June 2015. Patients were excluded if they had serious spinal pathology or chronic spinal pain. Treatments took place at one of 21 primary care practices or at a medical research institute. Two postgraduate trained physiotherapists with more than 5 years clinical experience provided patients with the treatment rationale under experimental conditions.

2.3 Experimental procedure

Study clinicians greeted the patient wearing the allocated attire and gave a briefing on the treatment rationale accompanied with a written description of the treatment. The patient remained naïve to the attire manipulation throughout. The treatment rationale was standardized and identical for all patients. The briefing described the background to the PREVENT Trial, the rationale behind counseling therapies, and likely efficacy of these therapies for LBP (Appendix A and B).

2.4 Outcome measures

Primary outcome: The primary outcome was the patient's perception of treatment credibility, assessed immediately after the clinician had provided the treatment rationale. Treatment credibility was measured using the first four items of the Credibility and Expectancy Questionnaire (CEQ) [19]. The CEQ is internally consistent (Cronbach's alpha 0.84 for credibility scale, 0.82 for expectancy scale) [7] and has construct validity [7, 19]. The first four items assess treatment credibility and the last two items assess treatment expectancy. Treatment expectancy is suggested to differ from treatment credibility in that the former involves emotional processes such as "hope", rather than logical processes such as "believability" [19]. For clarity, we will hereinafter refer to the four item treatment credibility subscale score as CEQ-4. Possible scores on the CEQ-4 range from 3 to 37.

We collected baseline data on age, gender, educational background, back beliefs (Back Beliefs Questionnaire) [20], pain intensity over the past week (Numeric Rating Scale) [21], disability (Roland Morris Disability Questionnaire) [22], pain catastrophizing (Pain Catastrophizing Scale) [23], depression (Depression Anxiety and Stress Scale) [24], and treatment setting characteristics (for example, general practice rooms, physiotherapy clinic, research institute). We collected all data for the present study prior to patients being randomized for the PREVENT Trial (Figure 2).

2.5 Data analysis

To calculate sample size we used the algorithm given in G*Power 3[25] for a t-test with equal group sizes. Accordingly, a sample of 64 per group was required for a two-group t-test with a two-sided significance level ($p<0.05$) to detect an effect size of 0.5 with 80% power.

In our primary analysis, we compared mean treatment credibility scores for the experimental and control groups and computed an effect size (Cohen's d) using an independent samples t-test. We performed a sensitivity analysis to account for potential clustering in the data. Using a linear mixed model, we estimated marginal

means with the treatment setting and study clinician entered as random effects variables.

In our exploratory secondary analyses, we used a multivariate linear regression model to test hypothesized predictors of treatment credibility, and potential moderating variables. We used previous research [7] to specify potential predictors and moderators *a priori*. In the first multivariate model we forced the (randomized) attire allocation into Block 1 and forced potential independent predictors of treatment credibility (back beliefs, pain intensity, disability, age, gender, catastrophizing, depression, educational background, setting characteristics) into Block 2. We built a separate model to test each moderating variable. In total, we tested four potential moderators of attire effects: treatment setting characteristics i.e. general practice rooms, physiotherapy clinic, research institute (attire x setting), the study clinician involved (attire x clinician), the age of the patient (attire x age), and the gender of the patient (attire x gender). All analyses were conducted in SPSS v22.0, IBM Corp. The primary analysis was based on intention to treat. To assess the robustness of our results to cluster effects, we performed, post hoc, a linear mixed model analysis to estimate group means that controlled for potential sources of data clustering (recruitment center, clinician).

2.6 Ethical approval

We obtained ethical approval for this study from the University of New South Wales Human Research Ethics Committee in June 2013 (HC12664). All participants gave written informed consent before data collection began.

3. Results

Participant flow through the study is shown in Figure 2. Complete outcome data were available for all patients randomized for the primary analysis. Because the number of cases with missing baseline values was low (2/128 = <2%) they were removed from the secondary analysis. Baseline characteristics are shown in Table 2.

CEQ-4 total scores ranged from 6 to 37 (Mean (SD) = 24.7 (6.5)) and were normally distributed. The independent samples t-test found no significant effect of formal attire on CEQ-4 score (Cohen's d=0.19, P = 0.37). Controlling for baseline differences using an ANCOVA analysis did not change the results. The experimental group had a mean (SD) CEQ-4 of 24.1 (6.6) and the control group a mean of 25.3 (6.4) (Table 3, Figure 3). The mean difference between groups was 1.2 (95%CI -1.1 to 3.5). Accounting for the potential clustering effect of recruiting from multiple centers and clinicians did not affect the results (Table A.1, Appendix C).

Results of the multiple regression analysis of hypothesized predictors of treatment credibility are shown in Table 4. Patient age was the only significant predictor of treatment credibility; older patients reported higher CEQ-4 scores (Unstandardized B = .16 (95%CI 0.08 to 0.24); Standardized Beta 0.36). The final model containing professional attire, age, gender, pain intensity, disability, back beliefs, catastrophizing, depression, education background and treatment setting explained 9.5% of the variance in treatment credibility.

The moderation analysis revealed no significant moderating effects of age, gender, trial clinician involved, or treatment setting, on the effects of formal attire on treatment credibility.

4. Discussion and conclusion

4.1 Discussion

In this study we provide evidence that the attire of a clinician does not influence perceptions of treatment credibility in patients who are about to receive patient education. Our secondary analysis found that neither patient characteristics such as pain intensity, disability, educational background, gender, and depression, nor the clinical setting in which the treatment took place, predicted treatment credibility. The

age of the patient was the only significant predictor - older patients rated treatment credibility higher than younger patients, regardless of what their clinician was wearing.

Our findings do not support the use of formal attire (suit, tie) among clinicians working in primary care and in so doing contrast with the dominant view held by clinicians [26, 27] and the available evidence [6, 15]. To our knowledge, only two other studies have randomized professional attire during a clinical encounter, although they did not evaluate effects on credibility [16, 17]. Our results add to the findings of Fischer et al. [16] and Pronchik et al. [17] on measures of patient satisfaction, and support the notion that attire does not determine whether a patient views the treatment as credible or not during a clinical encounter.

This study has limitations. First, we did not directly measure perceptions about the credibility of the clinician. It may have been useful, for example, to ask patients specifically about the characteristics of their clinician, including aspects of their appearance and impressions of trustworthiness, attractiveness, and believability, all of which are factors known to influence credibility [14]. However, because we were interested in the implicit effect of attire on initial impressions of treatment credibility prior to the treatments taking place, it was not possible to measure these perceptions without unblinding patients to our study hypothesis. Second, the two attire contexts that we tested may have not been different enough to observe an effect. The possibility remains that we may have observed differences if our 'formal attire' context included a white coat and medical equipment such as a reflex hammer [28], and our 'casual' attire context included items reported to be unfavorable to patients, for example jeans, sneakers, long-hair on males, and facial piercings [6]. However, because we chose to target ecological validity we assessed two forms of attire commonly seen in primary care in Australia. Third, we were only able to include male clinicians under the age of 35. We do not know, therefore, whether our findings generalize to female clinicians or clinicians older than 35. Finally, in our sample, the education level was higher in the experimental group (Table 2). In our regression

analysis that controlled for baseline factors, there was no effect of education level either as a confounder or as an independent predictor (Table 4).

The rationale provided in this study contained standardized, simple language that is commonly used in healthcare settings in Australia (Appendix A). There is a possibility that the effect of attire on treatment credibility would be different with a differently styles of language, such as medical jargon.

We nested the current study within a larger randomized trial. The advantage of this method was that we could tightly control our experimental conditions. The key disadvantage is that our external validity is limited by the same inclusion criteria as that of the larger trial. However, the sample described here is broadly representative of patients consulting primary care with acute LBP, who have been referred by their treating clinician for a specialty consultation. Also, recruiting patients who agreed to participate in a trial of "talking treatments" for LBP could have led to a degree of selection bias. It is conceivable, for example, that patients seeking biomedical treatment (medicine, imaging, surgery), might have had a different response to the attire manipulation than the patients included in this experiment.

The question of what determines treatment credibility remains unanswered. Our findings suggest that patient, setting and clinician characteristics play only a small role at best. Smeets et al also found that patient characteristics explained only a small amount (11%) of variance in pre-treatment CEQ scores [7]. We can only speculate about what ultimately determines a patient's rating of treatment credibility. It is plausible that previous experience with different types of treatments might play a role. Those who have more experience with different types of treatments might be more likely to assign higher credibility to new treatments. This could also explain the association that we observed between age: older patients had higher ratings of treatment credibility. Perhaps older patients have more treatment experience to

inform the logic behind new ones. Several studies have found that older age predicts higher placebo effects in trials [29].

Credibility is also likely to be influenced by more explicit forms of communication than physical appearance. For example, treatments that are accompanied by a clear rationale might be more credible than those that are not. Persuasive language and the enthusiasm of the clinician might also play a role, along with non-modifiable factors such as clinician age and gender. To our knowledge, these factors are yet to be investigated as causes of treatment credibility.

4.2 Conclusion

In a trial setting, whether or not a clinician is formally dressed has no effect on perceptions of treatment credibility in patients with acute LBP.

4.3 Practice Implications

Our work suggests that in health care communication, substance is more important than physical appearance. Clinicians should therefore dress comfortably without fear of losing credibility.

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Table 1. Attire requirements in the experimental and control groups

Experimental - Formal attire	Control - Casual attire
Neck-tie	Collared polo shirt
Suit jacket and trousers	Non-tailored trousers (excl. jeans)
Neuroscience Research Australia ID badge*	No ID badge

* The ID badge contained a name, affiliation and photo.

Table 2. Patient characteristics at baseline. Numbers are mean (SD) unless stated otherwise

	Experimental – Formal attire (N=64)	Control – Casual attire (N=64)
Age	41.6 (14.7)	45.3 (14.0)
Female gender N (%)	31 (48)	29 (45)
Pain Intensity (0-10)	5.5 (2.3)	6.8 (2.3)
Disability (0-24)	10.6 (5.5)	12.4 (5.5)
Back Beliefs (14-70)	38.5 (7.6)	39.7 (7.9)
Catastrophizing (0-52)	16.2 (10.1)	22.8 (11.2)
Depression (0-21)	4.0 (4.2)	5.2 (4.5)
Education N (%)		
High school	12 (19)	19 (30)
Diploma	18 (28)	17 (27)
Degree	33 (52)	28 (44)

Table 3 Mean (SD) treatment credibility in each group, and mean (95%CI) difference between groups, measured immediately after clinician provided the treatment rationale.

	Experimental – Formal attire (n=64)	Control – Casual attire (n=64)	Difference between groups
Treatment credibility CEQ-4 (*range 6 to 37*)	24.1 (6.6)	25.3 (6.4)	1.2 (-1.1 to 3.5)

Table 4. Multiple regression analysis on potential determinants of treatment credibility

Steps	Variables	Unstandardized B	Standard Error	Standardized Beta	P	Adjusted R^2
Block 1	Attire	-1.60	1.14	-.13	0.16	0
Block 2	Attire	-.28	1.21	-0.02	0.82	9.5
	Age*	.16	0.04	0.36	0.00	
	Gender	.09	1.12	0.01	0.94	
	Pain	.21	0.28	0.08	0.45	
	Disability	.00	0.13	0.00	0.97	
	Back beliefs	-.04	0.09	-0.05	0.60	
	Catastrophizing	.08	0.06	0.15	0.17	
	Depression	-.16	0.16	-0.11	0.30	
	Setting	-.44	0.93	-0.04	0.64	
	Education	.35	0.50	0.06	0.49	
Block 3	Attire-age			-.03	0.68	8.8
	Attire-gender			-.50	0.06	11.1
	Attire-setting			-.07	0.13	8.9
	Attire-clinician			.16	0.22	9.2

* $P<0.05$

Figure Captions

Figure 1. Attire characteristics in the control (I.) and experimental (II.) groups

Figure 2. Participant flow diagram

Figure 3. Treatment credibility scores in the experimental (Formal attire) and control (Casual attire) groups.

Appendix A: Verbal treatment rationale

"This study that we are doing is looking at back pain, and in particular, how people make sense of their pain. Today will involve me asking some questions, because I want to know about everything we now know affects pain. Over the past 20 years that we have been treating low back pain, one thing we have found is that patients find it really helpful to talk about how the pain is influencing their life.

My job is to help you think about some of these things. And we hope that just getting some of this stuff off your chest will be helpful. Most of the time it can be hard to talk about this stuff with your family or friends because they aren't really interested. So today I will act as a sort a sounding board. Talking it through with a professional can help, and I hope that in the end you have a clearer understanding of the problem and less worry."

Appendix B: Written treatment rationale

Neuroscience Research Australia
Discover. Conquer. Cure.

TALKING TREATMENTS FOR BACK PAIN???

What?

- Talking for 2x 40min sessions with a specially trained physiotherapist

Why?

- Most current treatments for back pain provide only short term relief
- We still don't know how to best speed up recovery from an acute episode
- When patients talk with a professional about pain they often feel better afterwards

How?

- This is what we want to find out. BUT here's why we think it may work:
  - Talking things through helps us think more clearly
  - When you think more clearly, you can do a better job of planning your recovery

Barker Street Randwick Sydney NSW 2031 Australia
PO Box 1165 Randwick Sydney NSW 2031 Australia
T +61 2 9399 1000 F +61 2 9399 1005

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Appendix C:

Table A.1 Sensitivity analysis controlling for potential cluster effects

	Primary Analysis (CEQ-4)	Sensitivity Analysis* (CEQ-4)
Experimental – Formal attire (n=64)	24.1	23.8
Control – Casual attire (n=64)	25.3	25.0
Difference between groups	1.2 (-1.1 to 3.5)	1.2 (-1.1 to 3.5)

* Estimated marginal means from linear mixed model analysis accounting for potential cluster effects. Recruitment center and clinician included as random effects.