The Role of Sociodemographic Factors and Reflective/Critical Thinking in the Belief of Psychological Misconceptions Among Community College Students

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Suggested bibliographic reference
Hatchett, C., Hayashi, C., Hernandez, I., Christensen, K. Lazaris, N., Nebrija, J., Regan, C., Tharpe, A. & Wikel, D. (2023), The role of sociodemographic factors and reflective/critical thinking in the belief of psychological misconceptions among community college students. *Psi Beta Journal of Research, 3*(1), 21-26. https://doi.org/10.54581/PHQQ9467

Abstract

Misinformation has become a pervasive issue in society. In relation to human behavior and cognitive processes, psychological myths can have detrimental effects by distorting our perceptions. This study employed correlational and regression analyses with 86 community college students in Southern California to examine the relationships between demographic factors, belief in psychological myths, as well as the relationship between belief strength on reflective and critical thinking measures. Correlational analyses revealed significant associations between belief in psychological myths and identification with various demographic factors. Findings suggest that certain demographic characteristics may be associated with stronger inclination to believe in psychological misconceptions. There was no relationship between our measure of critical thinking and endorsement of psychological myths. Results from this study suggest a number of implications for higher education. For example, educators can design curriculum to specifically address misconceptions, foster critical thinking, and promote accurate understanding of psychological phenomena. Providing opportunities for critical thinking in higher education may be beneficial in mitigating misinformation and cultivating accurate perceptions of human behavior. Findings from the current study highlight the importance of promoting critical thinking in educational contexts to combat the spread and perpetuation of myths and misinformation, ultimately leading to a more informed and discerning society.

Keywords: misconceptions, college students, cognition, psychological myths, demographics

Psychological misconceptions plague society. These beliefs typically contradict scientific evidence. Research examining psychological misconceptions regarding scientific advancement and unresolved issues defines psychological misconceptions as "claims about mental processes that are unsupported by high-quality psychological research" (Bensley & Lilienfield, 2017, p. 2). In order to further understand why individuals may subscribe to unsupported psychological misconceptions, the current study explored the relationship between sociodemographic factors and critical thinking skill measurements to discover any patterns or relationships.

Psychological misconceptions can be harmful, resulting in real-world consequences. For example, individuals who serve on a jury may believe that eyewitness testimony is an accurate way of identifying a suspect of a serious crime, and falsely accuse an innocent person. However, the reality is that memory constantly changes, and those changes are influenced by a variety of factors such as biases, unreliability, and assurance, which may be influenced by sociodemographic factors (Albright, 2017). In turn, these influences jeopardize the accuracy of memory. In knowing this, it must be acknowledged that encoding, storage, and retrieval memory processes often do not produce a truthful "permanent record, like photographs stored in a safe" and cannot be treated as an accessible tape recorder or video camera for accurate eyewitness testimonies (Albright, 2017, p. 4).

Regarding higher education, research has supported that a phenomenon known as the *misinformation effect* has also been a driving factor in how psychological myths or misconceptions are created and can produce consequences that carry over into higher education learning. The American Psychological Association Dictionary of Psychology defines the misinformation effect as an event in which an individual inaccurately remembers false information that is provided by a researcher, contrary to precisely recalling the accurate information that was previously presented (American Psychological Association, n.d.). In essence, retroactive information obtained after the fact can confuse a person's thinking after the initial episode of information exchange. So, an individual's recollection of anecdotal memories may develop into less accurate accounts because of ensuing details. This effect tends to create beliefs in psychological misconceptions which is also referred to as *retroactive interference*, the state in which new learning interferes and supersedes old learning, which disrupts the memory of what was initially learned (Mcleod, 2023). For example, if an individual is initially taught to hold in their anger and do breathing meditations to help reduce the anger, but is later taught that it is better to yell and break objects as a way to reduce anger, then because of retroactive interference, the individual may believe the psychological misconception that "it is better to express your anger than to hold it in" (Lilienfeld et al., 2010, p. 2).

Furthermore, Bensley and Lilienfield (2017) found that a large percentage of laypersons endorse psychological myths, and, surprisingly, medical, and mental healthcare professionals also endorse some of those same misconceptions. One study showed that "72% of laypersons believed people only use 10% of their brains, and remarkably 6% of neuroscientists" believed the same (Herculano-Houzel, 2002, as cited by Bensley & Lilienfield, 2017, p. 1). Other studies have also shown that lack of critical thinking skills may be related to psychological myth endorsement (Bensley et al., 2014). Despite existing research, few studies have examined relationships between demographic variables such as religiosity, race, socioeconomic status, and psychological misconceptions or myth endorsement. As a result, the current study aimed to explore the relationships between community college students' endorsement of psychological misconceptions and confidence in their knowledge, while considering what roles cognitive and demographic factors have in recognizing these myths and misconceptions. It was hypothesized that there would be a strong, positive correlation between sociodemographic factors (such as age, race, religion, and

parent education level) and belief in psychological myths and degree of confidence in myth ratings. Investigators also hypothesized that there would be a strong, inverse correlation between reflective and critical thinking skill scores and level of belief in psychological myths.

Method

Participants

In total, 86 students from an urban community college in southern California agreed to participate in the study. All participants provided written consent upon being provided with an explanation of the study. The sample identified predominantly as women (55 women, 27 men, four non-binaries, one missing value) with a mean age of 27.4 years old. Participants were primarily psychology majors (61.2%) and the data collected represented a range of ethnic identities, including Hispanic/Latino (50.0%), White/European American (23.2%), Mixed Race (9.3%), Black/African American (8.1%), Asian American (3.5%), Middle Eastern/Indigenous (2.4%), and Other/Rather Not Say (3.5%). Socioeconomic status (SES) also varied across participants, with the majority (45.3%) identifying as working class, followed by middle class (38.4%), preferred not to respond (8.1%), other (4.7%), upper class (2.3%), and missing (1.2%). Through a religiosity importance measure, most participants also identified that religion was not at all important (48.8%) to them, followed by somewhat important (33.7%), then very important (17.4%).

Materials

Key variables in our study included sociodemographic factors (gender, age, SES, race/ethnicity, religiosity), background factors (college major, honors society membership, maternal and paternal education, completed psychology courses, stage in education when the scientific method was learned), myth sum score calculated by the total myths believed (higher scores indicating more myths endorsed), overall confidence in myth answers score (higher scores indicating more confidence), number of correct Cognitive Reflections Test (CRT) answers (higher scores indicating better performance), and religiosity score (higher scores indicating higher importance of religion).

All participants responded to a 76-item self-report questionnaire consisting of a two-part Psychological Myths Scale, a Psychology as a Science Scale, sociodemographic questions, as well as a CRT, which was randomly received across participants either prior to or after being presented with the Psychological Myths Scale. The CRT (Frederick, 2005) uses three text-based numerical problems to measure the cognitive ability or disposition of a participant to reflect on a question, rather than reporting the first intuitive response that comes to mind. Those who perform well on the CRT tend to perform well at numeracy tests, general ability tests, and tend to avoid biases in judgment and decision-making tasks (Campitelli & Gerrans, 2013). The internal reliability of the CRT is modest (α = 0.60 - 0.74; Stieger & Reips, 2016). The Psychological Myths Scale includes 16 myth statements, each consisting of two parts that assessed the participant's belief in the myth (measured as true/false/other) as well as their confidence of their answer about the myth, measured on a Likert scale from 1 (not very confident) to 7 (very confident). The confidence scale can indicate levels of accuracy in memory and recognition but is dependent on the question posed and analysis used (Tekin & Roediger, 2017).

Procedure

This study was approved first through the Irvine Valley College application to the Institutional Review Board (IRB), followed by IRB approval from the authors' home institution. Participants were recruited through convenience sampling from the immediate population of the community college through email recruitment to psychology professors, printed flyers posted on campus, and word of mouth. Participants were provided with an informed consent form that estimated their time commitment, outlined the online survey format, and informed them that their participation was entirely voluntary and there was no penalty for

withdrawing from the study. Participants were informed that their responses would remain confidential, and that any identifying information would be removed once the data was analyzed. All participants were read an administration script that covered all protocols involved in their participation in this study. Each was also provided with a paper version of the informed consent, which they signed before continuing to the online form. All study documents were retained in a locked office on campus.

All participants were required to complete the study questionnaire in person at a campus computer lab with at least one proctor from the research team present to ensure validity of the data. Participants were not allowed to look up answers or multitask. Data was collected using an online survey format hosted on Google Forms. Participants self-reported their answers for a series of 76 items total. Participants had no prior knowledge of the content or design of the study, and proctors ensured that no information was communicated between participants at any stage of the administration.

There was an element of experimental manipulation in which a CRT was assigned on a randomized basis to participants. Randomization was done to produce an experimental group (exposed to CRT) and a control group (not exposed to the CRT before rating their beliefs in the myths). Would activating critical thinking serve to reduce participants' scores on the myth belief measures? Randomization of the CRT was done with a sequence director based on each participant's phone number (an arbitrary designator). Because the study involved presenting participants with psychological misconceptions and experimental manipulation, after they completed the questionnaire all participants were immediately debriefed by a member of the research team. The debriefing provided participants with accurate information regarding the myths as well as the study's purpose.

Results

Correlation analyses assessed the relationship between key study variables. Myth Belief Score and CRT Scores were not significantly correlated. There was a weak yet significant, positive correlation between confidence score and religiosity score (r = .318, p = .003,). Confidence score and age were also significantly weakly positively correlated (r = .216, p = .046). Religiosity score and age also approached statistical significance (p = .061, r = .203).

Analysis of variance (ANOVA) assessed the relationships between sociodemographic factors and Myth Belief Score. No significant results were found for a father's educational level or academic major. However, there was a significant result for race (F(5, 77) = 3.01, p = 0.015, 95% CI = [-4.76, 5.923]), with post hoc comparisons revealing the greatest differences between White/European-American (n = 20) and Black/African American (n = 7). ANOVA assessment of the relationship between SES and Confidence Score indicated significant differences between Middle Class (n = 33) and Upper Class (n = 2) participants (F(4, 80) = 2.73, p = 0.035, 95% CI = [-33.333, 40.358]).

No statistically significant findings were found for ANOVAs of Scientific Method Learned and Myth Belief Score, father's education level and confidence score, academic major and confidence score, race, and confidence score, Scientific Method Learned and Confidence Score, SES and Myth Belief Score, mother's education level and Myth Belief Score, or mother's education level and Confidence Score.

Discussion

This study was designed to explore the relationships between community college students' endorsement of psychological misconceptions and confidence in their knowledge while considering what roles cognitive and demographic factors have in recognizing these myths and misconceptions. The most notable findings from the analyses conducted were isolated significant differences between Black/African American and White/European-American racial groups and myth belief, as well as between self-reported religiosity and confidence levels. Consistent with previous studies (e.g., Cavazos et al., 2020; Furnham & Hughes, 2014),

there were limited significant findings between traditional, non-refutational psychological education as measured by number of psychology courses completed and recognition of psychological myths and misconceptions (Cavazos et al., 2020). Although critical thinking skills are imperative for recognizing misinformation and overcoming popular myths, the CRT measurement had no significant effects on myth recognition when administered prior to the myth belief scale, consistent with previous research (e.g., Bensley & Lilienfeld, 2015).

Myth belief score differences between Black/African American and White/European-American participants, while notable, had limited practical significance due to limited participants per group, failing to meet a minimum participant percentage threshold. Religiosity level and confidence in myths were also significantly positively correlated, suggesting that those who value religion more have stronger confidence in their myth "knowledge." Furthermore, higher religiosity scores among Black/African American and White/European-American participants could potentially account for differences in myth endorsement between these groups, as well as within racial and ethnic groups, as measured by both religiosity and confidence scores. Finally, confidence in myth beliefs and age were significantly positively correlated, suggesting that confidence in beliefs increases with age.

Study Strengths, Limitations, and Implications

It is important to interpret the results within the context of the strengths and limitations of this study design. Strengths of this study included live proctoring of the research questionnaire, which improved the study's internal validity. In terms of external validity, the study sample consisted of a diverse demographic of the community college student population. Although the study sample size was sufficient for analyzing relationships between individual factors and key variables, future studies would benefit from including larger between-group sample comparisons for increased internal and external validity.

It is important to note that this study relied on widely used instruments for measuring psychological myth belief and critical and reflective thinking for gathering data. Although the Psychological Myths and CRT scales have demonstrated reliability in previous research, there remain inherent challenges to measuring psychological misconceptions, particularly with forced-choice (true/false) measures. In their study testing psychological knowledge and investigating widely held misbeliefs using a new test design, Bensley and Lilienfeld (2015) argued for the inclusion of a *not sure/I don't know* response option for reducing guessing and chance in results. Similarly, more comprehensive psychological myth scales are available (Bensley & Lilienfeld, 2015; Lilienfeld et al., 2010) and could also be implemented with the addition of a third, *not sure/I don't know* answer choice.

Furthermore, data collection included an assessment of participants' beliefs regarding psychology as a science, which was not included in the current study analyses, which might have accounted for common sense attitudes toward common myths rather than applying greater critical thinking (Gaze, 2014). This is important to consider, as previous knowledge can affect new learning, particularly when an individual is more confident in their misbeliefs (Bensley & Lilienfeld, 2015). Given the lack of findings between CRT exposure and myth belief scores, developing critical thinking skills for reducing intuition-based reasoning will likely be an important direction for higher education interventions (Cavazos et al., 2020).

In the context of the study's strengths and limitations, it is recommended that future research continue to empirically investigate widely held and potentially harmful psychological myth beliefs. For example, future research studies could implement both cross sectional and longitudinal experimental designs for tracking myth belief and confidence over time, in addition to qualitative research for deepening understanding of how myths are encountered, accepted, and overcome after exposure to scientific knowledge. Future studies could also

continue investigating the relationship between religion, confidence, and psychology as a science in the context of demographics.

There are also implications and practical recommendations for instructional design in higher education. For example, qualitative research aimed at psychology instructional design for all majors (Cavazos et al., 2020) could help provide an empirical understanding of effective strategies to reduce exposure to and endorsement of misinformation. Practical strategies may include normalizing adaptive heuristics while applying corrective instructional design (Lilienfeld, 2010) and having instruction and correction prioritize highly consequential or harmful myths (Furnham & Hughes, 2014).

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