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Differential Effects of Personal-Level vs Group-Level Racial Discrimination on Health among Black Americans

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Objective: Racial/ethnic minorities in the United States not only experience discrimination personally but also witness or hear about fellow in-group members experiencing discrimination (ie, group-level discrimination). The objective of our study was to examine whether the effects of group-level discrimination on mental and physical health are different from those of personal-level discrimination among Black Americans by drawing upon social psychology research of the Personal/Group Discrimination Discrepancy.

Design and Setting: We conducted a secondary analysis of cross-sectional survey data from a larger study.

Participants: One hundred and twenty participants, who self-identified as Black/African Americans during the laboratory sessions (57.5% women, mean age = 48.97, standard deviation = 8.58) in the parent study, were included in our analyses.

Main Predictor Measures: Perceived personal-level discrimination was assessed with five items that were taken from two existing measures, and group-level racial discrimination was assessed with three items.

Main Outcome Measures: Self-reported physical and mental health were assessed with a modified version of SF-8.

Results: Perceived personal-level racial discrimination was associated with worse mental health. In contrast, perceived group-level racial discrimination was associated with better mental as well as physical health.

Conclusions: Perceived group-level racial discrimination may serve as one of several health protective factors even when individuals perceive personal-level racial discrimination. The present findings demonstrate the importance of examining both personal- and group-level experiences of racial discrimination as they independently relate to health outcomes for Black Americans.
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Introduction

Experiencing racial discrimination personally (ie, personal-level discrimination) is stressful—people not only report psychological distress [1-4] but also experience biological stress reactions following the experience of discrimination.[5-10] Because stress, both daily hassles and major life events, negatively affects mental and physical health,[11-16] the experience of personal-level discrimination, as a stressor, can have profound effects on health.[17-20] It is now widely hypothesized that the experience of personal-level discrimination is one major factor contributing to the pervasive and prevalent health disparities that many racial/ethnic minorities face in the United States.[21-25]

However, racial/ethnic minorities not only experience discrimination personally, but also witness or hear about fellow in-group members experiencing discrimination (ie, group-level discrimination). This is particularly true in the current society, where more and more people are exposed to information about other people's experiences with discrimination (eg, unarmed Black Americans being unfairly treated by the police, homosexual couples being refused service at restaurants), possibly because sharing information is easier than ever with the help of advanced technology (eg, smart phone) and social networking websites (eg, Facebook).[26,27]

Does group-level discrimination have similar effects on individuals' health as personal-level discrimi-

nation? No study to date, to our knowledge, has empirically addressed this question. However, according to social psychology research of the Personal/Group Discrimination Discrepancy (PGDD), which refers to the individual's tendency to perceive and report greater amount of discrimination against their social group than themselves personally as members of that group,[28,29] personal- and group-level discrimination are hypothesized to have differential effects on psychological well-being, such as self-esteem and affect.[30-32] For example, it has been shown that, among Belgian women and African immigrants in Belgium, those who reported more, as opposed to less, personal-level discrimination had significantly lower self-esteem, whereas those who reported more, as opposed to less, group-level discrimination had significantly *higher* self-esteem than those who reported less group-level discrimination.[31] These opposite effects of personal- vs group-level discrimination on psychological well-being have been further replicated by an experimental study in which the experience of personal- vs group-level discrimination was experimentally induced,[32] suggesting a causal negative relation between personal-level discrimination and self-esteem and a causal positive relation between group-level discrimination and self-esteem. Taken together, these studies provide strong evidence that group-level discrimination may buffer the negative psychological consequences of personal-level discrimination.

Our study built on this PGDD and psychological well-being literature and investigated the separate effects of personal- vs group-level discrimination on mental and physical health. We hypothesized that there are independent effects of personal- and group-level discrimination on health. Specifically, we predicted that Black Americans who report higher levels of perceived personal-level discrimination would report poorer mental and physical health than Black Americans who report lower levels of perceived personal-level discrimination. It was also predicted that Black Americans who report higher levels of perceived group-level discrimination would report *better* mental and physical health than Black Americans who report lower levels of perceived group-level discrimination. We also explored whether or not there would be interactive effects of personal- and group-level discrimination on mental and physical health. However, we did not make a specific prediction because the findings in the current PGDD literature are mixed, with some finding an interacting effect[30] and others finding no evidence of such effect.[31,32]

Specifically, we predicted that Black Americans who report higher levels of perceived personal-level discrimination would report poorer mental and physical health than Black Americans who report lower levels of perceived personal-level discrimination.

Methods

Participants

One-hundred and thirty individuals who met the following eligibility criteria were recruited in the metropolitan Richmond, Virginia area through flyers or purposive referral sampling: 1) aged ≥ 35 years; 2) self-identified as Black/African American; 3) was able to come into the lab for one hour; and 4) had a permanent address and a personal phone number. Of those 130 individuals, nine individuals indicated their race as other than Black/African American (5 American Indian/Alaska native, 2 Asian/Pacific Islander, 3 Caucasian/White) during the laboratory session even though they self-identified as Black/African American during the screening. These individuals were excluded from all analyses. Additionally, one participant did not report their age. Because age was included as a control variable in the main analyses, this resulted in 120 analyzable cases (57.5% women, mean age = 48.97, standard deviation = 8.58).

Procedure

The data analyzed in our study came from a larger study approved by the Virginia Commonwealth University IRB and conducted between October, 2013 and December, 2014. In the original study, up to two participants reported to each laboratory

session that was run by one of nine Black research assistants. Participants first underwent a baseline vital check. Next, they completed a computer-based questionnaire, which included the measures analyzed in our study. Participants then underwent another vital check and finally participated in a physical feature assessment (eg, skin tone, nose shape, lip thickness).[33] Upon completion of the study, participants were debriefed and received $40 for their participation.

The questionnaire consisted of a series of measures designed to assess their beliefs and attitudes, experiences of discrimination, and mental and physical health. In the following section, only the measures that are the focus of our study are discussed. All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants being included in the study.

Measures

Perceived Personal-level Discrimination

Five items from two separate measures[34,35] were selected to assess perceived personal-level discrimination. Example items include "I feel like I am personally a victim of society because of my race" and "I personally have been a victim of racial discrimination." Participants' responses to the five items on a scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) were averaged to compute a composite score (α = .84). Higher numbers indicate more experience of personal-level racial discrimination. It should be noted that this measure was chosen over more frequently used measures in health disparities research, which tend to result in many zero values,[36-38] in order to better capture variability in perceived personal-level discrimination among Blacks. The composite scores were normally distributed with skewness = -.12 (*SE* = .21) and kurtosis = -.58 (*SE* = .42).

Perceived Group-level Discrimination

Perceived group-level discrimination was assessed with three items: "Other members of my race experience discrimination," "My racial group is discriminated against," and "My racial group has been victimized by society." Participants' responses to the three items on a scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) were averaged to compute a single score (α = .84). Higher numbers indicate greater perceptions of group-level discrimination. The composite scores for perceived group-level discrimination also had a normal distribution with skewness = -.65 (*SE* = .21) and kurtosis = -.24 (*SE* = .42).

Self-reported Mental and Physical Health

An 8-item modified version of SF-8 Health Survey[39] was used to assess participants' self-reported physical and mental health during the past 4 weeks. SF-8 has been found to be reliable and valid[40,41] and is designed to assess the eight subscales from widely-used SF-36: general health; physical functioning; role limitations due to physical problems; pain; energy; social functioning; emotional well-being; and role limitations due to emotional problems. Following the standard guidelines, the first four items were averaged to compute a composite score for physical health (α = .85), and the latter four items were averaged to compute a composite score for mental health (α = .76).[39] The scale ranged from 0 to 100, with higher numbers indicating better health.

Statistics

For each mental and physical health, a multiple regression with a main effect of perceived personal-level discrimination, a main effect of perceived group-level discrimination, and an interaction-term between the two as predictors was conducted. Before being entered into the model, both perceived personal- and group-level discrimination were grand-mean-centered. Age, household income, and education were included in each regression as control variables because age was associated with mental health (r= .18, P = .05), household income was associated with both physical (r= .21, P = .02) and mental health (r= .23, P = .01), and education was associated with physical health (r = .25, P = .01). Sex was excluded from control variables because it was not associated with mental or physical health and the inclusion of gender as a control variable did not change the main results. However, it should be noted that, consistent with prior research,[42-44] men reported more perceived personal-level discrimination (M = 3.56, SD = .95) than women (M = 2.90, SD = .86), t(119) = 4.00, SE = .16, P < .0001.

Table 1. Means, standard deviations, and correlations among all major variables (N=120)

	1	2	3	4
Personal-level discrimination	--			
Group-level discrimination	.49[b]	--		
Mental health	-.22[a]	.06	--	
Physical health	-.02	.18[a]	.67[b]	--
M	3.18	3.86	68.85	69.89
SD	.96	.85	21.33	21.91

a. P < .05
b. P< .001

Results

Table 1 summarizes descriptive statistics for major variables. Consistent with previous research, participants reported higher perceived group-level discrimination (M = 3.86, SD = .85) than perceived personal-level discrimination (M = 3.18. SD = .96) on average. Additionally, correlation coefficients indicate that participants who reported higher levels of personal-level discrimination were also likely to report higher levels of group-level discrimination (r = .49, P < .001) and that participants who reported better mental health were also likely to report better physical health (r = .67, P < .001).

Self-Reported Mental Health

Table 2 summarizes the findings of both mental and physical health. The overall model predicting mental health was significant, adjusted R^2 = .11, F(6,113) = 3.52, MSE = 403.61, P = .003. Consistent with our prediction, both the main effects of perceived personal-level discrimination (B = -7.33, SE = 2.35, P = .002) and perceived group-level discrimination (B = 5.97, SE = 2.85, P = .04) were significant. Specifically, Black Americans who reported personally experiencing a greater degree of racial discrimination had poorer mental health than those who reported experiencing less racial discrimination. In contrast, Black Americans who perceived a greater, as opposed to lesser, degree of group-level discrimination had better mental health. Finally, the interaction between perceived personal- and group-level discrimination was not significant (B = 1.99, SE = 2.52, P = .43).

Self-Reported Physical Health

A multiple regression revealed that the overall model predicting physical health was significant, adjusted R^2 = .08, F(6,113) = 2.72, MSE = 441.69, P = .02. Consistent with our prediction, there was a significant positive association between perceived group-level discrimination and physical health (B = 6.28, SE = 2.98, P = .04). This indicates that Black Americans who perceive that fellow Black Americans experience racial discrimination to a greater degree had better physical health than those who perceive that other Black Americans experience racial discrimination to a lesser degree. In contrast, inconsistent with our prediction, the main effect of perceived personal-level discrimination did not reach statistical significance. However, it should be noted that the direction of the association between perceived personal-level discrimination and physical

Table 2. Multiple regressions predicting mental and physical health

	Mental Health				Physical Health			
	B	SE	β	t	B	SE	β	t
Intercept	38.44	12.06		3.19	45.25	12.61		3.59
Covariates								
Age	.45	.22	.18	2.04[a]	.14	.23	.06	.62
Income	3.21	1.63	.19	1.96[a]	2.51	1.71	.14	1.47
Education	.14	1.28	.01	.11	2.02	1.34	.15	1.51
Personal-level discrimination	5.97	2.85	.24	2.09[a]	6.28	2.98	.25	2.11[a]
Group-level discrimination	-7.33	2.35	-.33	-3.13[b]	-3.49	2.45	-.15	-1.42
Personal X discrimination	1.99	2.52	.08	.79	3.95	2.63	.15	1.50

a. P < .05
b. P< .001

health was consistent with the prediction, such that greater experiences of personal-level discrimination was associated with worse physical health (B = -3.49, SE = 2.45, P = .16). Finally, the interaction between perceived personal- and group-level discrimination did not reach statistical significance (B = 3.95, SE = 2.63, P = .14).

Discussion

The negative health consequences of the experience of discrimination is well-documented.[19,20,23,45,46] However, prior research has generally focused on the effects of personal-level discrimination on mental health, and relatively little is known about the effects of witnessing/hearing about fellow in-group members' experience with discrimination on mental and physical health. Our study contributes to the growing literature of the discrimination-health disparities literature by drawing upon social psychology research of PGDD and investigating the independent effects of personal- and group-level discrimination on mental and physical health among Black Americans.

The findings of our study were generally consistent with our predictions. Black Americans who reported higher levels of perceived personal-level discrimination had poorer mental health than those who reported lower levels of perceived personal-level discrimination. Although the effects of perceived personal-level discrimination on physical health did not reach statistical significance, the direction of the regression coefficient was consistent with the prediction, such that Black Americans who reported higher levels of perceived personal-level discrimination tended to have poorer physical health than those who reported lower levels of perceived personal-level discrimination. The null finding of self-reported physical health might be due to small sample size. It might be also due to a difference in the amount of time it takes for stress to manifest in mental vs physical health. The experience of stress that is psychological in nature, such as the experience of personal racial discrimination, is likely to be more proximal to mental health than to physical health; therefore, it may manifest in mental health much faster than in physical health, particularly in our relatively young sample. Indeed, the cumulative effect of the biological mechanisms thought to underlie the stress-physical health (eg, increased allostatic load,[47-49] upregulation of pro-inflammatory genes,[50-53] alterations in the DNA methylation patterns[54-57]) may not manifest until decades of exposure.[58]

Our hypotheses about the effects of perceived group-level discrimination were also supported by our findings. More specifically, Black Americans who reported higher levels of perceived group-level discrimination had better mental and physical health than those who reported lower levels of perceived group-level discrimination. These findings are consistent with prior research of the PGDD showing that greater reports of group-level discrimination is associated with better psychological well-being.[30-32] Finally, there was no evidence for an interactive effect of personal- and group-level discrimination on mental and physical health. That is, Black Americans who reported higher levels of perceived group-level discrimination had better mental and physical health than those who reported lower levels of perceived group-level discrimination, regardless of whether they reported higher or lower levels of perceived personal-level discrimination. These findings suggest that perceived group-level discrimination could serve as one of several health proactive factors even when Black Americans perceived discrimination against themselves.

Black Americans who reported higher levels of perceived personal-level discrimination had poorer mental health than those who reported lower levels of perceived personal-level discrimination.

While our study cannot address why group-level discrimination had differential effects of personal-level discrimination on health, several well-established social psychology theories point to potential explanations. First, according to the discounting hypothesis,[59] an attribution of unfair treatment to racial discrimination, rather than to internal, personal characteristics, such as flaws in personality or abilities (eg, "I did not get a job not because I did not meet the qualifica-

tions but because the interviewer was a racist") can serve to protect psychological well-being.[60,61] If individuals perceive that their fellow in-group members are also experiencing the same kinds of unfair treatment, then it is easier for them to attribute the unfair treatment to discrimination rather than to their personal characteristics. Second, according to the relative deprivation theory,[62] subjective judgments that one is better off than others is associated with positive personal outcomes,[63] and people often engage in downward comparisons to maintain and/or boost their self-esteem and positive affect.[64-66] Given that Black Americans in the current sample perceived more discrimination happening to fellow in-group members than to themselves on average, reflected in a higher mean of perceived group-level discrimination than that of perceived personal-level discrimination (3.86 vs 3.18, respectively), this is suggestive of downward comparison. Supporting the positive effects of downward comparison, a post-hoc analysis using between personal- and group-level discrimination difference scores as a predictor (ie, positive numbers indicating more group- than persona-level discrimination and thus more downward comparison) revealed that Black Americans who engaged in downward comparison to a greater degree had better mental health (B = 6.21, SE = 2.07, P = .003). Although it did not reach statistical significance, the direction of the relation between difference scores and physical health was also consistent with the downward comparison (B = 3.14, SE = 2.18, P = .15). Finally, perceptions of group-level discrimination may allow individuals to feel that they are not alone in their struggle.[31,32] Future research systematically investigating these potential mechanisms is strongly encouraged.

Our findings should be interpreted in light of study limitations. The relatively small sample size may have limited our ability to detect significant associations for physical health and interactions between personal and group-level discrimination. Other limitations include the exclusion of other racial/ethnic minority groups for which racial discrimination is a salient stressor, lack of regional diversity, and limited focus on older Black Americans. The findings from our study should be replicated in larger, diverse samples of racial/ethnic minorities.

Conclusions

Our study adds to both applied health disparities research and social psychology research testing the predictions of the PGDD. Disparities research on the discrimination-health link has generally focused on the effects of the experience of personal-level discrimination. Our present findings demonstrate the importance of examining both personal- and group-level experiences of discrimination as they independently relate to health outcomes for Black Americans. It should be noted that we are not arguing that perception of group-level discrimination is good for health among Black Americans. Rather, an examination of the effects of group-level discrimination would provide additional information about factors that make Black Americans more resilient against the well-documented negative health consequences of the experience of personal-level discrimination. Additionally, social psychology research on the PGDD has primarily focused on psychological well-being (eg, self-esteem and affect), which are relatively malleable. The findings from our study extends this work to other measures of mental health and physical health, and suggests that PGDD is related to these broader health indicators as well.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Hagiwara; Acquisition of data: Hagiwara, Alderson, Mezuk; Data analysis and interpretation: Hagiwara, Mezuk; Manuscript draft: Hagiwara, Alderson; Statistical expertise: Hagiwara, Mezuk; Administrative: Hagiwara, Alderson

References

1. Dover TL, Major B, Kunstman JW, Sawyer PJ. Does unfairness feel different if it can be linked to group membership? Cognitive, affective, behavioral and physiological implications of discrimination and unfairness. *J Exp Soc Psychol*. 2015;56:96-103. http://dx.doi.org/10.1016/j.jesp.2014.09.003.
2. Klonoff EA. Disparities in the provision of medical care: an outcome in search of an explanation. *J Behav Med*. 2009;32(1):48-63. http://dx.doi.org/10.1007/s10865-008-9192-1. PMID:19127421.
3. Landrine HKE, Klonoff EA. The schedule of racist events: A measure of racial discrimination and a study of its negative physical and mental health consequences. *J Black Psychol*. 1996;22(2):144-168. http://dx.doi.org/10.1177/00957984960222002.
4. Sellers RM, Caldwell CH, Schmeelk-Cone KH, Zimmerman MA. Racial identity, racial discrimination, perceived stress, and psychological distress among African American young adults. *J Health Soc Behav*. 2003;44(3):302-317. http://dx.doi.org/10.2307/1519781. PMID:14582310.

5. Berger M, Sarnyai Z. "More than skin deep": stress neurobiology and mental health consequences of racial discrimination. *Stress*. 2015;18(1):1-10. http://dx.doi.org/10.3109/10253890.2014.989204. PMID:25407297.
6. Blascovich J, Mendes WB, Hunter SB, Lickel B, Kowai-Bell N. Perceiver threat in social interactions with stigmatized others. *J Pers Soc Psychol*. 2001;80(2):253-267. http://dx.doi.org/10.1037/0022-3514.80.2.253. PMID:11220444.
7. Guyll M, Matthews KA, Bromberger JT. Discrimination and unfair treatment: relationship to cardiovascular reactivity among African American and European American women. *Health Psychol*. 2001;20(5):315-325. http://dx.doi.org/10.1037/0278-6133.20.5.315. PMID:11570645.
8. Matthews KA, Salomon K, Kenyon K, Zhou F. Unfair treatment, discrimination, and ambulatory blood pressure in black and white adolescents. *Health Psychol*. 2005;24(3):258-265. http://dx.doi.org/10.1037/0278-6133.24.3.258. PMID:15898861.
9. Mendes WB, Major B, McCoy S, Blascovich J. How attributional ambiguity shapes physiological and emotional responses to social rejection and acceptance. *J Pers Soc Psychol*. 2008;94(2):278-291. http://dx.doi.org/10.1037/0022-3514.94.2.278. PMID:18211177.
10. Szanton S, Rifkind J, Mohanty J, et al. Racial Discrimination is associated with a measure of red blood cell oxidative stress: a potential pathway for racial health disparities. *Int J Behav Med.* 2012;19(4):489-495. 10.1007/s12529-011-9188-z.
11. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. *JAMA*. 2007;298(14):1685-1687. http://dx.doi.org/10.1001/jama.298.14.1685. PMID:17925521.
12. DeLongis A, Coyne JC, Dakof G, Folkman S, Lazarus RS. Relationship of daily hassles, uplifts, and major life events to health status. *Health Psychol*. 1982;1(2):119-136. http://dx.doi.org/10.1037/0278-6133.1.2.119.
13. Glaser R, Kiecolt-Glaser JK. Stress-induced immune dysfunction: implications for health. *Nat Rev Immunol*. 2005;5(3):243-251. http://dx.doi.org/10.1038/nri1571. PMID:15738954.
14. Kanner AD, Coyne JC, Schaefer C, Lazarus RS. Comparison of two modes of stress measurement: daily hassles and uplifts versus major life events. *J Behav Med*. 1981;4(1):1-39. http://dx.doi.org/10.1007/BF00844845. PMID:7288876.
15. Lu L. Daily hassles and mental health: a longitudinal study. *Br J Psychol*. 1991;82(Pt 4):441-447. http://dx.doi.org/10.1111/j.2044-8295.1991.tb02411.x. PMID:1782516.
16. Marin M-F, Lord C, Andrews J, et al. Chronic stress, cognitive functioning and mental health. *Neurobiol Learn Mem*. 2011;96(4):583-595. http://dx.doi.org/10.1016/j.nlm.2011.02.016. PMID:21376129.
17. Dolezsar CM, McGrath JJ, Herzig AJM, Miller SB. Perceived racial discrimination and hypertension: a comprehensive systematic review. *Health Psychol*. 2014;33(1):20-34. http://dx.doi.org/10.1037/a0033718. PMID:24417692.
18. Gibbons FX, Etcheverry PE, Stock ML, et al. Exploring the link between racial discrimination and substance use: what mediates? What buffers? *J Pers Soc Psychol*. 2010;99(5):785-801. http://dx.doi.org/10.1037/a0019880. PMID:20677890.
19. Pascoe EA, Smart Richman L. Perceived discrimination and health: a meta-analytic review. *Psychol Bull*. 2009;135(4):531-554. http://dx.doi.org/10.1037/a0016059. PMID:19586161.
20. Schmitt MT, Branscombe NR, Postmes T, Garcia A. The consequences of perceived discrimination for psychological well-being: a meta-analytic review. *Psychol Bull*. 2014;140(4):921-948. http://dx.doi.org/10.1037/a0035754. PMID:24547896.
21. Brondolo E. Racial and ethnic disparities in health: examining the contexts that shape resilience and risk. *Psychosom Med*. 2015;77(1):2-5. http://dx.doi.org/10.1097/PSY.0000000000000149. PMID:25551202.
22. Brondolo E, Gallo LC, Myers HF. Race, racism and health: disparities, mechanisms, and interventions. *J Behav Med*. 2009;32(1):1-8. http://dx.doi.org/10.1007/s10865-008-9190-3. PMID:19089605.
23. Gee GC, Walsemann KM, Brondolo E. A life course perspective on how racism may be related to health inequities. *Am J Public Health*. 2012;102(5):967-974. http://dx.doi.org/10.2105/AJPH.2012.300666. PMID:22420802.
24. Sanders-Phillips K Settles-Reaves B, Walker D, Brownlow J. Social inequality and racial discrimination: risk factors for health disparities in children of color. *Pediatrics.* 2009;124(Suppl 3:S):176-186. 10.1542/peds.2009-1100E.
25. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med*. 2009;32(1):20-47. http://dx.doi.org/10.1007/s10865-008-9185-0. PMID:19030981.
26. Tynes BM, Giang MT, Williams DR, Thompson GN. Online racial discrimination and psychological adjustment among adolescents. *J Adolesc Health*. 2008;43(6):565-569. http://dx.doi.org/10.1016/j.jadohealth.2008.08.021. PMID:19027644.
27. Tynes BM, Umaña-Taylor AJ, Rose CA, Lin J, Anderson CJ. Online racial discrimination and the protective function of ethnic identity and self-esteem for African American adolescents. *Dev Psychol*. 2012;48(2):343-355. http://dx.doi.org/10.1037/a0027032. PMID:22369340.
28. Taylor DMWS, Moghaddam FM, Lalonde RN. The personal/group discrimination discrepancy: perceiving my group, but not myself, to be a target for discrimination. *Pers Soc Psychol Bull*. 1990;16(2):254-262. http://dx.doi.org/10.1177/0146167290162006.
29. Taylor DM, Wright SC, Porter LE. Dimensions of perceived discrimination: The personal/group discrimination discrepancy. In: Zanna MP, Olson JM, eds, *The Psychology of Prejudice: The Ontario Symposium.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc; 1994.
30. Armenta BEHJ, Hunt JS. Responding to societal devaluation: effects of perceived personal and group discrimination on the ethnic group identification and personal self-esteem of Latino/Latina adolescents. *Group Process Intergroup Relat*. 2009;12(1):23-39. http://dx.doi.org/10.1177/1368430208098775.
31. Bourguignon D, Seron E, Yzerbyt V, Herman G. Perceived group and personal discrimination: differential effects on personal self-esteem. *Eur J Soc Psychol*. 2006;36(5):773-789. http://dx.doi.org/10.1002/ejsp.326.
32. Stroebe K, Ellemers N, Barreto M, Mummendey A. For better or for worse: the congruence of personal and group outcomes on targets' responses to discrimination. *Eur J Soc Psychol*. 2009;39(4):576-591. http://dx.doi.org/10.1002/ejsp.557.
33. Hagiwara N, Alderson CJ, McCauley JM. "We get what we deserve": the belief in a just world and its health consequences for Blacks. *J Behav Med*. 2015;38(6):912-921. http://dx.doi.org/10.1007/s10865-015-9652-3. PMID:26123430.
34. Branscombe NR, Schmitt MT, Harvey RD. Perceiving pervasive discrimination among African Americans: implications for group identification and well-being. *J Pers Soc Psychol*. 1999;77(1):135-149. http://dx.doi.org/10.1037/0022-3514.77.1.135.
35. Levin S, Sinclair S, Veniegas RC, Taylor PL. Perceived discrimination in the context of multiple group memberships. *Psychol Sci*. 2002;13(6):557-560. http://dx.doi.org/10.1111/1467-9280.00498. PMID:12430842.
36. Bastos JL, Celeste RK, Faerstein E, Barros AJD. Racial discrimination and health: a systematic review of scales with a focus on their psychometric properties. *Soc Sci Med*. 2010;70(7):1091-1099. http://dx.doi.org/10.1016/j.socscimed.2009.12.020. PMID:20122772.
37. Hagiwara N, Penner LA, Gonzalez R, Albrecht TL. Within-group health disparities among Blacks: the effects of Afrocentric features and unfair treatment. *Cultur Divers Ethnic Minor Psychol*. 2013;19(4):477-

480. http://dx.doi.org/10.1037/a0032566. PMID:23914746.
38. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: findings from community studies. *Am J Public Health*. 2003;93(2):200-208. http://dx.doi.org/10.2105/AJPH.93.2.200. PMID:12554570.
39. Ware JEJ, Kosinski M, Dewey JE, Gandek B. *How to score and interpret single-item health status measures: A manual for users of the SF-8 Health Survey.* Lincoln, RI: QualityMetric Incorporated; 2001.
40. Bost JE, Williams BA, Bottegal MT, Dang Q, Rubio DM. The 8-item Short-Form Health Survey and the physical comfort composite score of the quality of recovery 40-item scale provide the most responsive assessments of pain, physical function, and mental function during the first 4 days after ambulatory knee surgery with regional anesthesia. *Anesth Analg*. 2007;105(6):1693-1700. http://dx.doi.org/10.1213/01.ane.0000287659.14893.65. PMID:18042869.
41. Turner-Bowker DM, Bayliss MS, Ware JE Jr, Kosinski M. Usefulness of the SF-8 Health Survey for comparing the impact of migraine and other conditions. *Qual Life Res*. 2003;12(8):1003-1012. http://dx.doi.org/10.1023/A:1026179517081. PMID:14651418.
42. Borrell LN, Kiefe CI, Williams DR, Diez-Roux AV, Gordon-Larsen P. Self-reported health, perceived racial discrimination, and skin color in African Americans in the CARDIA study. *Soc Sci Med*. 2006;63(6):1415-1427. http://dx.doi.org/10.1016/j.socscimed.2006.04.008. PMID:16750286.
43. Klonoff EA, Landrine H. Cross-validation of the schedule of racist events. *J Black Psychol*. 1999;25(2):231-254. http://dx.doi.org/10.1177/0095798499025002006.
44. Sellers RM, Shelton JN. The role of racial identity in perceived racial discrimination. *J Pers Soc Psychol*. 2003;84(5):1079-1092. http://dx.doi.org/10.1037/0022-3514.84.5.1079. PMID:12757150.
45. Gee GC. A multilevel analysis of the relationship between institutional and individual racial discrimination and health status. *Am J Public Health*. 2002;92(4):615-623. http://dx.doi.org/10.2105/AJPH.92.4.615. PMID:11919062.
46. Williams DR. Race, socioeconomic status, and health. The added effects of racism and discrimination. *Ann N Y Acad Sci*. 1999;896(1):173-188. http://dx.doi.org/10.1111/j.1749-6632.1999.tb08114.x. PMID:10681897.
47. Beckie TM. A systematic review of allostatic load, health, and health disparities. *Biological Research for Nursing*. 2012;14(4):311-346.
48. Doom JR, Gunnar MR. Stress physiology and developmental psychopathology: Past, present, and future. *Development and Psychopathology*. 2013;25(4pt2):1359-1373.
49. Korte SM, Koolhaas JM, Wingfield JC, McEwen BS. The Darwinian concept of stress: benefits of allostasis and costs of allostatic load and the trade-offs in health and disease. *Neurosci Biobehav Rev*. 2005;29(1):3-38. http://dx.doi.org/10.1016/j.neubiorev.2004.08.009. PMID:15652252.
50. Cole SW, Hawkley LC, Arevalo JM, Sung CY, Rose RM, Cacioppo JT. Social regulation of gene expression in human leukocytes. *Genome Biol*. 2007;8(9):R189-R189. http://dx.doi.org/10.1186/gb-2007-8-9-r189. PMID:17854483.
51. Cole SW. Human social genomics. *PLoS Genet*. 2014;10(8):e1004601. http://dx.doi.org/10.1371/journal.pgen.1004601. PMID:25166010.
52. Miller GE, Chen E, Fok AK, et al. Low early-life social class leaves a biological residue manifested by decreased glucocorticoid and increased proinflammatory signaling. *Proc Natl Acad Sci USA*. 2009;106(34):14716-14721. http://dx.doi.org/10.1073/pnas.0902971106. PMID:19617551.
53. Powell ND, Sloan EK, Bailey MT, et al. Social stress up-regulates inflammatory gene expression in the leukocyte transcriptome via β-adrenergic induction of myelopoiesis. *Proc Natl Acad Sci USA*. 2013;110(41):16574-16579. http://dx.doi.org/10.1073/pnas.1310655110. PMID:24062448.
54. Borghol N, Suderman M, McArdle W, et al. Associations with early-life socio-economic position in adult DNA methylation. *Int J Epidemiol*. 2012;41(1):62-74. http://dx.doi.org/10.1093/ije/dyr147. PMID:22422449.
55. de Rooij SR, Costello PM, Veenendaal MVE, et al. Associations between DNA methylation of a glucocorticoid receptor promoter and acute stress responses in a large healthy adult population are largely explained by lifestyle and educational differences. *Psychoneuroendocrinology*. 2012;37(6):782-788. http://dx.doi.org/10.1016/j.psyneuen.2011.09.010. PMID:21978868.
56. Szyf M. The early life environment and the epigenome. *Biochimica et Biophysica Acta (BBA) -. General Subjects.* 2009;1790(9):878-885. http://dx.doi.org/10.1016/j.bbagen.2009.01.009.
57. Yang B-Z, Zhang H, Ge W, et al. Child abuse and epigenetic mechanisms of disease risk. *Am J Prev Med*. 2013;44(2):101-107. http://dx.doi.org/10.1016/j.amepre.2012.10.012. PMID:23332324.
58. Hayman LWJ Jr, Lucas T, Porcerelli JH. Cognitive appraisal vs. exposure-based stress measures: links to perceived mental and physical health in low-income black women. *J Nerv Ment Dis*. 2014;202(11):807-812. http://dx.doi.org/10.1097/NMD.0000000000000198. PMID:25275345.
59. Crocker J, Major B. Social stigma and self-esteem: the self-protective properties of stigma. *Psychol Rev*. 1989;96(4):608-630. http://dx.doi.org/10.1037/0033-295X.96.4.608.
60. Brewin CR, Furnham A. Attributional versus preattributional variables in self-esteem and depression: a comparison and test of learned helplessness theory. *J Pers Soc Psychol*. 1986;50(5):1013-1020. http://dx.doi.org/10.1037/0022-3514.50.5.1013. PMID:3712226.
61. Major B, Quinton WJ, Schmader T. Attributions to discrimination and self-esteem: impact of group identification and situational ambiguity. *J Exp Soc Psychol*. 2003;39(3):220-231. http://dx.doi.org/10.1016/S0022-1031(02)00547-4.
62. Stouffer SA, Suchman EA, Devinney LC, Star SA, Williams Jr RM. *The American Soldier: Adjustment During Army Life. (Studies in Social Psychology in World War II, Vol. 1.).* Oxford, England: Princeton Univ. Press; 1949.
63. Smith HJ, Pettigrew TF, Pippin GM, Bialosiewicz S. Relative deprivation: a theoretical and meta-analytic review. *Pers Soc Psychol Rev*. 2012;16(3):203-232. http://dx.doi.org/10.1177/1088868311430825. PMID:22194251.
64. Aspinwall LG, Taylor SE. Effects of social comparison direction, threat, and self-esteem on affect, self-evaluation, and expected success. *J Pers Soc Psychol*. 1993;64(5):708-722. http://dx.doi.org/10.1037/0022-3514.64.5.708. PMID:8505703.
65. Mussweiler T. Comparison processes in social judgment: mechanisms and consequences. *Psychol Rev*. 2003;110(3):472-489. http://dx.doi.org/10.1037/0033-295X.110.3.472. PMID:12885111.
66. Wills TA. Downward comparison principles in social psychology. *Psychol Bull*. 1981;90(2):245-271. http://dx.doi.org/10.1037/0033-2909.90.2.245.