

The Michigan Odd Beliefs Scale: A Measure of Suggestibility as Assessed by Endorsement of Urban Myths

Robert J Spencer^{1,2}, Annalise M Rahman^{1,2}, Heather A Tree¹, Percival H Pangilinan³, and Linas A Bieliauskas²

¹Department of Mental Health Services, VA Ann Arbor Healthcare System, Ann Arbor, USA

²Department of Psychiatry, Michigan Medicine, Ann Arbor, USA

³Department of Physical Medicine and Rehabilitation, Michigan Medicine, Ann Arbor, USA

*Corresponding author:

Robert J Spencer

Department of Mental Health Services (116C), VA Ann Arbor Healthcare System, 2215 Fuller Road, Ann Arbor, MI 48105, USA.

Received : August 29, 2019

Published : September 16, 2019

ABSTRACT

We describe development and psychometric characteristics of the Michigan Odd Beliefs Suggestibility Scale (MOBS), a brief measure of suggestibility as measured by endorsement of urban myths. One hundred fifteen undergraduate students (57% female, mean age=20.3 years [SD=4.5]) were administered 21 “true” or “false” items, consisting of “urban myths” which are popularly referenced. The MOBS had a mean endorsement of 6.4 items (SD=3.3), with endorsement of greater than 12 items occurring in fewer than five percent of participants. The MOBS had fair-to-moderate internal consistency, with a Cronbach’s alpha of 0.67. The MOBS demonstrated convergent validity with a subscale of Openness on the NEO-FFI but was not significantly associated with other personality traits or need for cognition. These findings support the MOBS as a measure of susceptibility to belief in unsupported axioms; such susceptibility is distinct trait that has not been sufficiently captured by other assessment measures. While we describe the psychometric characteristic of the MOBS in a university population, it is quite possibly similarly applicable in clinical settings.

KEYWORDS: Insight; Psychometrics; Assessment; Suggestibility; Michigan Odd Beliefs Scale (MOBS).

INTRODUCTION

In the era of the internet, information comes in many forms. Although some information is supported by empirical evidence, other information is less exhaustively researched, with assertions being made based on anecdotes, hearsay, or other forms of cultural transmission. “Urban myths” are beliefs and fables that have persisted in popular culture despite a lack of concrete supporting evidence. These myths, which include conspiracy theories, scientifically implausible alternative medicine practices, and supernatural beliefs are relatively common and may arise from the human need to

make sense of the world [1]. Indeed, this need is engrained biologically in the form of pareidolia, the tendency to see patterns in otherwise meaningless ‘noise.’ Similarly, it is well documented that people often judge a message based on the appearance of the source, as opposed to the information contained in the message itself [2]. This desire to understand the world may encourage some individuals to commit logical fallacies by maintaining or even perpetuating a myth, rather than evaluating it using (often opposing) logic and data.

In a healthcare setting, a susceptibility to popular beliefs or myths can have critical medical implications. Patients often

come to healthcare appointments with preconceived ideas about their diagnoses or possible treatments after reviewing dubious internet stories or hearing a pseudoscientific pitch from a television doctor. Indeed, well-presented pamphlets, polished websites, and emotion-laden stories may influence people in times of vulnerability [3]. Less accurate sources of information may then mislead some healthcare consumers, particularly those who are prone to uncritically accept printed or electronic, but unsupported, information at face value. Measuring the propensity to embrace unsupported claims may lead to better understanding of varying patient approaches to and compliance with healthcare recommendations and prescriptions.

In principle, most people agree that opinions, no matter how strongly held, should change in the face of sufficient counter evidence. This principle has been put to the test over the past two decades following the publication by Wakefield and colleagues [4] proposing that vaccines confer a significant risk for the development of autism. Many published articles [5] and unpublished anecdotal stories (e.g. some celebrities) supporting this claim surfaced in the years following this publication, providing further evidence of confirmatory bias. Despite the association between vaccination and Autism being definitively refuted through well-controlled and thorough research [6, 7], many intelligent and otherwise rational people continue to advance the idea of the dangers of vaccines.

Irrational beliefs can also be observed within the setting of neuropsychological assessment. For example, the research literature clearly demonstrates short-term cognitive and emotional difficulties following mild traumatic brain injury, or concussion, though little evidence exists to support lasting cognitive or emotional symptoms [8]. Nevertheless, many patients present for neuropsychological assessment, thoroughly convinced that their current symptoms are caused by remote mild head injuries, as opposed to the more parsimonious and likely etiology of premorbid and comorbid factors. Furthermore, information regarding symptoms of mild traumatic brain injury is gathered most frequently from friends and the Internet, followed by medical professionals and informational pamphlets [9]. The skill or ability to distinguish the integrity of information drawn from respected sources (i.e., textbook chapters, peer-reviewed articles in respected journals) from information conveyed through hastily-constructed pamphlets, word-of-mouth, popular media, and poorly-designed websites is not universal. People are often misled by extraneous information that is unbound to rationality or data. Factors such as a speaker's

apparent confidence, enthusiasm, and eloquence can often hold more sway with listeners than the content of his or her central arguments. Likewise, the production quality and technological appearance of an infomercial can leave the viewer with impressions that run completely counter to reality. Influence through these non-informational sources is termed the "peripheral route to persuasion" [10, 11]. Individuals likely differ in their vulnerability to this type of influence, but current broad-band assessment instruments commonly used in clinical practice do not directly address the issue of suggestibility.

Of the broad band assessment instruments widely available, the Openness to Experience scale of the NEO-PI [12] most closely assesses suggestibility. This scale includes subscales for fantasy, aesthetics, feelings, actions, ideas, and values. It can be argued that individuals who are particularly open-minded or those who value abstract and emotional experience over factual knowledge risk taking an overly-inclusive, and uncritical, approach to accepting new beliefs.

The construct of need for cognition may present a counterpoint to Openness to Experience. Need for cognition refers to the attraction toward intellectual stimulation [13]. Although need for cognition has not been investigated in the context of suggestibility, it can be argued that critical thinking can be protective against developing or maintaining unsupported beliefs.

Urban myths present a novel opportunity for exploring the degree to which people are willing to believe unsubstantiated assertions, or, suggestibility. This investigation explored the psychometric characteristics of such a measure of suggestibility, the Michigan Odd Beliefs Scale (MOBS), which consists of statements that have little established empirical basis. We hypothesized that (a) items on the MOBS would have adequate internal consistency, and (b) suggestibility would share a small but significant relationship with openness on the NEO-PI. We also tentatively hypothesized (c) a small relationship between suggestibility and high need for cognition.

METHODS

Participants

Participants included 115 undergraduate students (56.5% female, mean age=20.3 years [SD=4.5]), enrolled in psychology courses at two large four-year Midwestern universities. Participants received class credit for their one-

hour participation. Data collection was approved by the institutional review boards at each university. All participants completed the MOBS, the Need for Cognition scale, and the NEO-FFI. Participants completed the measures individually, in a classroom setting.

Table 1: Michigan Odd Beliefs Scale (MOBS) items, means, and item-total correlations.

MOBS Item	Item Endorsement	Item-Total Correlation
1. The government cordons off area 51 because of documented alien activity	23%	0.33
2. Exposure to sunlight on hot days may cause loss of neurons and brain damage	23%	0.15
3. Speaking to fetuses in the womb increases the sizes of their brains	27%	0.19
4. Time travel is likely to occur within the next 100 years	17%	0.21
5. Many medications affect the size of the brain	27%	0.22
6. The government does not support natural remedies because they don't make money from the sales	39%	0.23
7. High altitude causes a chronic lack of oxygen to the brain	73%	0.24
8. When possible, planes should take precautions not to fly over the Bermuda Triangle	38%	0.31
9. Sitting for too long can cause build-up of nervous energy that is expelled in the form of nervous tics	46%	0.24
10. I have probably had contact with a ghost, even if I didn't realize it at the time	31%	0.30
11. Cell phone use puts people at risk for cancer	53%	0.23
12. Running can cause mild brain damage	3%	0.23
13. Laughter causes the brain to produce white blood cells	22%	0.21
14. Humans can develop ESP through training	14%	0.49
15. Animals have microscopic neuro-sensors for detecting seismic activity	52%	0.27
16. Shaving one's hair can cause it to re-grow noticeably thicker	55%	0.34
17. Chapstick™ contains fiberglass	9%	0.23
18. Some Bigfoot sightings are real, even if most have been found to be hoaxes	19%	0.18
19. The government suppresses information about the health benefits of tobacco use	20%	0.14
20. Alligators live in the sewers of New York City	7%	0.23
21. Dementia is caused by environmental toxins	44%	0.26

MATERIALS AND PROCEDURES

The MOBS originally consisted of 25 statements that are largely unsupported by evidence, but in many cases have

persisted in popular culture (i.e., “urban myths”). Participants responded to items as either being “true” or “false”. Items were chosen based on consensual agreement about their general prevalence among the members of the study team; items of a religious or political nature were purposely excluded. The 25 chosen items were examined for internal consistency; four items were removed because they hindered the overall internal consistency of the scale, as measured by Cronbach's alpha. The final 21-item scale is included in **Table 1**.

The Need for Cognition scale [14] is a self-report measure of an individual's enjoyment of effortful cognitive processing. The test consists of 18 items that are rated on a nine-point Likert scale ranging from “very strong disagreement” to “very strong agreement.” High scores on the Need for Cognition Scale indicate that the individual engages quickly and enthusiastically in processing new topics to sort relevant from irrelevant information [13,15]. Individuals high in need for cognition have been shown to be more conscientious and more open to experience than individuals low in need for cognition [16].

The NEO Five-Factor Inventory (NEO-FFI) is a 60-item personality inventory assessing each of the personality dimensions from Costa and McCrae's [12] five-factor model of personality. Scales, which can be interpreted at either low or high scores, include Neuroticism (vs security), Extraversion (vs preferring solitude), Openness to Experience (vs closed-mindedness), Agreeableness (vs competitiveness), and Conscientiousness (vs carelessness). Each of the five scales is comprised of several subscales assessing facets of each personality factor. Neuroticism includes negative affect, self-reproach, anxiety, and depression. Extraversion includes positive affect, sociability, and activity. The Openness scale is comprised of aesthetic interests, intellectual interests, and unconventionality. Agreeableness includes non-antagonistic and prosocial facets. Finally, Conscientiousness includes orderliness, goal-striving and dependability.

Data Analysis

SPSS Version 21.0 was used for all analyses (IBM Corporation, 2012; [17]). Descriptive statistics were calculated to determine the average number of items endorsed by participants. An independent samples t-test was also used to compare the average item endorsement by male versus female participants. To assess the overall internal consistency of the scale (Hypothesis a), Cronbach's alpha was calculated.

To address the hypothesis that certain personality profiles would contribute significantly to suggestibility (Hypothesis b), Pearson's *r* bivariate correlations were calculated between overall suggestibility score and subscales of the NEO-FFI. Similarly, the relationship between need for cognition and suggestibility (Hypothesis c) was assessed

using bivariate correlations. To better understand the relationship between individual myth endorsement and personality, bivariate correlations were also calculated between each MOBS scenario and the NEO-FFI factors and facets. Given the number of comparisons, a false discovery rate correction for Type I error was applied.

RESULTS

The MOBS had a mean endorsement of 6.43 items ($SD=3.27$), with endorsement of greater than ten items occurring in fewer than 10% of respondents and endorsement of 12 or more items occurring in fewer than five percent of participants. These values may be illustrative of the degree to which individuals' beliefs fall outside the majority of a similar adult population. Men and women did not endorse a significantly different number of urban myths [$t(1, 113)=0.31$, ns]. The 21-item MOBS had moderate internal consistency, with a Cronbach's alpha of 0.67. **Table 1** presents each item's item-total correlation and the percentage of participants who endorsed it.

The MOBS was not significantly correlated with any of the factor scales from the NEO-FFI. Although non-significant, MOBS suggestibility had a small, positive correlation with Neuroticism ($r=0.16$, $p=0.097$) and Openness ($r=0.15$, $p=0.115$). The MOBS had negligible correlations with extraversion ($r=.02$, $p=.806$), agreeableness ($r=.02$, $p=.800$), conscientiousness ($r=-0.04$, $p=0.654$). Overall suggestibility score was, however, significantly positively associated with the Aesthetic facet of the Openness factor ($r=0.204$, $p=0.028$). Although individual MOBS scenarios were significantly correlated with facets of the NEO-FFI none of these correlations remained significant after applying a correction for multiple comparisons.

The MOBS was not significantly associated with Need for Cognition ($r=-0.03$, $p=0.744$).

DISCUSSION

The MOBS was developed as a brief measure of suggestibility for use primarily in healthcare settings. The present study provides early psychometric description of the MOBS for assessment of suggestibility in a general population. The MOBS meets psychometric standards in that there was significant variation in item endorsement among participants and the scale showed adequate reliability. To assess the construct validity of the scale, MOBS scores were compared with profiles on the NEO-FFI and Need for Cognition scale. Results indicated that the MOBS may be moderately related to the Aesthetic subscale of the NEO-FFI, a dimension of Openness related to artistic sensitivity. Conversely, the MOBS is not significantly associated with other personality traits, providing evidence that the propensity to believe in unsubstantiated myths is largely independent of personality, as defined by traditional assessment instruments.

In this sample, suggestibility was unrelated to need for Cognition. Although this finding is not as hypothesized, it may be accounted for by prior studies that have demonstrated a relationship between need for cognition and intelligence [18], and a lack of relationship between intelligence and mythical beliefs. Prior studies suggest that high intelligence and advanced education do not necessarily confer immunity to unsupported beliefs and may contribute to entrenched ideas [2]. That is, high intelligence may encourage the post hoc justifications for existing beliefs, rather than the rational sifting through of evidence and systematically weighing of evidence. A study by Mahoney and Kaufman [19] provides an explanation for the lack of relationship between need for cognition and mythical beliefs; while the two constructs shared significant overlap, need for cognition was found to be a non-linear variable such that "Need for Cognition must achieve a minimum threshold before spontaneous critical self-examination can occur" (p.685).

In this sample, a proportion of young people in the midst of university studies are willing to believe, and admit to believing, things that have no basis in evidence. Some of the statements are unlikely but might potentially be true (e.g., a dementia-toxin link), whereas others are quite baseless and supported solely by cultural transmission and superstition (e.g., ghost encounters and the existence of Big Foot). This study provides a description of what would be considered "normal," in terms of degree of such beliefs, vs. what would be considered outside the normal range. For example, endorsing more than 10 items on the MOBS occurs in 10% or less of the measured population. A limitation of the present study is the relative homogeneity of the sample. Future studies may validate the MOBS in a more diverse sample to better understand whether urban myth endorsement varies by age, education, area of country, or culture.

One's style of critically evaluating information might have an impact on how likely one is to embrace baseless alternative treatments or believe unsupported claims regarding their health. This issue is particularly relevant for consumers, who often reference the internet or word of mouth [9], and whose symptoms may be influenced by such literature [3]. It also may interact with the general cooperation of patients with psychological assessment procedures which they don't understand, or compliance with healthcare recommendations on the necessity of alternating lifestyle or adhering to medication regimens. We believe that the MOBS is a useful tool to capture the propensity of individuals or groups to subscribe to non-evidentiary beliefs, and the likelihood to having these beliefs influence health-related behaviors.

Acknowledgements

We would like to thank Adam P. McGuire for his assistance in data management.

Funding: No support funding was obtained.

Disclosure Statement: The authors do not have any conflicts of interest to disclose. This material is the result of work supported with resources and the use of facilities at the VA Ann Arbor Healthcare System in Ann Arbor, MI. The contents do not represent the views of the U.S. Department of Veterans Affairs or the United States Government.

REFERENCES

1. Shermer M (2011) *The believing brain: From ghosts and gods to politics and conspiracies - How we construct beliefs and reinforce them as truths*. New York Times Books-Henry Holt & Co - Macmillan Publishers, NY, USA.
2. Bardone E and Magnani L (2010) The appeal of gossiping fallacies and its ecological roots. *Pragmatics and Cognition* 18(2): 365-396.
3. Waldron-Perrine B, Tree HA, Spencer RJ, Suhr J, Bieliauskas L (2015) Informational literature influences symptom expression following mild head injury: An analog study. *Brain Inj* 29(9): 1051-1055.
4. Wakefield AJ, Murch SH, Anthony A, Linell L, Casson DM, Malik M, et al. (1998) Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet* 351(9103): 637-641.
5. Adams M (2009) Vaccines cause autism: Supporting evidence. *Natural News*.
6. DeStefano F, Thompson WW (2004) MMR vaccine and autism: An update of the scientific evidence. *Expert Rev Vaccines* 3(1): 19-22.
7. Taylor LE, Swerdfeger AL, Eslick GD (2014) Vaccines are not associated with autism: An evidence-based meta-analysis of case-control and cohort studies. *Vaccine* 32(29): 3623-3629.
8. Bieliauskas LA, Drag LL, Spencer RJ (2015) Long-term outcomes from traumatic brain injury. In: Koffler S, Morgan J, Marcopulos B, Greiffenstein MF (Eds) *Neuropsychology: A Review of science and practice, Vol. II* Oxford University Press, NY, USA, 26.
9. Spencer RJ, McGuire AP, Tree HA, Waldron-Perrine B, Pangilinan PH, Bieliauskas LA, et al. (2013) Reports of traumatic brain injury information sources among OIF/OEF Veterans undergoing polytrauma evaluations. *J Rehab Res Dev* 50(1): 1-6.
10. Petty RE, Cacioppo JT (1984) The effects of involvement on responses to argument quantity and quality: Central and peripheral routes to persuasion. *J Pers Soc Psychol* 46(1): 69-81.
11. Petty RE, Cacioppo JT (1986) *Communication and persuasion: Central and peripheral routes to attitude change*. Springer-Verlag, NY, USA.
12. Costa PT Jr, McCrae RR (1985) *The NEO Personality Inventory manual*, Psychological Assessment Resources. FL, USA.
13. Cacioppo JT, Petty RE (1982) The need for cognition. *J Pers Soc Psychol* 42(1): 116-131.
14. Cacioppo JT, Petty RE, Kao CF (1984) The efficient assessment of need for cognition. *J Pers Assess* 48(3): 306-307.
15. Cacioppo JT, Petty RE (1984) The need for cognition: Relationships to attitudinal processes. In McGlynn RP, Maddux JE, Stoltenberg C, Harvey JH (Eds) *Social perception in clinical and counseling psychology* Texas Tech University Press, TX, USA.
16. Sadowski CJ, Cogburn HE (1997) Need for cognition in the big-five factor structure. *J Psychol* 131(3): 307-312.
17. IBM Corp. Released 2012. *IBM SPSS Statistics for Windows, Version 21.0*. Armonk, IBM Corp, NY, USA.
18. Hill BD, Foster JD, Elliott EM, Shelton JT, McCain J, Gouvier WMD, et al. (2013) Need for cognition is related to higher general intelligence, fluid intelligence, and crystallized intelligence, but not working memory. *J Res Pers* 47(1): 22-25.
19. Mahoney JM, Kaufman D (1997) Need for cognition and irrational beliefs. *Psychol Rep* 81(2): 685-690.

Copyright: Spencer RJ, et al. ©2019. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Spencer RJ (2019). The Michigan Odd Beliefs Scale: A Measure of Suggestibility as Assessed by Endorsement of Urban Myths. *Medical Research* 1(1): 1.

DOI: <https://doi.org/10.35702/mrj.10001>