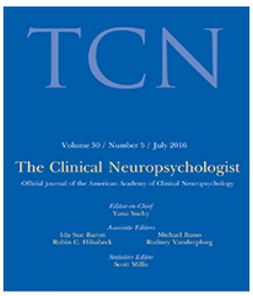

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A scoping review of stereotype threat for BIPOC: cognitive effects and intervention strategies for the field of neuropsychology

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ABSTRACT

Objective: Abundant evidence documents stereotype threat's (ST) detrimental effect on test performance across identities and contexts (i.e., eliciting underperformance). Review of the literature shows varied aspects of both stereotyped identities and cognition are inconsistently explored across studies. Only a portion of the literature focuses on ST's impact on Black, Indigenous, and People of Color (BIPOC). It is important to understand and learn to mitigate ST, particularly for historically marginalized and systemically oppressed BIPOC patients. Relevance exists for neuropsychologists, who engage in activities (i.e., assessments) that may activate ST, and should be aware of additional factors impacting testing results and clinical decision making. **Method:** Using scoping review criteria (Peters et al., 2015) and Preferred Reporting Item for Systemic Reviews and Meta-Analysis (PRISMA) guidelines, we reviewed literature across multiple databases (*Google Scholar, PubMed, PsychINFO*) on ST and cognition with a focus on BIPOC. **Results:** The current literature suggests that race-based ST may be implicated in underperformance for executive functioning and separately working memory. There is limited research on the effects of ST for memory, language, attention, and visuospatial skills. **Conclusion:** Research on ST requires additional attention to establish interventions to mitigate negative effects in practice. These results provide 1) an overview of the cognitive implications of ST, 2) address the scope of this impact for BIPOC, and 3) provide possible intervention and training strategies for neuropsychologists and other clinicians to work to mitigate the effects of ST on BIPOC.

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Introduction

Stereotype threat is defined as the influence of contextual and social environments that place individuals at risk to perform outside of their objective ability level (Inzlicht & Schmader, 2012). Furthermore, stigmatized group members may underperform on tasks due to the added pressure of working to disconfirm stereotypes held against themselves or their social group. In a landmark study by Steele and Aronson (1995), researchers examined the effect of stereotype threat comparing African Americans and white individuals on a difficult verbal test. They found that the mere presence of stereotype threat, enforced by explicitly stating whether a task was diagnostic of ability or not, caused underperformance in African Americans compared to the white sample. Specifically, the impact of stereotype threat holds particular significance regarding testing and assessment, and therefore should be of notable importance for neuropsychologists and other clinicians engaged in testing/assessment-based clinical and research activities. Furthermore, it is important for neuropsychologists, psychologists, and other mental health professionals to work to understand and address how implicit bias and other nuanced aspects of systemic oppression, such as stereotype threat, impact Black, Indigenous, and People of Color (BIPOC).

It is also important for neuropsychologists and other clinicians to understand the methodologies used in research that study stereotype threat and its effects. Since the seminal work of Steele and Aronson (1995), stereotype threat research has garnered significant interest in explaining performance differences amongst groups. Research paradigms often used in labs tend to elicit stereotype threat effects via higher difficulty tasks and demand. A limitation of these studies is the fact that is a wide range of variables that mediate or moderate the overall effect stereotype threat can have, depending on individual differences (Régner et al., 2010). The prevalent research paradigm for these studies includes a stereotype threat manipulation in which one group is made aware of the threat in order to compare their performance to a separate group which is not in the threat manipulation. This foundational method has been applied to various outcomes such as intelligence (e.g., Steele & Aronson, 1995), memory (e.g., Hess et al., 2003), math tests (e.g., Schuster et al., 2015), driving (e.g., Yeung & von Hippel, 2008), and childcare skills (e.g., Bosson et al., 2004) among other studies.

More recent studies have added additional layers of complexity to help explain other mediating or moderating factors that may activate stereotype threat. For example, whether the individuals are aware of stigma assigned to their group, participants' feelings of self-worth, their values, and their level of identification with a group. Moreover, a "multi-threat" approach has more recently been proposed in the literature to examine the intersection between the target of the threat and the source of threat (Shapiro & Neuberg, 2007). Specifically, Shapiro and Neuberg (2007) concluded that the combinations between applicability of a stereotype to one's personal or social identity and whether it is the in-group or out-group as the source threat, manifest in different ways. The ecological validity of such experiments calls into question whether these findings can be generalizable in real-world situations, and how much stock to put in implications that can be derived from these studies. Namely, the real-world environment is not as cut and dry as lab experiments because there are

several other confounding variables impacting perception and experience, ones that can be controlled in a lab setting.

Stereotype threat is widely researched across many minority and/or marginalized identities (e.g., gender identity, race, ethnicity, nationality, etc.); though, the research is scattered with significant variability in the identity, context, and outcome variable explored. Recent socio-political events (e.g., Black Lives Matter movement), that have shed light on preexisting discrimination and injustices, increase the importance to use this current momentum and social openness to change in order to critically examine and work to dismantle the potentially negative impact of stereotype threat for BIPOC. Despite the wealth of research on stereotype threat in general, as well as a portion of literature on stereotype threat related to racial/ethnic identities and BIPOC, the impact of stereotype threat continues to deleteriously affect the day-to-day lives of BIPOC across a range of settings. With perceived stereotypes for marginalized groups, there is additional pressure to perform as others would anticipate, or to attempt to disconfirm an anticipated performance (Boulton, 2016). More often than not, given the insidious and far-reaching conscious and unconscious bias of white superiority in the U.S., these perceived stereotypes are usually not positive, and can negatively impact when stereotype threat becomes activated. This relationship is complex for BIPOC, as the multitude of individual and intersecting identities can complicate and exacerbate one's vulnerability to stereotype threat, as this phenomenon is not limited to a single minority group (e.g., an elderly Black American woman completing a working memory task may, if primed, experience stereotype threat cues related to age, race, and gender that may impact her performance leading to inaccurate results).

Of note, many studies have an inherent limitation of erasing the nuanced complexity of the BIPOC experience, as that term encapsulates a wide rate of racial/ethnic identities. Similar to problems identified in the development and use of race-based norms in neuropsychology, even studies that do differentiate down to a specific marginalized race/ethnic identity (e.g., Black) assume broad homogeneity in discrimination and lived experience within that racial/ethnic group. This is problematic as race/ethnicity is used as a proxy assuming these underlying similarities in experience, but variations in phenotype within individual racial/ethnic identities (e.g., skin color, hair texture) may impact someone's day-to-day experience compared to others who identify from the same racial/ethnic background (Manly, 2005). Similarly, as racial classifications are socially determined, they may also change over time, impacting one's experience (Manly, 2005). Given that phenotypic classifications are used to classify race/ethnicity as a socially constructed variable, there is also variability across studies in inclusion/exclusion criteria for particularly racial/ethnic identifications (e.g., Black may encapsulate African American individuals born in the U.S. vs. Black immigrants from the West Indies or Africa; Manly, 2005).

In short, the priming of stereotype threat may negatively impact performance by encumbering BIPOC with additional affective and cognitive labor to manage their identity status. This may be an additive effect on top of existing labor (e.g., use of race-based code switching to manage identity status across settings). The interaction of stereotype threat and cognitive outcomes demonstrates a range of effect sizes across studies depending on the identity and the context examined. More specifically,

meta-analytic research using laboratory induced stereotype threat effects on intelligence testing outcomes for Latinx and Black Americans shows overall a medium effect ($d = 0.52$; Nadler & Clark, 2011). The relationship between stereotype threat and performance is complex; there is evidence for mediation mechanisms that help to explain patterns of performance implicated by stereotype threat cueing (Shapiro & Neuberg, 2007; Spencer et al., 2016). However, even with the variable effects of stereotype threat for BIPOC across varying contexts, it is clear that stereotype threat is critically significant to understand and work to mitigate. To further explore this complex relationship, the current paper will provide an overview of the cognitive implications of stereotype threat with a specific focus on the scope of this impact for BIPOC, and then will provide possible intervention strategies for neuropsychologists and other clinicians to work to mitigate the effects of stereotype threat on BIPOC. Of note, we acknowledge the impact of other factors (e.g., quality of education, systemic racism) that play a key role in explaining these differing effect sizes on cognitive performances as they are highly intertwined in society. Adhering to the scope of this manuscript, we focus on stereotype threat and its effect on cognitive performances and present literature relevant to this topic.

A final note, on the importance as we move forward in this literature to be particularly cognizant as researchers and clinicians not to infer group differences in research or clinical work from the potential effects of stereotype threat. Similar to issues with the use of race/ethnicity-based norm-use in neuropsychology, exploring racial/ethnic based cognitive differences has the potential to further stigmatize and reinforce race as a scientific concept (vs. a socially determined construct based on phenotypic similarity; e.g., Bagley, 1995; Fullilove, 1998; Manly, 2005). Furthermore, race/based norm use (similar to stereotype threat), does not help explain why there may be differences in cognitive test performance in the first place (Manly, 2005).

Overview of stereotype threat

The well-documented impact of stereotype threat on performance has potentially severe consequences for many different minority populations and identities (e.g., racial and ethnic minorities, sex and gender minorities, sexual orientation minorities, etc.), many of whom already face a number of systemic barriers, hurdles, and other disadvantages in society. If not addressed, this pattern of misrepresentation for minority communities may further hinder current and future generations. In particular, the negative impact of stereotype threat on Black Americans is documented as a significant barrier across many domains of psychology including, though not limited to, neuropsychological assessment, social psychology, industrial/organizational psychology, educational development, and psychopathology (e.g., Henry et al., 2010; Inzlicht & Schmader 2012; Kirnan et al., 2009; Smith & Hung, 2008; Thames et al., 2013). Stereotype threat is only one component of the aggregate systemic oppression that Black Americans experience. The severity of these racial disparities is stark and apparent, more recently notable through the Black Lives Matter (BLM) movement, which has not sought to condemn police violence alone, but contends that systemic racism is the ultimate issue. Namely, that the upstream effects of systemic racism serve to continue the suppression of human rights. Indeed, the presence of high-profile racial

injustice may act to prime vulnerability to stereotype threat for BIPOC communities. A consistent priming effect could have long standing effects on these communities and requires intervention to prevent further systemic injustice for racial minority groups.

These human rights disparities are context and/or situationally driven; however, they are not constrained to a single context and/or situation and may manifest in multiple areas of one's life. Stereotype threat may relate to these disparities, as the experience of stereotype threat may inform levels of inequality. The influence of stereotype threat for BIPOC may affect performance in a way that prevents minority groups from receiving appropriate job placement, educational opportunities, and healthcare utilization; by limiting the accuracy of performance assessment, access to career, academic, and healthcare settings may subsequently be reduced. Discrepancy between objective performance and stereotype threat primed performance may result in a perpetuation of inaccurate estimations of ability levels; this misrepresentation can act to further discrimination of minority groups by disallowing opportunity for occupational, educational, and social growth as well as have clinical implications for diagnoses and treatment.

Despite its far-reaching consequences, stereotype threat is typically studied within the context of test performance. As such, the impact of stereotype threat is particularly relevant for neuropsychologists, and the evaluation of cognitive testing performances. Available evidence suggests that stereotype threat may meaningfully alter neuropsychological test performance results by providing inaccurate estimates of objective cognitive ability levels (Thames et al., 2013). Indeed, research shows that the cognitive performances of minority groups show significant differences when compared to non-minority groups (Kaplan & Saccuzzo, 2001); the scores demonstrated by minority groups trend to be a full standard deviation or more below non-minority groups. Systematic differences in scores suggest that these scores are not representative of objective cognitive performances for minority groups (Rivera Mindt et al., 2010), with some researchers supporting differential norms for neuropsychological tests based on race/ethnicity as a way to compensate, in part, for stereotype threat as one component impacting these systematic differences (Manly, 2005). Overall, the impact of stereotype threat in test data may be observed as the collection of cognitive profiles that do not meet expectations for the sum of an individual's characteristics when compared to established normative data. Ultimately, this limitation may lead to a misrepresentation of objective cognitive performance, as evidenced by differences in test performances and cognitive ability due to negative sequelae related to the impact of stereotype threat (Nguyen et al., 2003).

Methods

Protocol and eligibility criteria

To conduct this scoping review, we adhered to the review guidelines proposed by Peters et al. (2015) in addition to study selection guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Page et al., 2021). In order to be eligible for this scoping review, all studies included must address effects of stereotype threat (i.e., as defined earlier in this paper)

and/or cognition (e.g., cognitive performance). Additional criteria included that the research must be 1) published between the years of 1995–2021, 2) empirical in nature, 3) published in English, and 4) published in a peer-reviewed journal. Articles that were either not peer-reviewed and/or not published were not included in this review, including non-peer-reviewed dissertations, and conference abstracts. The search for and collection of articles was conducted through electronic databases, including *Google Scholar, PubMed,* and *PsychINFO*. Additionally, when an article met eligibility criteria, a review of all referenced articles was completed in order to exhaust relevant article collection.

Search and study selection

The implemented search topic keywords included words related to cognition (e.g., cognition, neuropsychology, cognitive burden, cognitive performance, mental load, regulation, executive functioning, working memory) and stereotype threat (e.g., stereotype threat, BIPOC, discrimination, social identity, stereotypes, prejudice).

Articles were initially screened for relevance to cognitive performance levels related to stereotype threat. If relevance was determined, the full text article was collected by the first author for full reviewand determination of eligibility. Methodical points of interest for the first author were 1) impact of stereotype threat on cognition, and 2) the direction of that impact (i.e., decline versus enhancement), 3) which minority group, and 4) which relevant stereotyped aspects of identity were assessed. Collected articles were organized by cognition type (e.g., domain), and stereotype threat type (e.g., identity that was engaged). To eliminate effects of selection bias, all articles that met the eligibility criteria were included in the review, regardless of the results of the article. To ensure integration of quality data, articles that were not peer-reviewed were eliminated from consideration. The majority of literature reviewed addressed the effects of stereotype threat in the context of gender and age with gaps noted in literature addressing race-based effects; even more gaps were noted in clinical populations across all literature. The initial article pool included 51 manuscripts. After review, 22 of these articles met eligibility for inclusion in this manuscript. Of note, an additional 9 articles from the initial pool (although they did not include information about race and/or ethnicity) are also discussed throughout this manuscript, as they provide supplemental information related to other demographics (e.g., gender and/or age). Due to the scoping nature of this review, no additional analyses were completed.

The impact of stereotype threat on cognitive processes

Broadly speaking, research has shown that stereotype threat may have an impact on an individual's cognition as a whole. Stereotype threat's impact may be described as a combination of cognitive and affective factors that negatively alter performance when primed by stereotype threat (Schmader & Beilock, 2012; Walton & Cohen, 2003; McKay et al., 2003). One of the predominantly observed outcomes in performance is characterized by underperformance on tasks relative to objective ability, or tests that

measure an individual's level of competency at a specific type of task (Schmader, 2010). Underperformance can be seen across multiple areas of performance including cognitive testing (e.g., neuropsychological assessment), academic testing (e.g., classroom exams), standardized testing (e.g., the Graduate Record Examinations; GRE), occupational placement testing (e.g., personality, skills, interest), and physical performance (Walton et al., 2015). Though, this paper will focus exclusively on cognitive testing, as the other domains are outside of the scope of this review. Research supporting the effects of stereotype threat on performance are well-supported by current literature; performance-based discrepancies have been observed across many stereotyped groups, including racial, sex, and gender minorities. In addition, previous research suggests the magnitude of impact of stereotype threat on an individual's cognition is predicated by multiple factors including the individual's cultural identity (Weber et al., 2015), baseline cognitive abilities (Lyons et al., 2018), and effort/motivation (Jamieson & Harkins, 2012). When taken together, research suggests that there are a multitude of factors at play in terms of which individuals are impacted by stereotype threat and how they are impacted.

As mentioned earlier, it is theorized that stereotype priming may precipitate a vigilance to confirm or disprove the presented stereotype. The additional burden of increased vigilance to confirm or disprove the presented stereotype may prevent an individual from meeting their optimal performance level. Ståhl et al. (2012) further explain this cognitive process though evidence that cognitive mobilization in response to stereotype threat may be attributable to the presence of outcomes that communicate concern for failure. That is, if exposed to stereotype threat cues that prompt a concern for failure, individuals may then expend additional cognitive control resources to combat this concern. Individuals may utilize these similar cognitive resources when attempting to self-regulate, particularly if stereotypes are primed. Further supporting the relationship between stereotype threat and cognitive burden and its impact on individual performance, Johns et al. (2008) produced a four-experiment study showing convergent evidence of the negative effects of concurrent mental regulation and stereotype threat. They discovered that individuals who face stereotype threat often use emotion regulation strategies to impulsively attempt to control their expression of anxiety and that by doing so, such emotion regulation depletes executive resources which are needed to perform well on tests of cognitive ability. The discovery of the use of emotion regulation strategies in the face of stereotype threat lends itself to the idea that individuals facing stereotype threat may use different cognitive mechanisms in regard to the threat itself, which may be draining.

In light of current literature supporting the negative impact of stereotype threat on performance, it is critical to further examine this phenomenon. Broadly speaking, stereotype threat is documented to impact not only an individual's global cognitive functioning, but also specific cognitive domains such as executive functioning and working memory. These domains are critical for day-to-day functioning and as such will be examined below.

Stereotype threat and global cognition

Once initiated, stereotype threat produces a number of disruptive effects, including potential decreases in cognitive performance; global cognition, an aggregate of

cognitive functioning (e.g., orientation/attention, processing speed, learning and memory, verbal fluency, executive functioning, language, visuospatial ability, etc.), is one of most widely impacted domains (Spencer et al., 1999, 2016; Steele & Aronson, 1995). The current literature focuses primarily on differences between gender stereotypes but there is a dearth of literature regarding stereotype threat primed by an individual's racial identity. Taken together, the impact of stereotype threat on the day-to-day cognition of an individual cannot be understated as it is shown to lead to relative impairment. A breakdown of various cognitive domains and relevant literature is provided in the following sections with a mention of limitations and needed future directions.

Stereotype threat and executive functioning

Executive functioning, a broad set of cognitive processes that are necessary for selecting and monitoring behaviors that facilitate goal attainment, are critical for effortful cognitive tasks such as focusing, planning, decision-making, and problem-solving (Etnier & Chang, 2009). Examples of executive functioning include an individual's ability to inhibit (one's ability to suppress an automatic response in favor of another desirable response), set shift (one's ability to easily and effectively transition between multiple tasks), and update information (one's ability to continuously monitor and mentally manipulate information while also disregarding irrelevant information; Miyake et al., 2000; Ozier et al., 2019). Research has suggested that stereotype threat activation plays a role in underperformance for black participants on problem solving tasks, particularly regarding accuracy on these tasks (Brown & Day, 2006; Quinn & Spencer, 2001). Brown and Day (2006) demonstrated that when compared to white participants, Black participants performed more poorly under both "standard" threat (i.e., told that the test was a measure of thinking and observation) and "high" threat (i.e., told that the test was a measure of IQ). Performance impact has important implications that can be extrapolated to the real world where microaggressions and inadvertent comments can activate stereotype threat in individuals leading to increased feelings of anxiety interfering with optimal performance. For example, one can likely expect that an individual would exert resources to shift their cognition in response to a threat, thereby depleting resources necessary to complete tasks that require large amounts of information processing. Due to this, a greater focus on preventative measures (e.g., trainings on microaggressions in the workplace) are necessary to combat the effects of stereotype threat, particularly for groups such as BIPOC. Stereotype threat has been explored related to executive functioning in gender (Carr & Steele, 2010; Inzlicht et al., 2012; Rydell et al., 2014) and age (Fresson et al., 2017).

Stereotype threat and working memory

Much of the research conducted on the impact of stereotype threat focuses on working memory, and how individuals may be able to maximize their ability to alleviate the burden in the face of cognitive load. Specifically, research shows stereotype threat increases the cognitive load of a task by forcing the person to attend to both the task and the pressure of the stereotype, thereby affecting performance on difficult tasks and tests (Nguyen & Ryan, 2008). As such, cognitive load has shown to decrease

working memory capacity as the executive-control component of working memory is impacted; this decrease in working memory is observed in BIPOC populations (e.g., Latinx; Schmader & Johns, 2003). Decrease in working memory capacity has been shown through the use of an operational span task, which requires simultaneous storage and processing of information units (Schmader & Johns, 2003), the Stroop-color naming task (Richeson & Shelton, 2003), and an inhibition task (Mrazek et al., 2011). One explanation for this is a model proposed by Schmader et al. (2008) in which stereotype threat leads an individual to face negative affective, motivational, and physiological responses that together place demands on the executive-control components of working memory. The demand for these executive-control components in turn leaves fewer cognitive resources available to perform the task at hand, and hence performance suffers. Tine and Gotlieb (2013) found a negative impact of stereotype threat when individuals experienced the activation of multiple stigmatized identities, suggesting that this effect size is larger for individuals of intersectional identities (e.g., race, gander, SES). In their study, participants first completed working memory pre-tests, were then primed with a stereotype threat inducing stimulus, and then completed working memory posttests. Results demonstrated the most effect when primed with income-based stimuli; however, as additional identities were added (e.g., race, gender), the effect size increased. However, little research explores the impact of stereotype threat in relation to ethnic/racial identities for BIPOC and working memory skills, although this may be hypothesized to be even more crucial for this group, who may be jointly attending to not only the priming of stereotype threat and the task at hand, but also other race-based stressors (e.g., the pressure to code-switch, discrimination and microaggressions, etc.).

Emerging literature also seeks to further explain the cognitive bases of underperformance due to stereotype threat. Schmader and Johns (2003) suggest that the priming of a stereotype decreases an individual's working memory capacity, which subsequently diminishes performance ability. That is, underperformance may be explained by an underlying cognitive process. Schmader and John's (2003) research demonstrated consistent patterns of underperformance across complex cognitive tasks for individuals who were primed with a stereotype; the addition of attentional factors limited participants ability to utilize their full attentional and working memory capacity. Broadly, the effect of stereotype threat on working memory has also been explored on other aspects of identity including gender (Beilock et al., 2007; Rydell et al., 2014) and age (Johns et al., 2008); though, these areas are outside the scope of this review.

Stereotype threat and other cognitive domains

Regarding gender identity, language, and stereotype threat, there is evidence suggesting that men may experience stereotype threat in language domains under certain circumstances. Specifically, it is found that stereotype-threatened men perform poorly on verbal tasks under conditions of combined explicit stereotype threat and prevention focus (Keller, 2007). Surprisingly, individuals experiencing stereotype threat are shown to be more apt at categorically constrained word production, or increased verbal fluency, when compared to individuals who received a stereotype boost (Dabash & Longstaff, 2015). Researchers have suggested that this performance impact may be

due to individuals having a fear to confirm a negative stereotype; thereby, performing at a higher level to alleviate those fears (Barber et al., 2015). However, there is also evidence suggesting the opposite, in which subtle stereotype threat instructions decrease men's performance on verbal fluency tasks (Hirnstein et al., 2014). Limited research has so far explored the relationship between stereotype threat and racial/ethnic identities within the domain of language.

There is less literature on the impact of stereotype threat on other cognitive domains such as attention or visuospatial skills. In terms of attention, individuals under stereotype threat have shown a marked decrease in the ability to focus at the task at hand due to increased mind-wandering and anxiety associated with stereotype threat (Mrazek et al., 2011). In regard to visuospatial skills and stereotype threat, the little research in this area is related to gender identities (e.g., gender differences for line judgement tasks; Campbell & Collaer, 2009), with no studies exploring racial/ethnic identities.

Overall, divergent predictions about the intersectional experiences of stereotype threat, language, attention, visuospatial skills, and race may be hypothesized given the extant literature. Since the advent of Steele and Aronson (1995) study, there have been efforts to explore the effects of stereotype threat as they pertain to multiple domains. However, as previously noted, the limitation of this body of research is confined to the focus on age and gender. When race is included as a variable of interest, it is explored generally (i.e., merging multiple racial/ethnic minority identities) and rarely for a specific group (e.g., Black).

Implicants of stereotype threat across settings

Implications for clinical neuropsychological evaluations in healthcare

Overall, there is little to no research studying the impact of stereotype threat within neurological and/or clinical populations (Kit et al., 2008). Further assessment of stereotype threat in these populations is specifically relevant to neuropsychological testing, as the majority of individuals participating in clinical neuropsychological assessments present with some type of neurologically compromised status (whether subjective or objective). Inaccuracy in testing results is especially dangerous when considering underperformance in particular areas of neuropsychological testing manifesting as a profile that may mimic a prodromal neurological condition. For example, if an elderly BIPOC patient experiences stereotype threat while being administered a test of memory, their variability in their performance holds the potential to impact clinical decision making, diagnosis, and/or treatment recommendations. Especially if in an extremely pressured testing situation (e.g., evaluations for medical decision making, pre-surgical evaluations, transplant evaluations, etc.), the added stress activation of stereotype threat may be heightened. However, for many older adults, even commonplace dementia evaluations may be extremely anxiety-provoking and provide a context where the addition of negative impact of stereotype threat may be significant. Fresson et al. (2017) examined the effects of stereotype threat related to age status on a cohort of adults ranging from ages 59-70 and found that the adults who were primed with age related stereotype threat (who reported worry related to cognitive decline) performed at relatively lower levels on measure of executive functioning

when compared to the control group. They did not find significant differences related to memory or attention in this study; however, other researchers found significant negative effects on memory for elderly persons primed with age related stereotype threat. Hess et al. (2003) showed that older adults who placed high importance on their memory abilities demonstrated more susceptibility to the effects of stereotype threat. Chasteen et al. (2005) also completed research indicating that stereotype threat may work as a mediator for older adults' memory performances (i.e., memory performances declined as stereotype exposure increased). Regardless of any mixed results in the current literature, it is critical for clinicians to consider this potential underperformance as to not misdiagnose neurological conditions, especially in those clients that may have multiple stereotype threat vulnerable identities, such as BIPOC older adults.

While the literature relevant to this topic is wealthy with research on memory, it is important to consider race-based stereotype activation in this context. Blascovich et al. (2001) found that Black participants participating in cognitive tasks while experiencing stereotype threat displayed higher blood pressure elevation when compared to white participants (and performed more poorly on cognitive tasks). Their data suggests an effect of race-based stereotype threat and long-term healthcare. Considering the day-to-day racial injustice experienced by Black individuals, this chronic effect on blood pressure when primed with everyday stereotype threat could lead to long term biological changes in the cardiovascular system.

Not only does stereotype threat show an impact on performance levels in assessments, but there is an additional burden that may impact the efficacy of learning (Taylor & Walton, 2011). That is, individuals who have experienced learning environments limited by stereotype threat are less likely to be equipped with skills and knowledge that would have otherwise been present. Although for many clinical neuropsychologists, there may be concern that if learning is impacted in the assessment process, then other cognitive domains dependent on the learned material in the evaluation, may also not be an accurate portrayal of the patient's true abilities. However, it is important to consider the implications of this beyond the clinic, and how the impact of stereotype threat on learning may lead to pervasive negative outcomes (i.e., as it would affect one's ability to perform optimally beyond the presence of stereotype threat cueing in performance-based evaluations). These negative outcomes may be particularly relevant to pediatric neuropsychologists, or when assessing a patient's academic-based skills. For school-aged BIPOC patients, the impact of stereotype threat on learning may be further compounded by inequitable distribution of academic-related resources that may further contribute to disparities in learning. Overall, testing performance would be both limited by the effects of stereotype threat in the testing environment and the effects of attained knowledge limited by stereotype threat, creating a multiplicity of barriers for optimal performance.

When considering the holistic health of patients, especially BIPOC patients seen in neuropsychological testing clinics, it is important to conceptualize the activation of stereotype threat as an additive stressor on patients that should be avoided (over and above the negative impact on test scores, etc.). Similar to chronic stress, and the chronic impact of other insidious aspects of discrimination (e.g., daily onslaught of

microaggressions), chronic stereotype threat priming may negatively impact health outcomes with the addition of stress related to identity management. Further control may add an additional affective and cognitive burden that elicits additive negative mental and physical health outcomes, especially for BIPOC patients who already disproportionately are faced with a cumulative number of chronic stressors (e.g., racism, discrimination) compared to white patients. The influence of these chronic stressors may be broadly conceptualized through a diathesis-stress model (i.e., varying levels of vulnerability determining the allotted stress one may experience before presenting with clinical pathology; Monroe & Simons, 1991).

What's next? Mitigating stereotype threat in testing

Removing environmental cues

Environmental/situational cues may be items in the greater space/room, or things present in the actual test/testing materials, both of which can be powerful sources of stereotype threat. Demographic questions that precede tests may act as cues that trigger stereotype threat. In one study, Black participants that recorded their race on a questionnaire immediately prior to a verbal test performed worse than Black or white participants who were not race-primed (Steele & Aronson, 1995). However, when this question was omitted, their performance equaled that of the white participants. Danaher and Crandall (2008) demonstrated that gender-priming questions prior to a test generate similar detrimental effects on performance among female students taking the AP calculus exam. Thus, modifying the timing of demographic questions to occur after a test appears to be a simple but effective way to mitigate the effects of stereotype threat. It is important for neuropsychologists to explore and critically assess the potential impact of potential priming questions across all aspects of the neuropsychological assessment process (e.g., during clinical interviews prior to testing, basic demographic information on test forms and/or self-report measures for patients). It calls into question the potential of not just demographic questions, but particular images, examples, and items on testing materials may also unintentionally initiate stereotype threat priming (e.g., culturally insensitive items such as the noose on the Boston Naming Test; Horwitz & McCaffey, 2010).

Neuropsychologists should be considering not only their clinical interview and test materials, but also the testing space itself as part of the larger environment by which stereotype threat may be triggered. In regard to stereotype threat, greater environmental cues, and gender, Cheryan et al. (2009) found that merely changing the objects in a computer science classroom from stereotypical objects (such as Star Trek posters) to less stereotypical objects (such as nature posters) was enough to increase female undergraduate interest in computer science to the level of their male peers. Removing stereotypically masculine cues increased women's sense of belonging, which was strongly predictive of their desire to participate in computer science (Cheryan et al., 2009). Neuropsychologists should consider how their testing rooms (which typically are sterile), but also clinic waiting rooms, offices in which clinical interviews may be conducted, etc., may unintentionally contribute to stereotype threat priming and work to mitigate those potential cues.

Presenting tests as insensitive to differences

The ways in which tests are presented can also affect the likelihood of stereotype threat. Regardinggender-based stereotype threat, in one study, female students that were told that tests had shown gender differences in the past significantly underperformed compared to men (Spencer et al., 1999). However, when tests were characterized as insensitive to gender differences (i.e., having never shown gender differences in the past), female students performed at a similar, or higher level compared to male students (Good et al., 2008; Spencer et al., 1999). Thus, the inclusion of a brief statement that a test has not shown gender differences in the past can reduce stereotype threat and underperformance by female students in math (Good et al., 2008). The proposed strategy could also be used to mitigate the effects of stereotype threat for other identities, including race and ethnicity for BIPOC. By presenting an insensitivity to potential group differences, the additional burden to either confirm or disprove a stereotype may be lessened. Therefore, when possible, tests should also be conveyed as a "snapshot in time" relative to one's objective abilities (vs. a permanent, static diagnostic assessment), to potentially reduce activation of stereotype threat. For example, Black students showed greater cognitive activation of racial stereotypes and performed significantly worse on a verbal test when the test was presented as reflective of ability (Steele & Aronson, 1995). By eliminating stereotype activation for BIPOC, performance may not be affected and may then represent a more accurate measure of verbal ability. Stereotype threat activation presents a challenge for neuropsychologists conducting clinical evaluations, but also highlights the importance of neuropsychologists' "welcome spiel" to patients, and how they explain and frame the purpose, scope of the evaluation and how results will be scored and interpreted. More research is needed to explore if there may be best practices for neuropsychologists in how to frame testing to BIPOC patients to minimize the potential for stereotype threat priming. Further research could explore if the well-intended practice of providing pre-assessment education on testing and scoring considerations are helpful or harmful for stereotype threat activation.

Increasing visibility and representation in testing environment

The gender or racial composition of an environment may influence the extent to which stereotype threat is activated. For example, Inzlicht and Ben-Zeev (2000) found that when considering gender and stereotype threat, high-achieving women experienced deficits in group problem-solving when in the presence of men, and that these deficits increase proportionately with the number of men in the group. The presence of men constituted an threatening intellectual environment which impaired performance in the stereotyped domain (Inzlicht & Ben-Zeev, 2000). Additionally, the race or gender of individuals in positions of authority (for example, teachers) can have important implications for performance gaps. The gender gap in course performance in math and science is reduced significantly when female students learn from female professors (Carrell et al., 2010). Math and reading achievement also increased significantly for both Black and white students when assigned to a teacher of the same race (Dee, 2004). Thames et al. (2013) found that examiner-examinee racial discordance did not mediate the effect of stereotype on performance; however, it mediated the

effect of perceived discrimination on performance. In other words, Black Americans reporting high levels of perceived discrimination performed significantly worse on memory tests when the examiner was of a different race. Thus, it is possible that individual characteristics (perceived discrimination) and contextual factors (examiner race) may interact to affect performance (Thames et al., 2013). While increasing the visibility of people from minority groups among test-takers and test-administrators may improve academic achievement and test performance in stereotyped domains, these effects have not been studied as in neuropsychological test performance and have shown mixed results in other assessment contexts (Thames et al., 2013). This fact further highlights the importance of increasing diversity in the field of neuropsychology, as well as promoting training and development of BIPOC neuropsychology trainees(e.g., American Academy of Clinical Neuropsychology Relevance 2050 initiative; Rivera-Mindt et al., 2010). The integration of diversity in neuropsychology in addition to cultural humility training for all clinicians may further assist in the development of culturally sensitive assessment.

Reconstructional interventions

The act of reconstructing experience in the context of identity shows benefit for mitigating performance. Aronson et al. (2002) documented that guiding Black students to reorient themselves to see intelligence as a pliable concept that is not based on group identity resulted in higher GPA scores and reportedly higher levels of enjoyment in school. This strategy is helpful in that it allows for a lessened level of perceived threat and allows for lower burden on the individual. In a cognitive testing environment, reconstructional intervention could work to ensure that the client is experiencing lower levels of perceived threat and is able to engage in more optimal levels of performance. By encouraging a reappraisal of identity-related anxiety and reconstrual of the individual's potentially threatened identity, clinicians may lessen the burden of identity protection. Namely, for clinicians to remove the need for patients to engage in identity-related anxiety, by reframing the source of the anxiety and/or reframing their view of self (e.g., assure clients to not overestimate the likelihood that they will obtain poor scores related to their identity). Although this places an additional burden on the BIPOC examinee, it is the responsibility of the neuropsychologist to consider how their introduction and framing of testing may facilitate this process and help to mitigate stereotype threat for BIPOC patients and examinees.

Improve cross-group interactions

Another strategy to work to mitigate the impact of stereotype threat on BIPOC is to create identity-safe environments that encourage efficacious interactions between groups. To do this, one would need to ensure that the interpersonal environment is characterized by positive contact with members of the majority group (Crisp & Abrams, 2008). Davies et al. (2005) conducted research that supports the idea that identity safe environments work to diminish a susceptibility to stereotype threat. By allowing for identity safety, the relationship between the effects of stereotype threat and performance were eliminated. This finding may be extrapolated to consider the positive effects of building rapport and a safe environment for testing.

Individual coping strategies

There is evidence to suggest a coping intervention approach to mitigate the effects of racism for marginalized groups. Mitigation techniques would include such strategies as reappraisal (Hofmann et al., 2009), self-affirmation (Bratter et al., 2016; Schmiel et al., 2004), and mindfulness (Weger et al., 2012). However, as previously noted, it is critical to not place the burden of finding solutions to racism on the individual who is experiencing oppression. Namely, the solution should not add additional stressors and responsibility on the individual who is oppressed. Interventions should aim to focus on the actions and training of the non-oppressed population. In addition, stereotype threat may also be deterred by activating different aspects of an individual's identity that are not relevant to the stereotype. For example, asking participants about their favorite food or hobbies can build a more complex view of an individual and activate different parts of their identity, weakening the power of the stereotype (Ambady et al., 2004). When female students were asked to draw a self-concept map prior to a test where stereotype threat was induced, those with complex, more elaborated self-concepts scored higher (Gresky et al., 2005). Gresky et al. (2005) conclude that invoking other identities that are not linked to math performance can serve as a buffer against stereotype threat in women. Thus, neuropsychologists may consider how potentially during rapport building or the clinical interview process they may facilitate their patient reflecting upon the other various identities and roles they hold in their daily lives.

Conclusion

To summarize, the impact of stereotype threat cannot be ignored. Although much of the research on stereotype threat is explored with other minority/marginalized identities, it is clear there are implications for BIPOC. There is a continued and critical need to address the real-life consequences for BIPOC who experience the effects of stereotype threat in their day-to-day lives, as well as more specifically during testing and assessments. While the advancement of this research is lauded, it is critical that clinicians, especially neuropsychologists who participate in testing and integrate performance data in their assessments, continue to address and affect the actual day-to-day lives of BIPOC that experience everyday injustice. Neuropsychologists have the responsibility to examine their own practice, and not only assess the unintended ways (e.g., in the environment, clinical interview, test materials) that stereotype threat priming may occur for BIPOC patients, but also how they may be able to preventatively attempt to mitigate these effects. In addition to work at an individual level, the field of neuropsychology should aim to systematically address injustice, bias, and stereotype threat, by examining not just our measures, norms and standard of practices, but our training of future generations of neuropsychologists (e.g., at the externship, internship, post-doctoral level). As a field, we should consider integrating this information and training into our own assessments of clinicians, both to promote cultural humility but also to ensure that we do not perpetuate and trigger stereotype threat within our own internal assessment practices (e.g., board certification process, licensure exams, etc.). Although racism, discrimination, bias, and specifically stereotype

threat are all overwhelmingly pervasive aspects of systemic injustice in our society, we as neuropsychologists can work to understand, explore, and dismantle in not only our personal spheres of influence but in professional contexts as well.

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