



Discrete response patterns in the upper range of hypnotic suggestibility: A latent profile analysis



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ABSTRACT

High hypnotic suggestibility is a heterogeneous condition and there is accumulating evidence that highly suggestible individuals may be comprised of discrete subtypes with dissimilar cognitive and phenomenological profiles. This study applied latent profile analysis to response patterns on a diverse battery of difficult hypnotic suggestions in a sample of individuals in the upper range of hypnotic suggestibility. Comparisons among models indicated that a four-class model was optimal. One class was comprised of very highly suggestible (virtuoso) participants, two classes included highly suggestible participants who were alternately more responsive to inhibitory cognitive suggestions or posthypnotic amnesia suggestions, and the fourth class consisted primarily of medium suggestible participants. These results indicate that there are discrete response profiles in high hypnotic suggestibility. They further provide a number of insights regarding the optimization of hypnotic suggestibility measurement and have implications for the instrumental use of hypnosis for the modeling of different psychological conditions.

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1. Introduction

A perennial question in the study of hypnosis is whether responses to different hypnotic suggestions are implemented through a uniform set of mechanisms across individuals (Hilgard, 1965; Woody & Barnier, 2008). A factor analysis of the two most commonly-used hypnotic suggestibility scales, the *Harvard Group Scale of Hypnotic Susceptibility, Form A* (HGSHS:A Shor & Orne, 1962) and the *Stanford Hypnotic Susceptibility Scale, Form C* (SHSS:C Weitzenhoffer & Hilgard, 1962) revealed that their (combined) latent structure consists of a single higher-order factor, suggesting a core ability, and four secondary factors, which may reflect ancillary, *componential* abilities (Woody, Barnier, & McConkey, 2005). These results suggest that hypnotic suggestions comprise a relatively uniform structure and, except for variability in componential abilities, contemporary theories of hypnosis largely assume that highly suggestible (HS) individuals are a uniform population (Barnier, Dienes, & Mitchell, 2008; Jamieson & Woody, 2007; Lynn, Kirsch, & Hallquist, 2008; but see Woody & Sadler, 2008).

Standard measures of hypnotic suggestibility include a variety of suggestions that can be classified on the basis of the psychological function targeted and the type of suggestion (Woody & Barnier, 2008). Specifically, most hypnotic suggestions target motor (e.g., ideomotor movements), cognitive (e.g., amnesia), or perceptual (e.g., auditory hallucinations) functions; these suggestions may be either facilitative (e.g., an auditory hallucination of a voice) or inhibitory (e.g., the inability to remember previously-learned information). Motor suggestions are the easiest to respond to and the most well-represented on the HGSHS:A, SHSS:C, and the *Waterloo-Stanford Group C Scale of Hypnotic Susceptibility* (WSGC; Bowers, 1993). In

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contrast, cognitive and perceptual suggestions are those to which HS individuals most greatly vary and are under-represented on these scales (McConkey & Barnier, 2004). This may give rise to restriction of range in the upper range of hypnotic suggestibility, as measured by these scales, and the false impression that HS individuals are relatively uniform in their response patterns to hypnotic suggestions.

The putative uniformity of hypnotic responding among HS individuals typically assumed by contemporary theories of hypnosis is challenged by growing evidence for heterogeneity in this population. HS individuals display marked variability in the types of hypnotic suggestions to which they respond (McConkey & Barnier, 2004; Terhune, Cardeña, & Lindgren, 2011b) and, more crucially, the strategies and attentional mechanisms underlying their responses (Galea, Woody, Szechtman, & Pierrynowski, 2010; King & Council, 1998). These and other results suggest that there are two discrete subtypes of HS individuals: a dissociative subtype that experiences greater involuntariness during hypnotic responding and exhibits impaired working memory at baseline, disrupted cognitive control following a hypnotic induction, and uses minimal attentional resources to respond to suggestions; and a non-dissociative subtype that experiences greater voluntariness during hypnotic responding (but still less than low suggestible individuals), a normal cognitive profile, and requires attention to respond to suggestions (King & Council, 1998; Terhune, Cardeña, & Lindgren, 2011a, 2011b). However, despite the accumulating evidence for this bifurcated typology, it remains unclear whether heterogeneity in HS individuals reflects continua-like diversity on one or more dimensions or the presence of fundamentally discrete categories of respondents.

Most of the evidence marshaled for a HS typology thus far (see Galea et al., 2010; King & Council, 1998; Terhune et al., 2011a, 2011b) has come from small-sample studies ($N_s < 30$) in which HS subtypes were demarcated using independent theoretical discriminators (e.g., a measure of dissociative tendencies). Moreover, these studies have largely neglected variation in hypnotic responding in favor of analyses of other behavioural, cognitive, or physiological variables. Identifying subtypes on the basis of behavioural response patterns to measures of hypnotic responding with larger samples represents a more rigorous approach because it is less constrained by assumptions pertaining to particular theories, it ensures greater sample sizes for derived classes, and it can yield clearer evidence as to whether derived subtypes are discrete groups or merely respondents who occupy different positions on one or more continua.

At least four studies with samples in excess of 100 participants have presented results that bear on the issue of whether HS individuals are comprised of discrete subtypes. One study, which applied taxometric analysis to responses on the HGSHS:A and the WSGC, found evidence for a latent taxon of HS individuals, suggesting that hypnotic suggestibility is categorical and that HS individuals are a discrete subgroup (Oakman & Woody, 1996). However, a significant limitation of taxometric analysis is that it's unable to discriminate between multimodal models (Ruscio, Ruscio, & Carney, 2011), namely whether hypnotic suggestibility is best modeled as being comprised of more than two subgroups. Accordingly, although it suggests that HS individuals are distinct from the remainder of the population, this study is unable to provide information as to whether HS individuals are better represented as a homogeneous group or a family of discrete classes.

A second study (Hallquist, Lynn, & Barnes, 2008) applied latent class analysis (LCA), a finite mixture modeling method that is able to discriminate between different multimodal models, to response patterns on the *Carleton University Responsiveness to Suggestions Scale* (CURSS; Spanos, Radtke, Hodgins, Stam, & Bertrand, 1983). The LCA revealed that a four-class model, which included a low suggestible class, two medium suggestible classes, and a single class of HS individuals, best fit the data. Insofar as HS individuals comprised a discrete category in this study, it goes against proposals for a bifurcated or trifurcated HS typology (Barber, 1999; Terhune et al., 2011b) and is consistent with the results of Oakman and Woody (1996). However, the CURSS suffers from the same limitation as the HGSHS:A, SHSS:C, and WSGC – the underrepresentation of *difficult* (e.g., cognitive or perceptual) hypnotic suggestions, which are those on which HS individuals are most frequently found to vary (McConkey & Barnier, 2004). That is, the CURSS does not possess sufficient sensitivity to measure individual differences in the upper range of hypnotic responding and thus an analysis of response patterns on this scale is unable to provide substantive information regarding variability among HS individuals.

A study by Brenneman and Kihlstrom (1988; Kihlstrom, 2008) circumvented the content limitation present in the two previous studies. These authors applied cluster analysis to the response patterns of medium and HS individuals on the *Stanford Profile Scales of Hypnotic Susceptibility* (SPSs; Weitzenhoffer & Hilgard, 1963). These scales include a diverse set of motor, cognitive, and perceptual suggestions and are thereby much better suited to investigate individual differences in the upper range of hypnotic responding than the standard scales widely used by hypnosis researchers (for a comparison, see Barnier & McConkey, 2004). The cluster analysis revealed the presence of 12 subgroups, suggesting a complex pattern of discrete classes of participants. However, this analysis is ambiguous because there is no consensus regarding reliable analytic techniques for class enumeration in cluster analysis, i.e., the determination of the optimal number of clusters in a sample. This renders cluster analysis inferior to finite mixture modeling techniques, such as LCA and latent profile analysis (LPA), which utilize strict criteria for class enumeration and are widely regarded as superior for the identification of latent classes (Vermunt & Magidson, 2002). Terhune and Cardeña (2010a) applied LPA to participants' spontaneous experiential responses to a hypnotic induction and found evidence for four response classes, two of which included HS participants. Notably, the two classes that included HS participants corresponded to the dissociative and non-dissociative subtypes found in other studies (King & Council, 1998; Terhune et al., 2011a, 2011b) and thereby provide convergent evidence for a bifurcated typology. However, the extent to which these subtypes can be identified on the basis of response patterns to different hypnotic suggestions remains unknown.

The present study examined whether HS individuals display uniform behavioural responding to a diverse set of difficult hypnotic suggestions by applying LPA to the response patterns on the SPSs of individuals in the medium to high range of

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