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The association between mindfulness and hypnotizability: Clinical and theoretical implications

Michelle P. Grover¹, Mark P. Jensen², David R. Patterson², Kevin J. Gertz², and Melissa A. Day¹

¹School of Psychology, The University of Queensland, Brisbane, Australia

²Department of Rehabilitation Medicine, The University of Washington, Seattle, USA

Abstract

Mindfulness-based interventions and hypnosis are efficacious treatments for addressing a large number of psychological and physical conditions, including chronic pain. However, there continues to be debate surrounding the relative uniqueness of the theorized mechanisms of these treatments – reflected by measures of mindfulness facets and hypnotizability – with some concern that there may be so much overlap as to make the mechanism constructs (and therefore the respective interventions) redundant. Given these considerations, the primary aim of the current study was to examine the degree of unique versus shared variance between two common measures of mindfulness facets and hypnotizability: the Five Facet Mindfulness Questionnaire (FFMQ) and the Stanford Hypnotic Clinical Scale (SHCS). A cross-sectional survey was conducted with a sample of N=154 Veterans with heterogeneous chronic pain conditions. Bivariate Pearson correlations were used to examine the associations between the target scales. Results showed that the correlations between the FFMQ scales and SHCS total score were uniformly weak, although significant negative correlations were found between mindfulness facets of observe and non-react with hypnotizability ($p < .05$). Thus, not only are the mindfulness and hypnotizability constructs unique, but when significantly associated, hypnotic suggestibility corresponds with a tendency to be less mindful. These findings have important implications for future research aimed towards matching patients to the treatment most likely to be of benefit, and suggest that matching patients on the basis of these theoretically derived “unique” moderators may hold potential.

Keywords

mindfulness; hypnotizability; Five Facet Mindfulness Questionnaire; Stanford Hypnosis Clinical Scale

Historically, the origin of mindfulness meditation can be traced back thousands of years to many Eastern religions, as well as to a variety of other philosophical and psychological traditions including ancient Greek philosophy, phenomenology, existentialism, and naturalism (Brown, Ryan, & Creswell, 2007). Similarly, the origin of hypnosis also extends

Corresponding author and address for reprints: Melissa A. Day, m.day@uq.edu.au, T: +61 7 3365 6421, F: +61 7 3365 4466, W: www.psy.uq.edu.au, The University of Queensland, 330 McElwain Building, Brisbane, Queensland, Australia 4072.

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back thousands of years to the ancient temples of Aesculapius (Alladin, 2008), with modern day hypnosis (originally known as Mesmerism) traced back to the late 1700s when it was made popular by Franz Mesmer (Alladin, 2008). Only more recently, however, was mindfulness meditation introduced into the western allopathic medical community (Kabat-Zinn, 1990; Wilson, 2014). Likewise, the use of hypnosis in the medical field did not become popular until 1843, when James Braid began to document the biological and physical benefits of hypnotic interventions (Alladin, 2008). Over the past two decades, research has shown that both mindfulness-based interventions and hypnosis are effective treatments for addressing a large number of psychological and physical symptoms and conditions, including chronic pain (Fjorback, Arendt, Ornbøl, Fink, & Walach, 2011; Jensen, & Patterson, 2006; Kabat-Zinn, Lipworth, & Burney, 1985; Morone, Greco, & Weiner, 2008; Patterson, & Jensen, 2003).

Despite the seemingly unique historical and theoretical roots of mindfulness meditation and hypnosis, there appears an overlap between interventions based on these two approaches, both empirically and conceptually. First, the two treatments are used to address similar conditions (e.g., pain, stress, anxiety, and depression) (Goldin, 2012; Goldin & Gross, 2010; Holroyd, 2003; Jensen & Patterson, 2006; Lifshitz & Raz, 2012; Lynn, Barnes, Deming, & Accardi, 2010). Second, although to our knowledge there have not yet been any head-to-head comparisons in efficacy between treatments based on these approaches in the same sample, the beneficial effects of the two approaches appear to be similar (Garland et al., 2017; Tan et al., 2007). Third, mindfulness-based interventions and hypnosis are often lumped together as “relaxation techniques.” It is possible that treatments which use mindfulness or hypnotic techniques operate via the same (or closely related) mechanisms, such as via their effects on perceived relaxation (Lynn, Malaktaris, Maxwell, Mellinger, & van der Kloet, 2012; Semmens-Wheeler, & Dienes, 2012; Vickers, Zollman, & Payne, 2001).

Consistent with the idea that mindfulness-based interventions and hypnosis represent fundamentally the same or closely related interventions, there is evidence of overlap between the two with potentially shared underlying cognitive mechanisms and neurophysiological changes (particularly in frontal cortical areas associated with executive function and cognitive control) (Cojan et al., 2009; Del Casale et al., 2015; Holroyd, 2003; Hölzel et al., 2011; Jensen, Day, & Miró, 2014; Tang, Hölzel & Posner, 2015). Further, shared changes in brain oscillations related to hypnotizability and deep meditation have been reported; both appear to result in increases in slower oscillations in the theta and alpha bandwidths (Holroyd, 2003; Jensen, Adachi, & Hakimian, 2015; Jensen, Day, & Miró, 2014). Finally, both modalities require an ability to focus attention and harness concentration (Lifshitz & Raz, 2012; Holroyd, 2003). Based on this past research, it is plausible that a typical phenomenological and neurophysiological response to a mindfulness-based intervention (i.e., reflecting the “observing” or “non-reacting” facets of mindfulness) may be the same or similar to the “trance-like” response to hypnosis (Barabasz & Perez, 2007; Benham, Woody, Wilson, & Nash, 2006; Enea, Dafinoiu, Opri, & David, 2014).

However, there may also be some important differences between these two approaches. Theoretically, mindfulness-based interventions train the mind to observe thoughts, stress, emotions, and bodily sensations intentionally and with a non-judgmental attitude, on a moment-to-moment basis, such that these experiences are increasingly perceived as transient and variable (Day, Jensen, Ehde, & Thorn, 2014). Within this, a key process is the development of a decentered perspective which cultivates a shift in relationship to experience such that it is “observed,” as if from a distance (i.e., also referred to as metacognitive insight, defusion, distancing or re-perceiving) (Day & Thorn, 2014; Shapiro, Carlson, Astin, & Freedman, 2006). It has been theorized that those individuals who enter treatment with higher baseline levels of mindfulness (i.e., the ability to foster a non-judgmental awareness of one’s experience, observe one’s moment-to-moment experience, describe one’s experience with words, and to act or participate with awareness) are most likely to benefit from formal training in mindfulness meditation to enhance this capacity (Day, Ehde, & Jensen, 2015).

Hypnosis on the other hand, involves an interaction between two people that, through the use of hypnotic suggestions, creates a temporary shift or change in perception and processing (Lynn, Das, Hallquist, & Williams, 2006; Otani, 2016). Consistent with this, hypnosis and hypnotic procedures tend to result in systematic and well replicated changes in the recipient’s phenomenological experience (Holroyd, 2003; Otani, 2016). For example, hypnotic inductions tend to result in the subject feeling more relaxed and at the same time more focused (Brown & Fass, 1990; Holroyd, 2003; Yapko, 2011). Importantly, hypnotizability (the trait-like tendency to respond to hypnotic suggestions) is consistently associated with enhanced subjective responses to hypnotic procedures (Lynn, Das, Hallquist, & Williams, 2006; Otani, 2016).

Thus, a key difference between mindfulness-based interventions and hypnosis has to do with the targeted therapeutic process; with the practice of mindfulness the target is a shift in one’s *relationship* to experience, while hypnosis targets a shift in the experience itself. Importantly, these shifts have also been theorized to respectively occur as a function of baseline differences in mindfulness facets and hypnotizability. Based on this reasoning, one of the ways we can potentially address questions regarding the similarities and differences between mindfulness-based interventions and hypnosis is to examine the degree of overlap in these baseline states prior to exposure to either of these approaches. Given these considerations, the primary aim of the current study was to examine the unique versus shared variance of the theoretically specific cognitive processes underlying individuals’ responses: mindfulness facets and hypnotizability.

Specifically, we conducted a cross-sectional analysis that examined the associations between two of the most widely used measures of mindfulness facets and hypnotizability, respectively: the Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2008) and the Stanford Hypnotic Clinical Scale (SHCS) (Weitzenhoffer & Hilgard, 1962). We hypothesized that, if mindfulness and response to hypnotic procedures (here operationalized as an SHCS hypnotizability score) were overlapping constructs, we would expect statistically significant and large positive associations between hypnotizability and one or more mindfulness facets (here operationalized as FFMQ subscale scores). If mindfulness-

based interventions and hypnosis did not overlap in a reliable manner however, we would anticipate weak and non-significant associations between hypnotizability and scale scores representing mindfulness.

Method

Design

A cross-sectional study was completed with a sample of Veterans endorsing heterogeneous chronic pain conditions recruited to participate in a randomized controlled trial comparing three behavioral pain management approaches (ClinicalTrials.gov identifier: NCT02653664). This study reports a subset of measures collected as part of the baseline, pre-treatment assessment conducted prior to randomization. One other paper using baseline data from this study that examined predictors of treatment utilization is currently under review. However, the two papers have distinct aims and involve analyses using different data from the baseline assessment. Ethics approval for all study procedures was provided by the University of Washington and VA Puget Sound Health Care System Institutional Review Boards. Informed consent was obtained from all participants prior to participation.

Participants and Procedure

Participants were 154 Veterans receiving care at one of two divisions of the VA Puget Sound Health Care System (VAPSHCS) who endorsed heterogeneous chronic pain conditions. Participants for the larger trial were primarily recruited via clinician referral and focused medical record review; all participants who completed the baseline battery of measures upon entry into the trial were included in the present analysis. The inclusion criteria for the trial were: (1) Veteran status, (2) age 18 years or older, (3) ability to read, speak and understand English, (4) self-reported pain lasting at least 3 months with an average intensity of 3 or greater (0–10 scale) over the past week, a worst pain intensity of 5 or greater (0–10 scale) over the past week, and pain experienced at least 75% of the time in the past 3 months. The trial exclusion criteria were: (1) cognitive impairment measured via a 6-item cognitive screener (Callahan et al., 2002), (2) history of (past 5 years) or current (within past 6 months) experience of psychosis, thought disorder, severe or unstable mental health functioning (i.e., active suicidal or homicidal ideation or related behaviors) or indications of behavioral problems that would make the individual inappropriate in a group therapy environment, (3) daily use of greater than 120mg morphine equivalent medication, (4) any planned life events that would interfere with participating in the study, and (5) difficulties or limitations communicating over the telephone. Baseline measures were collected via telephone interview up to four weeks prior to treatment participation; two measures administered in this baseline assessment battery were included in the present analyses. Participants were reimbursed \$25 for completing this assessment.

Measures

Demographics and Pain Questionnaire.—All study participants were asked to respond to demographic questions asking them about their age, sex/gender, race, ethnicity, educational attainment and employment status. In addition, the participants were asked to provide information regarding the duration and type of pain they experience.

Mindfulness.—The Five Facet Mindfulness Questionnaire-Short Form (FFMQ-SF) was used to measure five domains of mindfulness: Observing, Describing, Awareness, Non-Judging and Non-Reactivity (Bohlmeijer et al., 2011). The FFMQ-SF is a 24-item short form version of the original FFMQ 39-item scale (Baer et al., 2006; Bohlmeijer et al., 2011). Each item is rated on a 5-point Likert-type scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). The score for each of the items corresponding to the five factors are summed, with higher scores indicative of a higher level of mindfulness for the given domain. The FFMQ-SF has demonstrated adequate to excellent internal consistency, ranging from $\alpha = .73$ for Non-Reactivity to $\alpha = .91$ for Describing in a community sample with depression (Bohlmeijer et al., 2011). Strong convergent, discriminant and criterion validity were also established and the five-factor structure was confirmed. Adequate to good internal consistency was found in the current sample for the Observing ($\alpha = .73$), Describing ($\alpha = .88$), Awareness ($\alpha = .82$), Non-Judging ($\alpha = .79$) and Non-Reactivity ($\alpha = .78$) scales of the FFMQ-SF.

Hypnotizability.—The Stanford Hypnotic Clinical Scale (SHCS) was used to assess hypnotizability (Morgan & Hilgard, 1978–1979). In this study, the SHCS was administered by research staff members trained and supervised by a licensed clinical psychologist (M.P.J.) highly experienced in the use of this measure. The measure begins with a standard hypnotic induction followed by 5 suggestions: (1) hand movement, (2) age regression, (3) experiencing a dream, (4) a posthypnotic suggestion, and (5) posthypnotic amnesia. Participant responses to each suggestion are coded as a “0” or “1,” depending on whether they meet criteria for responding to the suggestion. These responses are summed to create the total score, which ranges from 0 to 5. The SHCS has demonstrated validity through its strong correlation with other measures of hypnotizability (Hilgard & Hilgard, 1975).

Statistical Analyses

SPSS version 21.0 was used to conduct all data analyses. Descriptive statistics were computed to determine the means and standard deviations for the descriptive and target variables. Bivariate Pearson correlations were computed in order to determine if there was a significant relationship between the FFMQ scales and the SHCS. The criterion used to determine the statistical significance of inferential tests was $p < .05$.

Results

The overall sample size was $N = 154$. See Table 1 for the summary sample characteristics.

Data were initially screened by examining each item’s descriptive statistics for errors and missing values. Data for some responses to the SHCS items was missing for 13 participants. Given these missing responses, SHCS total scores computed using pro-rated data, which is a common procedure regularly employed by researchers (Byars, & Simon, 2014; Hazel, Oppenheimer, Technow, Young, & Hankin, 2014; Krabbendam et al., 2015; Mazza, Enders, & Ruehlman, 2015; Neugebauer et al., 2014). Further checking was undertaken to screen for possible univariate outlier violations. Scatterplots were used to assess for assumptions of normality, linearity and homoscedasticity, and found no violations. The descriptive statistics

for the target scales are shown in Table 2, and the correlations between these scales are presented in Table 3.

The results indicated that the associations between the mindfulness facets and hypnotizability were uniformly weak. Overall, there was a significant negative correlation between hypnotizability and two mindfulness facets: FFMQ Observe, $r = -0.196$, $p = 0.015$; and FFMQ Non-React, $r = -0.168$, $p = 0.37$. No significant correlations between hypnotizability and the other variables of FFMQ Non-React; FFMQ Act Aware; FFMQ Non-Judge and FFMQ Describe were observed ($ps > .05$).

Discussion

The primary aim of this study was to examine the unique versus shared variance of the theoretically specific moderators underlying individuals' responses to mindfulness- and hypnosis- using the subscale scores from the FFMQ (observe, describe, act aware, non-judge, non-react), and the hypnotizability total score from the SHCS. Overall, the correlations were uniformly weak, lending support to the hypothesis that mindfulness facets and hypnotizability are in fact different constructs. However, the analyses performed in this study did show two statistically significant *negative* associations between hypnotizability and the mindfulness facets of observe and non-react, suggesting that not only are these constructs unique but when significant, heightened hypnotizability is associated with a tendency to be *less* mindful.

The capacity to observe experience is intimately aligned with the idea of cultivating a decentered perspective, which is the central tenet in mindfulness theory and has been described as the “meta mechanism” of mindfulness-based interventions (Shapiro, Carlson, Astin, Freedman, 2006). It is a form of self-directed noticing or observing what *is*. Theoretically, this self-directed observing can be viewed as the antithesis of hypnotizability, which entails clinician directed noticing that is initiated during a hypnotic induction. Furthermore, while mindful observing entails simply noticing experience (i.e., which involves a shift in *relationship* to experience), hypnotizability involves an ability to respond to a clinician directed suggestion (i.e., to *change* the experience itself). It must of course be acknowledged that one must first observe/recognize psychological/physiological symptoms for the subsequent change that occurs in response to hypnotic suggestions (Yapko, 2011). This process within hypnosis is theoretically achieved using flexible attentional control (i.e., disengagement of attention from its current focus) via suggestions resulting in altered perception and changes in physiological and/or behavioral symptomology (Lynn, Das, Hallquist, & Williams, 2006; Otani, 2016). Thus, it is conceivable that this form of attentional control (that contains an element of disengagement) may be qualitatively different from a decentered perspective that entails mindful or “bare” observation/attention. In this context, the present finding of the mindfulness facet of observing and hypnotizability being negatively correlated provides preliminary evidence to support a theoretical distinction between the two constructs.

The FFMQ mindfulness facet of non-reacting is conceptualized as a tendency to allow thoughts and feelings (even those that are “distressing”) to come and go without a need to

“react” to these experiences (Baer et al., 2006). This is conceptually distinct from hypnotic suggestibility, which involves *going along with what is suggested*, as opposed to just noticing without reacting. Specifically, it is thought that response to direct suggestions in hypnosis shows a degree of absent-mindedness or confusion in the patient that is coupled with invoked involuntary responding (possibly akin to “reactivity”) which is thought to result in an openness and willingness to change (Morgan, & Hilgard, 1978–1979). Furthermore, a sense of non-reactivity involves an ability to accept experience as it is (i.e., without a need to *change* that experience), which is distinct from what is involved with responding to a hypnotic suggestion (i.e., to alter experience in some fashion). Therefore, the observed negative correlation between non-reactivity and hypnotizability is consistent with the prevailing theory, and provides further support for the distinction between these constructs.

A non-judgmental approach entails allowing experience to be one’s experience without adding on layers of expectancy, judgment or self-criticism about having this experience. This non-judgmental approach is a central tenet of Kabat-Zinn’s widely cited definition of mindfulness, and is a capacity of mind that is directly targeted within the practice of mindfulness meditation (Kabat-Zinn, 1990). Non-judgment notably diverges from hypnotizability, which often involves responding to suggestive images to cultivate an experience that is judged to be pleasant or more tolerable (cf. Kogan, et al., 1998). The current finding that non-judgment was unrelated to hypnotizability provides further evidence supporting a distinction between these constructs, and also possibly between mindfulness-based interventions and hypnosis. The describing and acting with awareness facets also showed non-significant associations with hypnotizability in the current study, suggesting that these mindfulness facets – which have been associated with alexithymia and “stepping out of auto pilot,” respectively – are also unique and unrelated to hypnotic suggestibility (Baer, Smith, Hopkins, Krietemeyer, & Toney; 2006; Baer et al., 2008).

Clinical Implications

Theoretically and empirically, higher baseline levels of mindfulness and hypnotizability respectively enhance the degree of response to mindfulness-based interventions and hypnosis (Benham, Woody, Wilson, & Nash, 2006; Day, Ehde, Jensen, 2015; Frischholz, Tryon, Vellios, Fisher, Maruffi, & Spiegel, 1980; Keng, Smoski, & Robins, 2011; Morgan, & Hilgard, 1978–1979; Sabourin, Cutcomb, Crawford, & Pribram, 1990; Yapko, 2011). Thus, the identification of the degree of similarity and divergence between the constructs of mindfulness and hypnotizability has critical implications for future research aimed towards matching patients to the treatment (e.g., a mindfulness-based intervention vs. hypnosis) most likely to be of benefit on the basis of these theoretically derived “unique” moderators (Day, Ehde, Jensen, 2015). If the indicators (i.e., measures) of these mindfulness facets and hypnotizability were found to actually assess the same underlying construct, then developing patient-treatment matching algorithms on the basis of these measures to determine whether to deliver a mindfulness-based intervention or hypnosis to a given patient would have little utility. However, results of the current study provide preliminary evidence that disconfirm this notion, with the associations between measures of mindfulness facets and

hypnotizability found to be uniformly weak. This highlights the potential of these measures to differentiate these unique moderators at baseline.

Although more research is needed, the finding that facets of observing and non-reactivity were *negatively* associated with hypnotizability has particular potential clinical importance. In a recent review of the item content of measures assessing cognitive process (i.e., *how* people think), it was found that of the five FFMQ scales, only observing and non-reactivity provide a pure assessment of cognitive process in the absence of cognitive content and/or behavioral/social factors (Day, Lang, Newton-John, Ehde, & Jensen, 2017). Thus, higher scores on these two scales in particular may provide an optimal measure for matching an individual to a mindfulness-based intervention, as opposed to hypnosis, and vice versa (i.e., low scores on these scales may be expected to be associated with heightened hypnotizability, indicating hypnosis may be the optimal treatment approach). However, the current findings provide only tentative evidence in this capacity, and interpretation of these results must take into consideration several important study limitations.

Limitations

First, this sample was comprised of predominately male veterans who were about 53 years of age on average, reporting heterogeneous chronic pain types; hence, the generalizability of these findings to other demographic groups and specific pain types may be limited. Future research is needed to determine if the current results replicate within other more diverse samples. Second, this study was cross-sectional in nature, therefore identification of causality/directionality was not possible. Third, there continues to be debate surrounding the definition of mindfulness and how mindfulness can be accurately measured, and some researchers have questioned whether the FFMQ provides an appropriate assessment (Grossman, 2011; Van dam et al., 2017). Many measures of mindfulness have been developed (nine, at last count, including the FFMQ, which was used in this study) (Van dam et al., 2017); however the validity of each of these self-report measures has been questioned in regards to their capacity to account accurately for individual variability in the meanings attributed to mindfulness, and the subsequent interpretation of the overall concept of what it therefore means to be mindful (Van dam et al., 2017). Likewise, measures of hypnotizability have also been criticized due to confounds in measuring hypnotic and non-hypnotic suggestibility, and depth of the hypnotic state (Hilgard, & Tart, 1966; LeCron, 1953; Tart, 1970). Moreover, it has been further argued that the SHCS (the measure used in this study) could be compromised by the changes in hypnotic depth occurring throughout the assessment, thus obscuring genuine effects (Tart, 1970). Other criticisms associated with using the SHCS have focused on factors related to the manner of delivery, training, experience, sensitivity, status, and self-confidence of the hypnotist with regards to subjective ratings and observations of hypnotizability (Thorne, & Beier, 1968; Weitzenhoffer, 1962); in this study however, such potential confounds were controlled via stringent training of the assessor by the second author who has expertise and experience in the use of the SHCS. Despite the debate and ambiguity underlying the various interpretations and measurement scales of mindfulness and hypnotic susceptibility, the current conceptualizations provide (at the very least) sign posts pointing in the direction towards potential critical factors

underlying the optimization of the management of chronic pain, as well as needed future research.

Conclusions

Mindfulness-based interventions and hypnosis have been found to be sustainable, economically viable interventions, that can be used for the effective management of emotional, behavioral, and physiological symptomology, including chronic pain (Cuellar, 2008; Tan et al., 2015). While the similarities and differences of these two approaches has been the subject of debate, this study found that measures of the theorized unique moderators underlying the two approaches are distinct. The current findings demonstrate limited overlap between measures of baseline mindfulness facets and hypnotizability, suggesting the capacity to match patients to mindfulness-based intentions vs. hypnosis in order to optimize outcome may at least in part be informed by baseline differences in these constructs.

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References

- Alladin A (2008). Hypnotherapy explained Radcliffe Publishing.
- Barabasz A, & Perez N (2007). Salient findings: Hypnotizability as core construct and the clinical utility of hypnosis. *Intl. Journal of Clinical and Experimental Hypnosis*, 55(3), 372–379.
- Baer RA, Smith GT, Hopkins J, Krietemeyer J, & Toney L (2006). Using self report assessment methods to explore facets of mindfulness. *Assessment*, 13, 27–45. [PubMed: 16443717]
- Baer RA, Smith GT, Lykins E, Button D, Krietemeyer J, Sauer S, Walsh E, Duggan D, Williams JMG (2008). Construct validity of the five facet mindfulness questionnaire in meditating and non-meditating samples. *Assessment*, 15, 329–342. [PubMed: 18310597]
- Benham G, Woody EZ, Wilson KS, & Nash MR (2006). Expect the unexpected: Ability, attitude, and responsiveness to hypnosis. *Journal of Personality and Social Psychology*, 91, 342–350. [PubMed: 16881769]
- Bohlmeijer E, Klooster PM, Fledderus M, Veehof M, & Baer RA (2011). Psychometric properties of the Five Facet Mindfulness Questionnaire in depressed adults and development of a short form. *Assessment*, 18, 308–320. [PubMed: 21586480]
- Brown DP, & Fass ML, eds. (1990). *Creative master in hypnosis and hypnoanalysis: A festschrift for Erika Fromm Hillsdale, NJ: Erlbaum.*
- Brown KW, Ryan RM, & Creswell JD (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, 18(4), 211–237.
- Byars K, & Simon S (2014). Practice patterns and insomnia treatment outcomes from an evidence-based pediatric behavioral sleep medicine clinic. *Clinical Practice in Pediatric Psychology*, 2(3), 337–349.
- Callahan CM, Unverzagt FW, Hui SL, Perkins AJ, & Hendrie HC (2002). Six-item screener to identify cognitive impairment among potential subjects for clinical research. *Medical care*, 40(9), 771–781. [PubMed: 12218768]
- Cuellar NG (2008). Mindfulness meditation for veterans: Implications for occupational health providers. *AAOHN Journal*, 56(8), 357–363. [PubMed: 18717302]
- Cojan Y, Waber L, Schwartz S, Rossier L, Forster A, Vuilleumier P, (2009). The brain under self-control: modulation of inhibitory cortical networks during hypnotic paralysis. *Neuron*, 62(6), 862–875. [PubMed: 19555654]

- Day MA, Ehde DM, & Jensen MP (2015). Psychosocial pain management moderation: The limit, activate, and enhance model. *Journal of Pain*, 16(10), 947–960. [PubMed: 26351009]
- Day MA, Jensen MP, Ehde DM, & Thorn BE (2014). Towards a theoretical model for mindfulness-based pain management. *Journal of Pain*, 15, 691–703. [PubMed: 24985483]
- Day MA, Lang CP, Newton-John TRO, Ehde DM, & Jensen MP (2017). A content review of cognitive process measures used in pain research within adult populations. *European Journal of Pain*, 21(1), 45–60. [PubMed: 27470291]
- Day MA, & Thorn BE (2014). Using theoretical models to clarify shared and unique mechanisms in psychosocial pain treatments: A commentary on McCracken and Morley's theoretical paper. *Journal of Pain*, 15(3), 237–238. [PubMed: 24581632]
- Del Casale A, Ferracuti S, Rapinesi C, Serata D, Caltagirone SS, Savoja V, Piacentino D, Callovin G, Manfredi G, Sani G, Kotzalidis DG, Girardi P, (2015). Pain perception and hypnosis. Findings from recent functional neuroimaging studies. *International Journal of Clinical Experimental Hypnosis*, 63(2), 164–170.
- Enea V, Dafinoiu I, Opri D, & David D (2014). Effects of hypnotic analgesia and virtual reality on the reduction of experimental pain among high and low hypnotizables. *International Journal of Clinical and Experimental Hypnosis*, 62(3), 360–377. [PubMed: 24837064]
- Fjorback LO, Arendt M, Ornbøl E, Fink P & Walach H (2011). Mindfulness-based stress reduction and mindfulness-based cognitive therapy: a systematic review of randomized controlled trials. *Acta Psychiatrica Scand*, 124, 102–119.
- Frischholz EJ, Tryon WW, Vellios AT, Fisher S, Maruffi BL, & Spiegel H (1980). The relationship between the Hypnotic induction profile and the Stanford hypnotic susceptibility scale, form C: a replication. *American Journal of Clinical Hypnosis*, 22(4), 185–196. [PubMed: 7424797]
- Garland EL, Baker AK, Larsen P, Riquino MR, Priddy SE, Thomas E, Hanley AW, Galbraith P, Wanner N, & Nakamura Y (2017). Randomized Controlled Trial of Brief Mindfulness Training and Hypnotic Suggestion for Acute Pain Relief in the Hospital Setting. *Journal of General Internal Medicine*, 32(10), 1106–1113. [PubMed: 28702870]
- Goldin WL (2012). Cognitive hypnotherapy for anxiety disorders. *Am J Clinical Hypnosis*, 54(4), 263–74.
- Goldin PR, & Gross JJ (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion*, 10(1), 83–9. [PubMed: 20141305]
- Grossman P (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re)invention of mindfulness: *Psychological Assessment*, 23(4), 1034–1041. [PubMed: 22122674]
- Hazel NA, Oppenheimer CW, Technow JR, Young JF, & Hankin BL (2014). Parent relationship quality buffers against the effect of peer stressors on depressive symptoms from middle childhood to adolescence. *Developmental Psychology*, 50(8), 2115–2123. [PubMed: 24932722]
- Hilgard ER, & Hilgard JR (1975). *Hypnosis in the Relief of Pain* Los Altos, CA: W. Kaufman.
- Hilgard ER, & Tart CT (1966). Responsiveness to suggestions following waking and imagination instructions and following induction of hypnosis. *Journal Abnormal Psychology*, 71, 196–208.
- Holroyd J (2003). The Science of Meditation and the State of Hypnosis. *American Journal of Clinical Hypnosis*, 46(2), 109–128. [PubMed: 14609297]
- Hölzel BK, Carmody J, Vangel M, Congleton C, Yerramsetti SM, Gard T, & Lazara SW (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research*, 191, 36–43 (2011). [PubMed: 21071182]
- Jensen MP, Adachi T, & Hakimian S (2015). Brain Oscillations, Hypnosis, and Hypnotizability. *The American journal of clinical hypnosis*, 57(3), 230–253.
- Jensen MP, Day MA, & Miró J (2014). Neuromodulatory treatments for chronic pain: Efficacy and mechanisms. *Nature Reviews Neurology*, 10, 167–168. [PubMed: 24535464]
- Jensen M, & Patterson DR (2006). Hypnotic treatment of chronic pain. *Journal of Behavioral Medicine*, 29(1), 95–124. [PubMed: 16404678]
- Kabat-Zinn. J (1990). *Full catastrophe living* Random House: New York.
- Kabat-Zinn J, Lipworth L, & Burney R (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine*, 8(2), 163–190. [PubMed: 3897551]

- Keng SL, Smoski MJ, & Robins CJ (2011). Effects of Mindfulness on Psychological Health: A Review of Empirical Studies. *Clinical Psychology Review*, 31(6), 1041–1056. [PubMed: 21802619]
- Kogon MM, Jasiukaitis P, Berardi A, Gupta M, Kosslyn SM, & Spiegel D (1998). Imagery and hypnotizability revisited. *International Journal of Clinical and Experimental Hypnosis*, 46, 363–370. [PubMed: 9780527]
- Krabbendam AA, Colins OF, Doreleijers TAH, van der Molen E, Beekman ATF, & Vermeiren RRJM (2015). Personality disorders in previously detained adolescent females: A prospective study. *American Journal of Orthopsychiatry*, 85(1), 63–71.
- LeCron LM (1953). A method of measuring the depth of hypnosis. *Journal Clinical Experimental Hypnosis*, 1(2), 4–7.
- Lifshitz M, & Raz A (2012). Hypnosis and meditation: Vehicles of attention and suggestion. *The Journal of Mind-Body Regulation*, 1(2):3–11.
- Lynn SJ, Barnes S, Deming A, & Accardi M (2010) Hypnosis, Rumination, and Depression: Catalyzing Attention and Mindfulness-Based Treatments. *International Journal of Clinical and Experimental Hypnosis*, 58(2), 202–221. [PubMed: 20390691]
- Lynn SJ, Das LS, Hallquist MN, & Williams JC (2006) Mindfulness, Acceptance, and Hypnosis: Cognitive and Clinical Perspectives. *International Journal of Clinical and Experimental Hypnosis*, 54(2), 143–166. [PubMed: 16581688]
- Lynn SJ, Malaktaris A, Maxwell R, Mellinger DI, & van der Kloet D (2012). Do Hypnosis and Mindfulness Practices Inhabit a Common Domain? Implications for Research, Clinical Practice, and Forensic Science. *The Journal of Mind Body Regulation*, 2(1), 12–26.
- Mazza GL, Enders CK, & Ruehlman LS (2015). Addressing item-level missing data: A comparison of proration and full information maximum likelihood estimation. *Multivariate Behavioural Resources*, 50(5), 504–519.
- Morgan AH, & Hilgard JR (1978–1979). The Stanford Hypnotic Clinical Scale for adults. *Am J Clinical Hypnosis*, 21, 134–147.
- Morone NE, Greco CM, & Weiner DK (2008). Mindfulness meditation for the treatment of chronic low back pain in older adults: a randomized controlled pilot study. *Pain*, 134(3), 310–319. [PubMed: 17544212]
- Neugebauer R, Turner JB, Fisher PW, Yamabie S, Zhang B, Neria Y, Gameroff M, Bolton P, & Mack R (2014). Posttraumatic stress reactions among Rwandan youth in second year after the genocide: Rising trajectory among girls. *Psychological Trauma: Theory, Research, Practice, and Policy*, 6(3), 269–279.
- Otani A (2016) Hypnosis and Mindfulness: The Twain Finally Meet. *American Journal of Clinical Hypnosis*, 58(4), 383–398. [PubMed: 27003487]
- Patterson DR, & Jensen MP (2003). Hypnosis and clinical pain. *Psychological Bulletin*, 129(4), 495. [PubMed: 12848218]
- Sabourine ME, Cutcomb SD, Crawford HJ, & Pribram K (1990). EEG correlates of hypnotic susceptibility and hypnotic trance: spectral analysis and coherence. *International Journal Psychophysiology*, 10(2), 125–142.
- Semmens-Wheeler R, & Dienes Z (2012). The Contrasting Role of Higher Order Awareness in Hypnosis and Meditation. *The Journal of Mind Body Regulation*, 2(1), 43–57.
- Shapiro SL, Carlson LE, Astin JA, & Freedman B (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 3373–386
- Tan G, Craine MH, Matthew B, Garcia MK, Giordano J, Jensen MP, McDonald SM, Patterson D, Sherman RA, Williams W, & Tsao J (2007). Efficacy of selected complementary and alternative medicine interventions for chronic pain. *Journal of Rehabilitation Research and Development*, 44(2), 195–222. [PubMed: 17551873]
- Tan G, Rintala DH, Jensen MP, Fukui T, Smith D, & Williams W (2015). A randomized controlled trial of hypnosis compared with biofeedback for adults with chronic low back pain. *European Journal of Pain*, 19(2), 271–280. [PubMed: 24934738]
- Tang YY, Hölzel BK, & Posner MI (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience*, 16(4), 213–225. [PubMed: 25783612]

- Tart T (1970). Self-report scales of hypnotic depth. *International Journal of Clinical and Experimental Hypnosis*, 18(2), 105–125. [PubMed: 5485326]
- Thorne DE, & Beier EG (1968). Hypnotist and manner or presentation effects on standardized hypnotic susceptibility test. *Journal of Consulting and Clinical Psychology*, 32(3), 610–612.
- Van dam NT, van Vugt MK, Vago DR, Schmalzl L, Saron CD, Olendzki A, Meissner T, Lazar SW, Kerr CE, Gorchov J, Fox KCR, Field BA, Britton WB, Brefczynski-Lewis JA, & Meyer DE (In Press). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, DOI: 10.1177/1745691617709589.
- Vickers A, Zollman C, & Payne DK (2001). Hypnosis and relaxation therapies. *Western Journal of Medicine*, 175(4), 269–272. [PubMed: 11577062]
- Weitzenhoffer AM, & Hilgard ER (1962). *Stanford hypnotic susceptibility scale, form C* (Vol. 27). Palo Alto, CA: Consulting Psychologists Press.
- Wilson J (2014). *Mindful America: The Mutual Transformation of Buddhist Meditation and American Culture*. Oxford University Press.
- Yapko MD (2011). *Mindfulness and Hypnosis: The Power of Suggestion to Transform Experience*. Norton & Company New York: London

Table 1.

Sample characteristics (N=154).

Variable	Mean (SD) or N (%)
Age in years	52.68 (12.12)
Sex	
Male	72.10 (72%)
Female	26.60 (27%)
Transgender	1.30 (1%)
Race	
White-American	62.10 (62%)
Black or African-American	17.60 (18%)
Asian	3.30 (3%)
Other (e.g., American Indian, Native Hawaiian)	17.00 (17%)
Ethnicity	
Non Hispanic or Latino	89.90 (90%)
Hispanic or Latino	10.10 (10%)
Employment Status [/]	
Employed Full Time	22.10 (22%)
Employed Part Time	5.20 (5%)
Attending School or Voc Training FT	4.50 (5%)
Attending School or Voc Training PT	0.60 (1%)
Retired	39.00 (39%)
Homemaker	5.02 (5%)
Unemployed due to Pain	17.50 (18%)
Unemployed due to Disability	35.70 (38%)
Unemployed due to Other Reasons	0.05 (1%)
Educational Attainment	
Graduate or Professional School	11.70 (12%)
College Graduate	33.10 (33%)
Some College	43.50 (44%)
Vocational or Technical	5.20 (5%)
High School Graduate or GED	5.80 (6%)
Some High School	0.60 (1%)
Basic Pain Type	
Probable Nociceptive	20.80 (21%)
Mixed/Undetermined	37.00 (37%)
Probable Neuropathic	42.20 (42%)

[/] Note: percentages do not add up to 100 as some participants selected multiple categories

Table 2.

Means and standard deviations of the study measures.

Measure	N	Mean (SD)
SHCS Pro-Rated	154	3.03 (1.42)
FFMQ Observe	154	14.60 (3.43)
FFMQ Describe	154	17.11 (4.39)
FFMQ Act Aware	154	17.44 (3.96)
FFMQ Non Judge	154	16.26 (4.40)
FFMQ Non React	154	15.30 (3.79)

Table 3.

Correlations between the SHCS and FFMQ scale scores.

FFMQ Scale	SHCS Pro-rated
Observe	-.20 *
Describe	-.08
Act Aware	-.06
Non Judge	-.04
Non React	-.17 *

* Note $p < .05$ (2-tailed)