Open Access

*OBM Integrative and Complementary Medicine*

LIDSEN Publishing Inc.

Original Research

# Hypnotic Responsiveness and Dissociation: A Multi-Variable Analysis

Joseph P. Green [1, *], Steven Jay Lynn [2], Olivia J. Green [1], Victoria R. Bradford [1], Rouhangiz Rasekhy [1]

1. The Ohio State University, Lima, Lima, OH, USA; E-Mails: green.301@osu.edu; green.1856@buckeyemail.osu.edu; bradford.815@buckeyemail.osu.edu; rasekhy.1@osu.edu
2. Binghamton University (SUNY), Binghamton, NY, USA; E-Mails: slynn@binghamton.edu

* **Correspondence:** Joseph P. Green; E-Mail: green.301@osu.edu

**Academic Editor:** Giuseppe De Benedittis

**Special Issue**: Hypnosis: from Neural Mechanisms to Clinical Practice

*OBM Integrative and Complementary Medicine*
2020, volume 5, issue 2
doi:10.21926/obm.icm.2002029

**Received:** February 18, 2020
**Accepted:** May 07, 2020
**Published:** May 11, 2020

**Abstract**

Since Charcot [1], researchers and theorists have associated hypnotic responsiveness with dissociation. However, contemporary researchers have typically not documented impressive or statistically significant correlations between the most commonly used measure of dissociation, the Dissociative Experiences Scale-II [2, 3] and hypnotic responsiveness. We examined the ability of two measures of non-pathological dissociation, which have received scant attention in the hypnosis literature, the Wessex Dissociation Scale (WDS; [4]) and the Dissociative Processes Scale (DPS; [5]), in the context of a broader investigation of predictors of hypnotic responsiveness including expectancies, fantasy-proneness, absorption, and an index of more serious dissociative experiences and symptoms in a sample of undergraduate students. Scales of non-pathological dissociation and most measures of pathological dissociation did not correlate significantly with hypnotic responsiveness; however, stepwise regression analyses predicting HGSHS:A behavioral and subjective scores retained the Detachment factor of the DPS in the final model, along with expectancies and absorption. We present our findings in the context of a broader discussion of dissociation and hypnosis.

**Keywords**
Hypnosis; dissociation; Wessex Dissociation Scale; Dissociative Processes Scale

## 1. Introduction

Dissociation has been characterized as a “disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment” (DSM-5; [6]). Dissociation occurs in everyday life and may be as prosaic as intense absorption in everyday experiences, such as appreciating the beauty of a sunset, or in cases of "highway hypnosis," in which attention is focused, often to the exclusion of one's surroundings and minimal, if any, attention is devoted to behavioral enactments while behaviors unfold in a seemingly automatic fashion [7, 8]. Apart from these normative experiences, dissociation can be manifested in serious dissociative symptoms in dissociative disorders, such as depersonalization/derealization disorder, dissociative amnesia, and dissociative identity disorder (formerly multiple personality disorder).

Since Charcot [1], researchers and theorists have associated dissociation, as a trait-like attribute, with hypnosis, although attempts to predict hypnotic responsiveness based on personality traits have been mostly unsuccessful, and the search for reliable and appreciable correlates of hypnotic suggestibility, including dissociation, has proved elusive [9-12]. Hypnotic suggestibility is a multifaceted construct, which may be affected by numerous individual difference and contextual variables, including the capacity and willingness to use imaginative abilities, personal beliefs and expectations, rapport with the hypnotist, and motivation to respond [13, 14]. Two popular theories of hypnosis -- Hilgard’s [15] neodissociation theory and Woody and Bowers’ [16] dissociated control theory -- assert that hypnotic responding results from a division of consciousness akin to dissociation or a fractionation of cognitive and behavioral systems of control and overall executive control. These theories contend that hypnosis activates dissociative processes that enhance hypnotic responsiveness and imbue them with a sense of nonvolition or lack of personal agency [17-19].

If dissociation lies at the heart of hypnotic responding, then we would expect measures of dissociation and hypnosis to be positively associated. Earlier investigations linked hypnotizability and dissociation within clinical samples [20], including the observation that patients who suffered from dissociative disorders were highly hypnotizable [21, 22]. More recently, Dell [23] has argued that “at the level of diagnostic groups hypnotizability and dissociation are *sometimes* ... robustly related” (p. 68). Vanhaudenhuyse and colleagues [24] reported a modest correlation of $r$=.39 between performance on the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; [25]) and responses to a single question assessing the degree to which participants "...felt a dissociation between your bodily sensation and the actual environment" (p. 30), administered just a few minutes after a “neutral hypnosis” exercise. However, ratings between medium and low suggestible participants did not differ significantly. When well validated self-report inventories of dissociation and standardized assessment of hypnotic ability are employed, researchers typically find small yet sometimes statistically significant correlations between the two constructs [10, 26-28].

Bernstein and Putnam's [2] Dissociative Experiences Scale (DES; and the DES-II, [3]) is the most commonly used measure to assess the frequency of dissociative experiences. The correlation between the DES and hypnotizability typically hovers around *r*=.20 [29-31] and may be affected by the testing context (i.e., whether both scales are completed in the same testing session or in different, purportedly unrelated sessions; [10, 32]), such that the correlation of the DES with measures of hypnotizability decreases to near zero when the measures are administered in independent testing contexts [18]. Given that the DES was originally designed to measure dissociation within clinical samples, it is not surprising that the distribution of scores is often heavily skewed toward the low end in non-clinical samples, which may account, at least in part, for the lack of meaningful association observed between the DES and hypnotizability [30].

With college student samples, DES total scale scores may not capture possible links between non-pathological dissociative tendencies and hypnotic responsiveness. For example, using a 'present state' (vs. trait) measure of non-pathological dissociation, Cleveland and colleagues [33] administered the State Scale of Dissociation (SSD; [34]) before and after a hypnotic induction from the Harvard Group Scale of Hypnotic Susceptibility: Form A [35]. Consistent with their predictions, they observed that "a robust change in state dissociation occurs as a result of the hypnotic process" and argued that their findings "provide support for the existence of a positive relationship between hypnosis and dissociation" (p. 206-207). Maxwell et al. [36] reported that while trait dissociation (DES) was not associated with hypnotic responsiveness, highly suggestible participants reported more state depersonalization than less suggestible participants. Perhaps dissociative *state-like* experiences during hypnosis, which are associated with hypnotic responding, could be explained in terms of eye closure, relaxation, and general detachment from the environment associated with a focus on suggested events, rather than explained by a *trait-like* attribute of dissociation.

Nevertheless, other dissociation scales might exhibit higher correlations between hypnotic responsiveness and dissociation and better reflect the influence of trait-like attributes. Indeed, researchers have developed a number of other scales, such as The Wessex Dissociation Scale (WDS; [4]) and the Dissociative Processes Scale (DPS; [5]), to assess non-pathological variants of dissociation. However, these scales have received scant attention in the context of hypnosis research.

The present study is the first to examine the correlates of these scales with behavioral and subjective responsiveness to a standardized assessment of hypnotic susceptibility, alongside the widely used DES and a measure of more serious dissociative symptoms and experiences, derived from the DES (DES-Taxon scale; [37]). We also explored the relations among factorially derived subscales of these measures, when available, as well as their links with hypnotizability, and expanded our inquiry to encompass interrelations among these measures with absorption, fantasy proneness, and expectancies regarding hypnotic responsiveness. Absorption and fantasy-proneness, like dissociation, typically correlate with hypnotic suggestibility in the range of $r$ = .20 to $r$ = .35 (see [11] for a review), although the link between absorption and hypnotizability decreases when the measures are administered in independent contexts (reviewed in [38]).

An important goal of our research was to determine whether these self-report measures accounted for variance in hypnotic suggestibility beyond that of expectancies, as previous research has documented that expectancies correlate robustly with hypnotic suggestibility (see

[11]). For example, Green and Lynn [39] reported that a 3-item expectancy measure correlated at $r$ = .53 with hypnotizability. The current research examined the correlates of different measures of dissociation with hypnotic responsiveness in tandem with (a) other self-report trait measures (i.e., absorption, fantasy-proneness), which previous research has associated with hypnotizability to a modest extent (see [11]) and (b) with expectancies to determine the variance that these measures alone, and in combination, contribute to responsiveness to hypnotic suggestions. Finally, we examined potential gender differences related to our findings.

## 2. Method

### *2.1 Participants*

A total of 177 undergraduate students enrolled in introductory psychology classes at The Ohio State University, Lima were invited to participate in a study on "personality and hypnosis." We excluded 5 students who reported that they were hypnotized before and 16 others with significant missing data (e.g., skipped an entire page of the self-report assessment booklet). Final data analyses were based on *N*=156 students who reported that they had not been hypnotized before. Table 1 lists self-reported demographic information describing the sample. All participants signed a consent form. The lead author's local Institutional Review Board approved the study. Participants received four course extra credit points in exchange for their participation.

**Table 1** Demographic information.

| *Sample of Undergraduate Students* | *N=156* |
|---|---|
| Age | |
| Mean | 19.08 |
| SD | 2.24 |
| Gender | |
| Female | 81 |
| Male | 75 |
| Race | |
| Caucasian American / "White" | 141 (90.4%) |
| African American / "Black" | 6 (3.8%) |
| Latino American | 2 (1.3%) |
| Asian American | 2 (1.3%) |
| Other | 5 (3.2%) |
| Grade Rank | |
| Freshman | 132 (84.6%) |
| Sophomore | 14 (9.0%) |
| Junior | 7 (4.5%) |
| *(did not report rank)* | 3 (1.9%) |

### *2.2 Materials*

*Wessex Dissociation Scale* (WDS: [4]). Based on Beck's [40] cognitive theory of personality, the WDS assesses the frequency of "decoupled" mental processes. The 40-item WDS addresses a wider range of less severe symptoms of dissociation than other scales, and, accordingly, "may provide a better reflection of the full spectrum of dissociation than the DES-II" [4]. The authors reported a *r*=.80 and .65 across clinical and non-clinical samples between the WDS and the DES. The authors of the scale also reported positive correlations between scores on the WDS and scales measuring anxiety and somatization. Sample WDS items include: "I find myself unable to think about things no matter how hard I try;" "Unwanted memories come into my head;" and, "My personality is very different in different situations." Participants selected one of six options (ranging from 0 to 5 and anchored with the following terms: *Never, Rarely, Sometimes, Often, Very Often,* or *All the time*). High scores on the WDS indicate greater dissociative experiences. A total scale score reflects the item mean for the entire scale, with higher scores reflecting greater dissociative experiences. Kennedy et al. [4] found high internal consistency across the WDS items (Cronbach alphas of .95 and .90, across clinical and non-clinical samples). Internal consistency values for all measures in the current study are presented in Table 4.

*Dissociative Processes Scale* (DPS; [5]). The 33-item DPS assesses normal-range dissociative tendencies within non-clinical populations. The items are positively keyed with a response format consisting of the following options**:** 1=*strongly disagree;* 2=*disagree;* 3=*neutral or cannot decide;* 4=*agree;* 5=*strongly agree*. A total scale score is generated by summing across the items. Watson [41] reported a Cronbach alpha of .93 for the total scale score and correlations with the DES around *r*=.60 across two college student samples.

The DPS consists of three factors. The first factor (DPS-F1), *Obliviousness,* consists of 14 items and assesses the inclination to act in mindless and automatic ways and to enter into "naturally-occurring trance states" [41]. Sample items include: "I will walk into a room, and not remember why I went in there"; and, "At times, people have told me that I seemed to be off in a world of my own." The second factor (DPS-F2), *Imagination,* measures absorption, imaginativeness, and fantasizing. Sample items include: "If I want to, I can imagine some things so vividly that they hold my attention like a good movie or book does"; and, "I have an interesting fantasy life." The third factor (DPS-F3), *Detachment,* consists of 6 items and reflects depersonalization and derealization experiences as reflected in the following item: "Sometimes when I am looking in the mirror I feel like I am seeing someone else."

*Dissociative Experiences Scale-II* (DES and DES-II, [2, 3]). The DES is a widely used questionnaire measuring dissociative experiences in both clinical and non-clinical samples [42]. The DES-II [3] response format requires participants to select one of 11 response options ranging from 0-100, listed in 10-point increments, to reflect the percentage of time that they experience the phenomenon described in each question. The total scale score is the average response across all of the items. Scores above 30 reflect severe dissociative pathology [3]. The scale has adequate temporal stability (e.g., test-retest *r*s =.79 to .84; [3]) and internal consistency statistics (average *r*s=.93; [42]).

Within clinical samples, a 3-factor solution is most commonly observed [43, 44]. Stockdale and colleagues [45] assessed different factor structures across two samples of college students and

concluded that the following 3-factor solution best fit their data: *Absorption* (16 items), *Amnesia* (6 items), and *Depersonalization,* (6 items).

Waller et al. [37] identified an 8-item subset of the DES (i.e., DES-Taxon/DES-T) that distinguished dissociative disordered patients from other patient groups and from non-pathological types of dissociation. Examples of items comprising the DES-Taxon include: "Some people have the experience of feeling that other people, objects, and the world around them are not real. What percentage of time does this happen to you?"; "... hear voices inside their head and tell them to do things or comment on things that they are doing ..."; and, "...find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people ..." The current study used the DES-II and derived factors based on findings from Stockdale et al. [45], as well as the DES-T scale.

*Tellegen Absorption Scale* (TAS; [46]). The TAS consists of 34 items measuring imaginative abilities and the tendency to become absorbed in everyday activities (e.g., being deeply moved by a sunset; experiencing thoughts as visual images; becoming so absorbed during a movie or play and feeling as though you are part of the play and not part of the audience). TAS scores range from 0 to 34 reflecting the number of items endorsed. Tellegen [46] reported a test-retest correlation of .91 over the course of one-month and an internal consistency value of .88.

*Inventory of Childhood Memories and Imaginings* (ICMI; [47]). The ICMI is a widely used measure of fantasy-proneness. The scale consists of 52 items assessing childhood and adult beliefs and imaginings (e.g., vividly re-experiencing sensations in one's imaginations such as the feeling of a gentle breeze; pretending to be someone else; having a past out-of-body experience; having felt, heard, or seen a ghost). ICMI scores range from 0 to 52 reflecting the total number of items endorsed. Scores on the ICMI correlate with the TAS (*rs*=.67 to .81; [48]), and the scale has adequate test-retest reliability statistics (see [49]).

*Expectancy Index* [39]. Prior to hypnosis, participants responded to the following statements: (1) *I expect that the hypnosis experience will be interesting and enjoyable;* (2) *I think that I will be a good hypnotic subject* (response format of the first two items: 1-*no, not at all,* 4-*somewhat, and* 7-*yes, very much*); and, (3) *Please predict—as best as you can—how many of the 12 suggestions you expect that you will respond to during hypnosis* (participants circled a number corresponding to their prediction). Summing items creates an overall, global index of positive expectancies about being hypnotized. Green and Lynn [39] found that the individual items and the overall index all positively correlated with hypnotic responsiveness.

*Harvard Group Scale of Hypnotic Susceptibility, Form A* (HGSHS:A; [35]). The HGSHS:A is a widely used, group administered, 12-item standardized measure of hypnotic suggestibility. The scale begins with a suggestion for participants to close their eyes and to think of their head falling forward, followed by a 15-minute (approximately) eye-closure induction and then ideomotor suggestions for movements (e.g., eye closure, hand lowering, hands moving together), motor-challenge-type suggestions (e.g., inability to bend an outstretched arm, arm immobilization, finger lock, arm rigidity, communication inhibition, eye catalepsy), and cognitive-perceptual suggestions (e.g., hallucinating a buzzing fly, post-hypnotic amnesia, post-hypnotic suggestion to touch ankle). After hypnosis, participants report the degree of overt behavioral responses (i.e., how movements would have been judged by an onlooker) on a scale that can range from 0 to 12 with higher scores indicating greater responsiveness to hypnotic

suggestions. About one hour is needed to administer the hypnosis session and allow time for participants to complete the post-hypnosis response booklet.

The standard response format consists of a dichotomous choice in response to each item: pass (e.g., "My head fell forward at least two inches") or fail (e.g., "My head fell forward less than two inches"). As part of a larger study on the response format of the HGSHS:A, we included a third option to allow participants to indicate that they did not attempt the suggestion and to list reasons as to why (e.g., felt too relaxed; didn't want to attempt). In this study, we classified non-attempts as item failures.

*Subjective Involvement/Involuntariness Ratings.* After indicating their behavioral response to each HGSHS:A suggestion, participants rated the degree to which their response felt "automatic" or "involuntary." For example, after participants rated whether their head fell at least 2 inches after the 'head falling forward' suggestion, we asked the following question: "To what degree did your head falling forward feel "automatic" or "involuntary" (that is, *as if* it occurred all by itself)?" Similar to the subjective experience scale developed by Bowers [50] and then later expanded to the HGSHS:A by Kirsch, Council, and Wickless [51], our response options ranged from 1 to 5 and included the following anchors: 1=*not at all automatic or involuntary*; 3=*somewhat*; 5=*very much automatic or involuntary.* We summed scores across the 11 HGSHS:A behavioral items to generate an overall subjective involvement score (the HGSHS:A amnesia item was not assessed for involuntariness). If a participant both reported that they did not behaviorally respond to a given item and subsequently left the subjective involvement response blank, then we assigned a value of 1 (lowest rating of subjective involvement) for that item.

### *2.3 Procedure*

We announced the study to prospective participants enrolled in 6 different sections of introductory psychology at The Ohio State University, Lima. Interested students were given a series of questionnaires as part of a "take home" booklet and were instructed to complete the scales and return for a standardized assessment of hypnotic suggestibility scheduled approximately one week later. Students completed the dissociation and personality scales that we listed above, along with additional scales not related to this investigation. The scales relevant to this study were presented in a fixed order and appeared in the following sequence: demographic questions, TAS, ICMI, WDS, DPS, and then the DES-II. Before hypnosis, the experimenter disputed common myths associated with hypnosis (i.e., hypnosis involves a trance state; you could get "stuck" in hypnosis; subjects are unable to resist suggestions) and provided students with an example of something "hypnosis-like" that they might experience during the session (i.e., that if they fully imagined that their foot was attached to a helium filled balloon, then their foot might actually lift off the floor). Immediately prior to the hypnosis session, students completed the expectancy items contained within a response booklet. The HGSHS:A was delivered via audio recording to student groups ranging in size from 9 to 39 participants. Following hypnosis, participants self-reported in the response booklet the extent to which they responded behaviorally to each suggestion and rated how automatic or involuntary their responses felt.

## 3. Results

*Organization of analyses and controlling for Type I error.* Based on previous work [12, 39, 52, 53], we predicted that women would score higher than men on the HGSHS:A behavioral and subjective measures, TAS and ICMI total scale scores, and across our expectancy items. We therefore grouped these variables together. Our next set of variables included more pathological measures of dissociation and consisted of total scale scores on the DES-II, each of the DES factors, and the DES-Taxon. Last, we contrasted responses by our female and male participants across our measures of non-pathological dissociation (i.e., the WDS, DPS, and the DPS factors). Because we ran multiple tests within each group of variables, we applied a Bonferroni correction adjusting the critical value of significance to control for Type I error.

*Findings.* In our first set of independent samples t-tests, we examined mean scores obtained from our female and male participants across the behavioral and subjective indices on the HGSHS:A, total scale scores on the TAS and ICMI, and on our global Expectancy Index. As can be seen in Table 2, female students passed more suggestions on the HGSHS:A (behavioral score), reported greater subjective involvement with the HGSHS:A items (subjective/involuntariness score), and scored higher on the ICMI. In addition, mean scores on the TAS and on our Expectancy Index were consistent with our a priori hypotheses; however, the magnitude of the difference between means did not reach statistical significance given the Bonferonni correction to alpha. Table 2 also lists responses by gender to the three individual expectancy items.

Results from our second set of t-tests did not show any gender-related differences on the DES-II, DES factors, or the DES-Taxon. Across our final set of t-tests, male and female students responded comparably across the WDS, DPS and on two of the three DPS factors. Female students generated higher scores the first DPS factor (DPS-F1, *Obliviousness*), relative to male students (see Table 2).

Given that our female students scored higher on the HGSHS:A – both in terms of behavioral responsiveness and their reported subjective involvement – we examined whether the correlations between our various measures and the HGSHS:A scores differed by gender. We used the Fisher transformation test to convert correlations into Z scores and then contrasted these scores between female and male students. Given a total of 33 comparisons (16 scales by HGSHS:A behavioral and subjective scores; HGSHS:A behavioral and subjective scores with one another), we adopted a $p<.01$ criterion for significance. None of these correlations differed by gender using this criterion (*Z*s ranged from -1.17 to 2.29; *p*s ranged from .02 to .94).

We calculated Pearson-Product Moment Correlations across our measures. As can be seen in Table 3, the dissociation scales inter-correlated highly. The WDS and DPS correlated with the DES-II (total scale scores), r=.74 and r=.70, respectively, and the WDS and DPS positively correlated with one another (r=.75). We obtained very small, non-significant, positive rs (i.e., less than .14) between scores on the WDS, DPS and the three DPS factors, and students' behavioral performance on the HGSHS:A. Correlations between these measures and subjective/involuntariness scores on the HGSHS:A also failed to reach significance. Although the DES-II correlations with behavioral and subjective responding were low, they attained statistical significance, r = .19 and r= .16, respectively. Correlations of behavioral and subjective hypnotic responsiveness with absorption were statistically significant (r = .30 and .33, respectively) as were correlations with fantasy-proneness (r = .27 and r = .26, respectively).

**Table 2** Mean scores for male and female participants across our measures.

| ***Measure*** | ***Overall M (SD)*** | ***Males M (SD)*** | ***Females M (SD)*** | ***t*** | ***p*** | ***Hedges' g*** |
|---|---|---|---|---|---|---|
| HGSHS:A (behavioral response) | 4.76 (3.06) | 4.12 (3.39) | 5.35 (2.60) | 2.52 | .01 | .41 |
| HGSHS:A (subjective/involuntariness) | 29.59 (10.63) | 26.39 (11.25) | 32.56 (9.13) | 3.74 | <.001 | .60 |
| TAS | 16.88 (5.98) | 15.89 (6.13) | 17.79 (5.72) | 2.00 | .05 | .32 |
| ICMI | 21.23 (7.59) | 19.53 (7.36) | 22.80 (7.49) | 2.74 | <.01 | .44 |
| Expectancy Index | 14.21 (4.30) | 13.53 (4.53) | 14.84 (4.00) | 1.91 | .06 | .31 |
| Individual Expectancy Items | | | | | | |
| *Expectancy -item #1 (interesting)* | 4.97 (1.27) | 4.83 (1.33) | 5.10 (1.20) | 1.34 | .18 | .21 |
| *Expectancy -item #2 (good subject)* | 3.97 (1.28) | 3.95 (1.30) | 4.00 (1.26) | 0.26 | .80 | .04 |
| *Expectancy -item #3 (estimation)* | 5.27 (2.83) | 4.76 (3.22) | 5.74 (2.33) | 2.19 | .03 | .35 |
| | 19.22 (14.23) | 18.60 (14.28) | 19.79 (14.24) | 0.52 | .60 | .08 |
| DES | | | | | | |
| DES-F1 (Absorption) | 26.17 (16.72) | 24.61 (15.87) | 27.61 (17.44 ) | 1.12 | .26 | .18 |
| DES-F2 (Amnesia) | 11.37 (13.91) | 11.60 (14.31) | 11.15 (13.63) | 0.20 | .84 | .03 |
| DES-F3 (Depersonalization) | 8.53 (13.58) | 9.58 (15.54) | 7.55 (11.49) | 0.93 | .35 | .15 |
| DES-Taxon | 11.47 (13.51) | 12.37 (15.21) | 10.63 (11.75) | 0.80 | .42 | .13 |
| | 1.25 (0.60) | 1.20 (0.59) | 1.30 (0.61) | 1.07 | .29 | .17 |
| WDS (Wessex) | | | | | | |
| DPS | 86.03 (23.43) | 82.84 (22.28) | 88.98 (24.21) | 1.64 | .10 | .26 |
| DPS-F1 (Obliviousness) | 40.79 (11.41) | 38.37 (11.39) | 43.04 (11.03) | 2.60 | .01 | .42 |
| DPS-F2 (Imagination) | 19.88 (6.24) | 19.72 (6.05) | 20.02 (6.44) | 0.30 | .76 | .05 |
| DPS-F3 (Detachment) | 10.03 (4.67) | 10.17 (4.46) | 9.89 (4.88) | 0.38 | .70 | .06 |

Note: Within each set of 5 dependent variables, a Bonferroni correction of alpha resulted in a critical value of $p \leq .01$. Because Levene's test for equality of variances was significant for both HGSHS:A indices, the test statistics listed for these two variables were based on *equal variances not assumed.*

**Table 3** Correlations between measures.

| Measure | 1 HGSHS:A (behavioral response | 2 HGSHS:A (subjective/involuntariness | 3 TAS | 4 ICMI | 5 DES-II | 6 DES-F1 (Absorption) | 7 DES-F2 (Amnesia) | 8 DES-F3 (Depersonalization) | 9 DES-Taxon | 10 Wessex Dissociation Scale | 11 Dissociative Processes Scale | 12 DPS-F1 (Obliviousness) | 13 DPS-F2 (Imagination) | 14 DPS-F3 (Detachment) | 15 Expect Q1 (interesting) | 16 Expect Q2 ('good subject') | 17 Expect Q3 (estimation) | 18 Expect Index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. HGSHS:A (behavioral response) | - | | | | | | | | | | | | | | | | | |
| 2. HGSHS:A (subjective/ involuntariness) | .81** | - | | | | | | | | | | | | | | | | |
| 3. TAS | .30** | .33** | - | | | | | | | | | | | | | | | |
| 4. ICMI | .27** | .26** | .63** | - | | | | | | | | | | | | | | |
| 5. DES-II | .19* | .16* | .50** | .51** | - | | | | | | | | | | | | | |
| 6. DES-F1 (Absorption) | .24** | .22** | .54** | .55** | .97** | - | | | | | | | | | | | | |
| 7. DES-F2 (Amnesia) | .12 | .06 | .31** | .35** | .87** | .75** | - | | | | | | | | | | | |
| 8. DES-F3 (Depersonalization) | .03 | -.01 | .34** | .31** | .82** | .68** | .76** | - | | | | | | | | | | |
| 9. DES-Taxon | .09 | .04 | .38** | .38** | .91** | .79** | .90** | .92** | - | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. Wessex Dissociation Scale | .09 | .11 | .51** | .58** | .74** | .72** | .61** | .63** | .69** | - | | | | | | | | |
| 11. Dissociative Processes Scale | .13 | .13 | .65** | .64** | .70** | .72** | .51** | .54** | .59** | .75** | - | | | | | | | |
| 12. DPS-F1 (Obliviousness) | .12 | .13 | .49** | .49** | .65** | .69** | .48** | .44** | .52** | .67** | .91** | - | | | | | | |
| 13. DPS-F2 (Imagination) | .12 | .10 | .60** | .66** | .49** | .52** | .33** | .34** | .40** | .54** | .82** | .60** | - | | | | | |
| 14. DPS-F3 (Detachment) | .01 | .10 | .56** | .49** | .58** | .52** | .45** | .66** | .61** | .68** | .76** | .54** | .59** | - | | | | |
| 15. Expect-Q#1 (interesting) | .30** | .32** | .22** | .20* | .11 | .17* | .03 | -.04 | .02 | .02 | .09 | .09 | .11 | -.04 | - | | | |
| 16. Expect-Q#2 ('good subject') | .29** | .22** | .10 | .20* | .15 | .16* | .13 | .09 | .12 | .01 | .10 | .08 | .08 | .12 | .52** | - | | |
| 17. Expect-Q#3 (estimation) | .32** | .30** | .16* | .09 | .17* | .19* | .09 | .09 | .11 | .04 | .11 | .10 | .11 | .08 | .36** | .40** | - | |
| 18. Expectancy Index | .39** | .36** | .20* | .18* | .19* | .22** | .10 | .07 | .11 | .04 | .13 | .11 | .13 | .08 | .69** | .72** | .89** | |
| 19. Gender | .20** | .29** | .16* | .22** | .05 | .09 | -.02 | -.07 | -.06 | .09 | .13 | .20** | .02 | -.03 | .11 | .02 | .17* | .15 |

Note: Values reflect Pearson Product Moment correlations with the exception of those involving gender (point bi-serial values; gender coded as 1=male, 2=female).

* and ** indicate significant bivariate differences at the $p<.05$ and $p<.01$ levels, respectively.

To examine the ability of our variables, collectively, to predict behavioral and subjective responsiveness on the HGSHS:A, we performed two exploratory multiple regression analyses. First, we conducted a stepwise multiple regression analysis to examine the ability of the following variables to predict overt behavioral responsiveness to the HGSHS:A: TAS, ICMI, DES-II, DES factor scores and the DES-Taxon, WDS and DPS total scale scores, DPS factor scores, the Expectancy Index, and participant's gender. The full model (model 3) consisted of our expectancy index, TAS, and DPS-F3 (Detachment), R2=.232, F (3, 152) = 15.27, p<.001; adjusted R2 = .216. The initial model contained our Expectancy index, R2=.15, p<.001. The addition of TAS scores to Expectancy Index scores (model 2) led to a statistically significant increase in R2 of .051, F (1, 153)=9.79, p=.002. The addition of DPS-F3 (Detachment; model 3) resulted in a significant increase in R2 of .031, F (1,152) =6.10, p=.015.

We conducted a second stepwise multiple regression analysis to estimate *subjective* responses on the HGSHS:A, using the same predictor variables noted above. The full model (model 4) consisted of our Expectancy Index, TAS, gender, and DPS-F3 (*Detachment*), $R^2$=.273, $F$(4,151)=14.19, $p$<.001, adjusted $R^2$=.254. The initial model contained our Expectancy Index, $R^2$=.13, $p$<.001. The second model added scores on the TAS and resulted in a significant increase in $R^2$ of .071, $F$(1,153)=13.62, $p$<.001. The third model included gender and increased $R^2$ by .042, $F$(1,152)=8.45, $p$=.004. The addition of DPS-F3 (*Detachment;* model 4) increased $R^2$ by .030, $F$(1,151)=6.13, $p$=.014.

Finally, we generated Cronbach alphas to determine internal consistency reliability across our measures (see Table 4). Alpha values ranged from .79 to .95, with the exception of our expectancy index ($\alpha$ =.59).

**Table 4** Internal consistency reliability statistics across measures.

| Measure | Number of Items | Cronbach Alpha |
|---|---|---|
| HGSHS:A (behavioral response)* | 12 | .79 |
| HGSHS:A (subjective/involuntariness) | 11 | .90 |
| TAS | 34 | .81 |
| ICMI | 52 | .85 |
| DES-II | 28 | .95 |
| DES-F1 (Absorption) | 16 | .92 |
| DES-F2 (Amnesia) | 6 | .85 |
| DES-F3 (Depersonalization) | 6 | .86 |
| DES-Taxon | 8 | .86 |
| Wessex Dissociation Scale | 40 | .93 |
| Dissociative Processes Scale | 33 | .95 |
| DPS-F1 (Obliviousness) | 14 | .90 |
| DPS-F2 (Imagination) | 7 | .86 |
| DPS-F3 (Detachment) | 6 | .88 |
| Expectancy Index | 3 | .59 |

* Kudar Richardson (KR-20) value for reliability of dichotomous variables is equal to Cronbach alpha. The reliability for our expectancy index was likely affected by the small number of items comprising the scale.

## 4. Discussion

Our study provides a comprehensive examination of the link between trait measures of dissociation and hypnotizability in the context of a more encompassing study of the correlates and potential determinants of hypnotic responsiveness. We replicated and extended previous research in important ways.

Perhaps our most noteworthy finding was the general failure to find statistically significant or impressive correlations of measures of dissociation with hypnotic responsiveness. Indeed, across all of our dissociation measures, only the DES-II total scale score ($r$=.19) and one of the three DES factors (*Absorption*, $r$=.24) correlated significantly with behavioral hypnotic suggestibility, and correlations were similarly low with subjective responses to hypnosis (DES-II total score $r$= .16; DES *Absorption* factor $r$ = .22). Our low range correlations between the DES-II and behavioral and subjective hypnotic responding were similar in magnitude to those reported in previous studies [11]. Moreover, the WDS and DPS, along with DPS subscale scores, were not reliably associated with hypnotic responding on a statistical basis, with low and non-significant correlations in the range of $r$ = .01 to $r$ = .13. Importantly, we found only a very weak and nonsignificant correlation ($r$ = .09) between hypnotic suggestibility and the DES-T, a measure of serious dissociative symptoms, confirming the failure in the hypnosis literature to find evidence for an association between hypnotic responding and psychopathology.

Given the similar pattern of findings across diverse scales of dissociation, it is sensible to argue that these scales can be used interchangeably in the context of hypnosis research with student populations. Whereas our survey was not designed to rigorously test dissociation-based theories of hypnosis [15, 16], our findings are inconsistent with predictions derived from such theories; specifically, the hypothesis that dissociation, considered as a trait, is a viable predictor of hypnotic responsiveness (see [18] for a review), with the following qualification: Our preliminary finding of a link between the *Detachment* subscale of the DPS and behavioral and subjective scores on the HGSHS:A in our regression analyses suggests that scores on this factor assay something relevant to hypnosis beyond absorption (as measured by the TAS) and a positive expectancy to respond. Although total scale scores on the WDS and the DPS and DPS factor scores did not correlate with hypnotic suggestibility, our regression analyses suggested that the third DPS factor of *Detachment* contributed to the prediction of HGSHS:A behavioral and subjective scores after expectations about being hypnotized and absorption were included.

One possibility is that the propensity toward detachment in everyday life potentiates the tendency toward disrupted metacognition or executive monitoring during hypnosis [18, 54, 55]. Indeed, previous work suggests that highly hypnotizable individuals may experience reduced metacognitive awareness of their behavioral intentions, resulting in an attenuated sense of agency [56, 57]. Although the fact that the zero-order correlation between hypnotic responding and the *Detachment* subscale was not significant (i.e., $r$s=.01 and .10 across behavioral and subjective scores on the HGSHS:A, respectively), we suggest that future research should, nevertheless, more fully explore detachment and deficits in metacognition as potential moderators or mediators of hypnotic responding.

We documented strong support for the convergent validity of measures of dissociation, which exhibited impressive positive intercorrelations. For example, the WDS and DPS correlated with the DES-II, *r*s=.74 and .70, respectively, and the WDS and the DPS correlated at *r* = .75. In fact, the lowest inter-correlation across total scores on the DES-II, DPS, WDS, and the DES-T was still a substantial *r* = .59 (DES-T and DPS).

Our study also provides supportive psychometric statistics regarding the internal consistency reliability of items comprising the dissociation measures and subscales, which were good to excellent and ranged from $\alpha$=.85 (DES-F2, *Amnesia*) to .95 (DES-II and DPS total score). Alpha values for the HGSHS: A scores (behavioral and subjective), TAS, and ICMI ranged from $\alpha$=.79 to .90. We obtained a rather low alpha value for our expectancy index ($\alpha$ =.59); however, this is not overly surprising given that the index consists of only 3 items and alpha values are "strongly affected by the length of the scale" [58]. Nevertheless, we suggest that future research employ expectancy measures with greater internal consistency.

Moreover, we replicated previous research [11, 36, 38, 59, 60] by finding low-to-moderate statistically significant correlations, *r* = .30 and *r* = .27, respectively, of behavioral measures of hypnotizability with absorption (TAS) and fantasy-proneness (ICMI), and correlations in a similar range with subjective measures of hypnotizability (absorption, *r* = .33; fantasy-proneness, *r* = .26). In contrast, we found moderate-to-high correlations of measures of dissociation with measures of fantasy-proneness (range *r* = .31 [DES-F3 *Depersonalization* factor] to *r* = .66 [DPS-F2 *Imagination* factor]), which is consistent with the idea that significant overlap exists between fantasy-proneness and dissociation [61]. Our finding of a high correlation between the measures of absorption and fantasy proneness (*r* = .63) indicates that these constructs map onto a common domain of immersion in imaginative experiences.

In previous work, we have found that female students endorse more favorable views about being hypnotized and scored higher on the HGSHS:A, TAS, and ICMI, relative to male students [12, 39, 52, 53]. Our present findings converge with these earlier observations. More specifically, female students passed more HGSHS:A suggestions, reported greater subjective involvement during hypnosis, and averaged higher scores on the ICMI relative to their male counterparts. The magnitude of the effect sizes associated with gender differences on the HGSHS:A scores and the ICMI ranged from .41 to .60, indicating a small to medium effect. By squaring zero-order correlations, we estimated that gender accounted for small but significant amounts of variance across HGSHS: A behavioral (4%) and subjective (8.5%) scores and on the ICMI (5%). In addition, female students tended to score higher on the TAS and to hold more favorable views about hypnosis, especially their overall estimation of passing suggestions; however, in the current study, the magnitude of these differences between genders did not meet the pre-set criterion for significance.

Total scale scores on the WDS and DPS did not differ between female and male participants, with the exception of the first DPS factor (*Obliviousness*), where gender accounted for 4% of the variance on this subscale. Our female participants scored higher on this factor relative to males, reflecting a greater self-reported rate of mindlessness, automaticity, or even absentmindedness. In contrast, Fernaeus and Ostberg [62] examined absentmindedness among undergraduates attending Stockholm University and failed to find any gender difference. We question whether our finding of female students scoring higher on the DPS *Obliviousness* factor will be replicated, and if so, the extent to

which it reflects a true gender difference or reporting bias. More specifically, one could speculate that female participants might be more willing to acknowledge experiences of mindlessness/absentmindedness than males with a more guarded, defensive self-presentation consistent with sociocultural expectations [63].

Although we found that the magnitude of correlations between our various scales did not differ by gender, and gender as a stand-alone variable did not enter as a predictive variable of behavioral scores on the HGSHS:A in our multiple regression analysis, we recommend that researchers analyze for potential gender differences in their data sets. Exploring predictive models of hypnotic susceptibility within a large sample by examining interactions between gender and individual scale scores would be informative and permit more complex models beyond those that linearly add individual scale scores. Indeed, in a previous investigation, we found that predictive models of hypnotizability varied across male and female participants when gender-by-scale interactions were considered [39]. Our current finding that gender contributed to the prediction of HGSHS:A subjective/involuntariness scores further underscores the importance of including gender as a potential moderating variable when examining associations between personality variables and hypnotic responsiveness.

Our exploratory regression analyses should be interpreted with caution given the number of variables in the analyses and our sample size. Tabachnich and Fidel [64] recommend a 40-1 ratio of cases to independent variables. Given a ratio of roughly 15-1 in the current study, we characterize our analyses as exploratory and caution that our results are preliminary. In addition, stepwise regression capitalizes on sample-specific variation, and future investigations with larger samples should consider alternative statistical approaches to derive predictive models driven by theory. Whereas the use of stepwise regression has lost favor among many statisticians, some methodologists still view the technique appropriate for exploratory purposes [65, 66]. Indeed, "An 'atheoretical' use of hierarchical regression may be just as inappropriate to using exploratory-based analyses such as stepwise regression" [67]. We believe that our use of stepwise regression was reasonable in light of the exploratory nature of our investigation of the WDS and DPS, and associated DPS factors, given that these scales have not been fully examined within the context of hypnosis research. Clearly, our findings need to be replicated, particularly those involving the predictive contribution of scores on the DPS *Detachment* factor. If they are, then subsequent investigations based on empirical findings pertaining to non-pathological measures of dissociation could be advanced and tested in a more theory driven manner.

Our study is further limited in that we only included trait measures of dissociation and our participants completed the dissociation measures within the context of a hypnosis study. Future investigations should examine state as well as trait measures of dissociation in terms of accounting for their interrelation in hypnotic contexts and their differential ability to predict hypnotic responsiveness. Given that many hypnotic suggestions call for a present-moment dissociation of behavioral enactment and subjective experience of involuntariness, state measures of dissociation may very well prove to be more robust correlates of hypnotic ability than trait measures [24, 33, 36]. Furthermore, researchers should consider whether the magnitude of correlations are affected by the testing context by administering measures of dissociation both within and outside of the context of hypnosis or if the order of administering scales (e.g., before or after hypnosis) matters.

We acknowledge that undergraduate students' self-reported experiences of dissociation and their responsiveness to a group administered hypnosis scale may not fully capture dissociative or hypnotic phenomena, and that our findings may not generalize to a clinical setting. It is also possible that dissociation and hypnotic responsiveness in our sample are not linked in a straightforward, linear fashion, and that individuals with stronger dissociative tendencies might experience hypnotic phenomena in a qualitatively distinct manner from those that are less dissociative [7], thereby attenuating correlations between hypnotic suggestibility and dissociation measures across the entire range of hypnotic suggestibility. Moreover, experiential as well as personality differences, such as past experience with trauma, attachment styles, and imaginative abilities, for example, might separately or collectively moderate dissociative experiences within the hypnotic context [68].

Consistent with previous research we reviewed, of all of the variables we examined, the one that numerically correlated most strongly with hypnotic responsiveness was our Expectancy Index and, subsequently, it was the first variable retained in the regression analyses. Indeed, our collective assessment of participants' expectancies that hypnosis would be interesting and enjoyable, they would be a good hypnotic subject, and would pass a number of suggestions, correlated with both behavioral ($r$ = .39) and subjective ($r$ = .36) measures of responsiveness. Correlations between individual items comprising our Expectancy Index and hypnotic responsiveness were also significant, albeit at a slightly lower level than our global expectancy index ($r$s across the individual expectancy items and behavioral and subjective HGSHS:A responses ranged from .22 to .32). As highlighted by many sociocognitive theorists [69-73], expectancies seem to play a prominent role in determining hypnotic responsiveness. Supporting this assertion, and similar to our findings, Kirsch, Silva, Comey and Reed [74] found that response expectancy correlated more strongly with hypnotic responding than absorption, fantasy-proneness, or personal motivation. Still, scores on our Expectancy Index only accounted for 15% and 13% of the variance in HGSHS:A behavioral and subjective scores, respectively, thereby providing only limited support for a sociocognitive model of hypnosis. Clearly, much more variance remains to be accounted for in future studies. Finally, a virtually unexplored area in hypnosis studies is to determine whether inducing dissociation by means such as mirror gazing, dot staring, ganzfeld setups, virtual reality, and pulsed audio and photic (with due cautions regarding seizures) stimulation [75-77], would increase hypnotic suggestibility, as, to date, little evidence exists to support a robust relation between trait dissociation and hypnotic responsiveness, even across the variety of measures of dissociation we examined.

**Acknowledgments**

We thank Emily Allen, Kay Black, MaryAnn Kromer, and Andrea Morales for their assistance with this study.

**Author Contributions**

Joseph P. Green: study design and preparation, IRB approval, data analyses and interpretation of results, writing manuscript, responding to reviewers' questions. Steven Jay Lynn: writing and contributing to manuscript, interpretation of results, theoretical knowledge regarding hypnosis, responding to reviewers' questions. Olivia J. Green, Victoria R. Bradford, and Rouhangiz Rasekhy: data

collection, data entry, assisting with initial data analyses and interpretation of results, contributed to manuscript.

**Competing Interests**

The authors have declared that no competing interests exist.

**References**

1. Charcot JM. Clinical lectures on diseases of the nervous system (psychology revivals). Routledge; 2013.
2. Bernstein EM, Putnam FW. Development, reliability, and validity of a dissociation scale. J Nerv Ment Dis. 1986; 174: 727-735.
3. Carlson EB, Putnam FW. An update on the dissociative experiences scale. Dissociatio Prog Dissociat Disord. 1993; 6: 16-27.
4. Kennedy F, Clarke S, Stopa L, Bell L, Rouse H, Ainsworth C, et al. Towards a cognitive model and measure of dissociation. J Behav Ther Exp Psychiatry. 2004; 35: 25-48.
5. Harrison J, Watson D. The dissociative processes scale. Unpublished manuscript. Department of Psychology, University of Iowa, Iowa City; 1992.
6. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub; 2013.
7. Terhune DB, Cardeña E, Lindgren M. Dissociated control as a signature of typological variability in high hypnotic suggestibility. Conscious Cogn. 2011; 20: 727-736.
8. Green JP. Hypnotizability, the dissociative experiences scale, HGSHS: A amnesia, and automatic writing: Is there an association? Int J Clin Exp Hypn. 1997; 45: 69-80.
9. Dienes Z, Brown E, Hutton S, Kirsch I, Mazzoni G, Wright DB. Hypnotic suggestibility, cognitive inhibition, and dissociation. Conscious Cogn. 2009; 18: 837-847.
10. Kirsch I, Council JR. Situational and personality correlates of hypnotic responsiveness. Contemporary hypnosis research. Guilford Press; 1992. p. 267–291.
11. Lynn SJ, Green JP, Polizzi CP, Ellenberg S, Gautam A, Aksen D. Hypnosis, hypnotic phenomena, and hypnotic responsiveness: Clinical and research foundations—A 40-year perspective. Int J Clin Exp Hypn. 2019; 67: 475-511.
12. Green JP. The five factor model of personality and hypnotizability: Little variance in common. Contemp Hypn. 2004; 21: 161-168.
13. Lynn SJ, Maxwell R, Green JP. The hypnotic induction in the broad scheme of hypnosis: A sociocognitive perspective. Am J Clin Hypn. 2017; 59: 363-384.
14. Nadon R, Laurence J-R, Perry C. Multiple predictors of hypnotic susceptibility. J Pers Soc Psychol. 1987; 53: 948.
15. Hilgard ER. Divided consciousness: Multiple controls in human thought and action. Br J Psychol. 1977; 70: 342-343.
16. Woody EZ, Bowers KS, Lynn S, Rhue J. A frontal assault on dissociated control. Guilford Press New York; 1994.

17. Green JP, Lynn SJ. Hypnosis, dissociation, and simultaneous-task performance. J Pers Soc Psychol. 1995; 69: 728.
18. Kirsch I, Lynn SJ. Dissociation theories of hypnosis. Psychol Bull. 1998; 123: 100.
19. Lynn SJ, Green JP. The sociocognitive and dissociation theories of hypnosis: Toward a rapprochement. Int J Clin Exp Hypn. 2011; 59: 277-293.
20. Covino NA, Jimerson DC, Wolfe BE, Franko DL, Frankel FH. Hypnotizability, dissociation, and bulimia nervosa. J Abnorm Psychol. 1994; 103: 455.
21. Frischholz EJ, Braun BG, Sachs RG, Schwartz DR, Lewis J, Shaeffer D, et al. Construct validity of the Dissociative Experiences Scale: II. Its relationship to hypnotizability. Am J Clin Hypn. 1992; 35: 145-152.
22. Putnam FW. Diagnosis and treatment of multiple personality disorder. Guilford Press; 1989.
23. Dell PF. Is high hypnotizability a necessary diathesis for pathological dissociation? J Trauma Dissociation. 2017; 18: 58-87.
24. Vanhaudenhuyse A, Ledoux D, Gosseries O, Demertzi A, Laureys S, Faymonville ME. Can subjective ratings of absorption, dissociation, and time perception during "neutral hypnosis" predict hypnotizability? An exploratory study. Int J Clin Exp Hypn. 2019; 67: 28-38.
25. Weitzenhoffer AM, Hilgard ER. Stanford hypnotic susceptibility scale, form C. Palo Alto, CA: Consulting Psychologists Press; 1962.
26. Dasse MN, Elkins GR, Weaver III CA. Correlates of the multidimensional construct of hypnotizability: paranormal belief, fantasy proneness, magical ideation, and dissociation. Int J Clin Exp Hypn. 2015; 63: 274-283.
27. Fassler O, Knox J, Lynn SJ. The Iowa sleep experiences survey: Hypnotizability, absorption, and dissociation. Pers Individ Differ. 2006; 41: 675-684.
28. Whalen JE, Nash MR. Hypnosis and dissociation. Handbook of dissociation. Springer; 1996. p. 191-206.
29. Green JP, Green ES. Predicting animal attachment from hypnotizability, absorption, and dissociation scores. Am J Clin Hypn. 2010; 52: 205-218.
30. Nadon R, Hoyt IP, Register PA, Kihlstrom JF. Absorption and hypnotizability: Context effects reexamined. J Pers Soc Psychol. 1991; 60: 144.
31. Woody E, Bowers K, Oakman J. Absorption and dissociation as correlates of hypnotic ability: Implications of context effects [paper presentation]. Society for Clinical and Experimental Hypnosis, Tucson, AZ; 1990.
32. Green JP, Lynn SJ. Context effects on the relation between hypnotic susceptibility and dissociation [paper presentation]. American Psychological Association 62nd Annual Meeting, New York, NY, United States; 1995.
33. Cleveland JM, Korman BM, Gold SN. Are hypnosis and dissociation related? New evidence for a connection. Int J Clin Exp Hypn. 2015; 63: 198-214.
34. Krüger C, Mace CJ. Psychometric validation of the State Scale of Dissociation (SSD). Psychol Psychother. 2002; 75: 33-51.
35. Shor RE, Orne EC. Harvard group scale of hypnotic susceptibility, form A. Int J Clin Exp Hypn. 1962. https://doi.org/10.1037/t02246-000

36. Maxwell R, Lynn SJ, Condon L. Hypnosis, hypnotic suggestibility, memory, and involvement in films. Conscious Cogn. 2015; 33: 170-184.
37. Waller N, Putnam FW, Carlson EB. Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. Psychol Meth. 1996; 1: 300.
38. Council JR, Kirsch I, Grant DL. Imagination, expectancy, and hypnotic responding. Hypn Imagin. 1996; 41-65.
39. Green JP, Lynn SJ. Hypnotic responsiveness: Expectancy, attitudes, fantasy proneness, absorption, and gender. Int J Clin Exp Hypn. 2010; 59: 103-121.
40. Beck AT. Beyond belief: A theory of modes, personality, and psychopathology. Frontiers of cognitive therapy. The Guilford Press; 1996. p. 1–25.
41. Watson D. Dissociations of the night: Individual differences in sleep-related experiences and their relation to dissociation and schizotypy. J Abnorm Psychol. 2001; 110: 526.
42. Waller NG. The dissociative experiences scale. The 12th mental measurements yearbook: The Buros Institute of Mental Measurements; 1995. p. 317-318.
43. Carlson EB, Putnam FW, Ross CA, Anderson G, Clark P, Torem M, et al. Factor analysis of the Dissociative Experiences Scale: A multicenter study. Proceedings of the eighth international conference on multiple personality and dissociative states. Rush Presbyterian Chicago; 1991.
44. Ross CA, Ellason JW, Anderson G. A factor analysis of the Dissociative Experiences Scale (DES) in dissociative identity disorder. Dissociatio Prog Dissociat Disord. 1995; 8: 229–235.
45. Stockdale GD, Gridley BE, Balogh DW, Holtgraves T. Confirmatory factor analysis of singleand multiple-factor competing models of the dissociative experiences scale in a nonclinical sample. Assessment. 2002; 9: 94-106.
46. Tellegen A, Atkinson G. Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. J Abnorm Psychol. 1974; 83: 268.
47. Wilson SC, Barber TX. Inventory of childhood memories and imaginings. Framingham, MA: Cushing Hospital; 1983.
48. Tellegen A. Differential personality questionnaire. Unpublished materials. University of Minnesota; 1979.
49. Lynn SJ, Rhue JW. The fantasy-prone person: Hypnosis, imagination, and creativity. J Pers Soc Psychol. 1986; 51: 404.
50. Bowers KS. Do the Stanford scales tap the “classic suggestion effect”? Int J Clin Exp Hypn. 1981; 29: 42-53.
51. Kirsch I, Council JR, Wickless C. Subjective scoring for the Harvard group scale of hypnotic susceptibility, form A. Int J Clin Exp Hypn. 1990; 38: 112-124.
52. Green JP, Lynn SJ. Fantasy proneness and hypnotizability: Another look. Contemp Hypn. 2008; 25: 156-164.
53. Page RA, Green JP. An update on age, hypnotic suggestibility, and gender: A brief report. Am J Clin Hypn. 2007; 49: 283-287.
54. Dienes Z, Perner J. Executive control without conscious awareness: The cold control theory of hypnosis. Hypnosis and conscious states: The cognitive neuroscience perspective. Amazon.co.uk; 2007. p. 293-314.

55. Terhune DB, Cleeremans A, Raz A, Lynn SJ. Hypnosis and top-down regulation of consciousness. Neurosci Biobehav Rev. 2017; 81: 59-74.
56. Lush P, Naish P, Dienes Z. Metacognition of intentions in mindfulness and hypnosis. Neurosci Conscious. 2016; 2016.
57. Terhune DB, Hedman LR. Metacognition of agency is reduced in high hypnotic suggestibility. Cognition. 2017; 168: 176-181.
58. Streiner DL. Starting at the beginning: an introduction to coefficient alpha and internal consistency. J Pers Assess. 2003; 80: 99-103.
59. Council JR, Green JP. Examining the absorption-hypnotizability link: The roles of acquiescence and consistency motivation. Int J Clin Exp Hypn. 2004; 52: 364-377.
60. Green JP, Council JR. Does the positive keying of the TAS inflate the absorption-hypnotizability link? Int J Clin Exp Hypn. 2004; 52: 378-388.
61. Giesbrecht T, Lynn SJ, Lilienfeld SO, Merckelbach H. Cognitive processes in dissociation: an analysis of core theoretical assumptions. Psychol Bull. 2008; 134: 617.
62. FERNAEUS SE, Östberg P. The AMQ: A four-factor inventory of absentmindedness and memory. Scand J Psychol. 2009; 50: 193-202.
63. Kawakami C, White JB, Langer EJ. Mindful and masculine: Freeing women leaders from the constraints of gender roles. J Soc Iss. 2000; 56: 49-63.
64. Tabachnick BG, Fidell LS, Ullman JB. Using multivariate statistics. Pearson Boston, MA; 2007.
65. Aron A, Aron EN. Statistics for psychology. Prentice-Hall, Inc; 1999.
66. Cohen B. Explaining Psychological Statistics. John Wiley and Sons, New York; 2001.
67. Petrocelli JV. Hierarchical multiple regression in counseling research: Common problems and possible remedies. Meas Eval Couns Develop. 2003; 36: 9-22.
68. Wieder L, Terhune DB. Trauma and anxious attachment influence the relationship between suggestibility and dissociation: A moderated-moderation analysis. Cogn Neuropsychol. 2019; 24: 191-207.
69. Council JR, Kirsch I, Hafner LP. Expectancy versus absorption in the prediction of hypnotic responding. J Pers Soc Psychol. 1986; 50: 182.
70. Kirsch I. Changing expectations: A key to effective psychotherapy. Thomson Brooks/Cole Publishing Co; 1990.
71. Kirsch I, Lynn SJ. Altered state of hypnosis: Changes in the theoretical landscape. Am Psychol. 1995; 50: 846.
72. Lynn SJ, Kirsch I, Hallquist MN. Social cognitive theories of hypnosis. The Oxford Handbook of Hypnosis: Theory, Research, and Practice. Oxford University Press; 2008. p. 111-139.
73. Spanos NP. Hypnosis and the modification of hypnotic susceptibility: A social psychological perspective. What is hypnosis? Current theoties and research. Milton Keynes, UK: Open University; 1986. pp. 85–120.
74. Kirsch I, Silva CE, Comey G, Reed S. A spectral analysis of cognitive and personality variables in hypnosis: Empirical disconfirmation of the two-factor model of hypnotic responding. J Pers Soc Psychol. 1995; 69: 167.
75. Aardema F, O'Connor K, Côté S, Taillon A. Virtual reality induces dissociation and lowers sense of presence in objective reality. Cyberpsychol Behav Soc Netw. 2010; 13: 429-435.

76. van Heugten-van der Kloet D, Cosgrave J, van Rheede J, Hicks S. Out-of-body experience in virtual reality induces acute dissociation. Psychol Conscious (Wash D C). 2018; 5: 346.
77. Leonard KN, Telch MJ, Harrington PJ. Dissociation in the laboratory: A comparison of strategies. Behav Res Ther. 1999; 37: 49-61.